This document contains a copy of the 2018-19 Penn State Graduate Bulletin as it appeared on August 27, 2018.

To view a current list of changes to the 2018-19 Graduate Bulletin since that date, please visit the Changes to the Graduate Bulletin page.
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GRADUATE

This is the official Graduate Bulletin of The Pennsylvania State University.

The Graduate Council has responsibility for, and authority over, all academic information contained in the Graduate Bulletin.

Each step of the educational process, from admission through graduation, requires continual review and approval by University officials. The University, therefore, reserves the right to change the requirements and regulations contained in this Bulletin and to determine whether a student has satisfactorily met its requirements for admission or graduation, and to reject any applicant for any reason the University determines to be material to the applicant’s qualifications to pursue higher education.
ARCHIVE

Past Bulletins

- 2017-18 Graduate Bulletin (http://bulletins.psu.edu/graduate/archive/graduate-2017-18.pdf)
- 2016-17 Graduate Bulletin (http://bulletins.psu.edu/graduate/archive/graduate-2016-17.pdf)
- 2014-15 Graduate Bulletin (http://bulletins.psu.edu/graduate/archive/graduate-2014-15.pdf)
- 2013-14 Graduate Bulletin (http://bulletins.psu.edu/graduate/archive/graduate-2013-14.pdf)
- 2012-13 Graduate Bulletin (http://bulletins.psu.edu/graduate/archive/graduate-2012-13.pdf)
- 2011-12 Graduate Bulletin (http://bulletins.psu.edu/graduate/archive/graduate-2011-12.pdf)
- 2010-11 Graduate Bulletin (http://bulletins.psu.edu/graduate/archive/graduate-2010-11.pdf)
- 2009-10 Graduate Bulletin (http://bulletins.psu.edu/graduate/archive/graduate-2009-10.pdf)
The Graduate School at Penn State is one of the largest in the nation with more than 14,000 graduate students enrolled at Penn State Erie, The Behrend College; Penn State Great Valley School of Graduate Professional Studies; Penn State Harrisburg, The Capital College; Penn State College of Medicine at the Penn State Hershey Medical Center; Penn State University Park; and Penn State World Campus.

Penn State Graduate Campuses Include:

Erie
Penn State Erie, The Behrend College, gives undergraduate and graduate students the best of two worlds: the friendly, student-centered environment of a smaller college with the academic resources of a major research university. We offer an academically rigorous, globally respected Penn State education in a setting where students can have close interaction with faculty and meaningful out-of-classroom experiences. With more than 4,500 undergraduate and graduate students, 80-plus academic programs, and an inspiring 854-acre campus, Penn State Behrend is among the largest campuses in the Penn State system.

SEE ALL PROGRAMS OFFERED AT THE ERIE CAMPUS (http://bulletins.psu.edu/grad-med-law-programs/#filter=filter_9)

Great Valley
For over 50 years, Penn State Great Valley has been dedicated to providing high-quality educational programs to professionals in southeastern Pennsylvania. Located in Malvern, the campus offers graduate degrees and certificates in accounting, business, data analytics, engineering, finance, and leadership in addition to a variety of noncredit professional development programs. Evening and hybrid courses are held in a flexible, seven week format, allowing students to meet the demands of work, family, and life in general.

SEE ALL PROGRAMS OFFERED AT THE GREAT VALLEY CAMPUS (http://bulletins.psu.edu/grad-med-law-programs/#filter=filter_10)

Harrisburg
Penn State Harrisburg is an undergraduate college and graduate school of the University. The Harrisburg campus enrolls nearly 800 graduate students and offers more than 40 graduate programs, including master’s and doctoral degrees and graduate and postbaccalaureate certificates. The college has nationally accredited programs, award-winning faculty who are accomplished teachers and scholars, and the resources of a world-class research university. Penn State Harrisburg is located on a suburban campus in Middletown, Pennsylvania, eight miles east of Harrisburg.

SEE ALL PROGRAMS OFFERED AT THE HARRISBURG CAMPUS (http://bulletins.psu.edu/grad-med-law-programs/#filter=filter_11)

Hershey
At Penn State College of Medicine we are committed to educating graduate students in basic medical sciences and others in public health-related professions. We seek to enroll students of exceptional quality, and provide them with a rigorous education and research environment allowing them to develop the skills necessary to be future leaders in their field.

Graduate Programs at the Penn State College of Medicine permit students to choose their dissertation adviser and committee members from the approximately 150 faculty members of the Program who represent more than 20 basic science and clinical departments. Research interests of Program faculty members are wide-ranging in both scientific disciplines and specific research interests. Graduate students benefit from the opportunity to tailor both their coursework and research to align closely with their particular interests. The objective of Graduate Programs at Penn State College of Medicine is to train individuals for advanced professional careers in the Biomedical Sciences, Neuroscience, Anatomy, Public Health Sciences and related fields.

SEE ALL PROGRAMS OFFERED AT THE HERSHEY CAMPUS (http://bulletins.psu.edu/grad-med-law-programs/#filter=filter_12)

University Park
University Park is Penn State's largest campus, with a diverse graduate population of more than 5,000 master’s and Ph.D. students.

SEE ALL PROGRAMS OFFERED AT THE UNIVERSITY PARK CAMPUS (http://bulletins.psu.edu/grad-med-law-programs/#filter=filter_13)

World Campus
Penn State World Campus is the online campus of Penn State. It enrolls more than 5,000 graduate students in degree and certificate programs offered by Penn State's academic units and colleges. World Campus offers its students a full array of services, including orientation, academic advising, career counseling resources, technical support, and tutorials.

SEE ALL PROGRAMS OFFERED AT THE WORLD CAMPUS (http://bulletins.psu.edu/grad-med-law-programs/#filter=filter_14)
COLLEGES AND ENROLLMENT UNITS

All graduate degree programs at Penn State are academically organized under one graduate college, The Graduate School, but with the graduate faculty located in, and graduate courses and graduate degree programs offered by the academic colleges that are generally organized around their subject matter. Some graduate programs may cross departments, colleges and even campuses, and such programs are called Intercollege Graduate Degree Programs, with many academically housed in the Graduate School and others housed in specific colleges or academic units. The colleges and enrollment units listed below offer graduate programs.

- Agricultural Sciences
- Arts and Architecture
- Donald P. Bellisario College of Communications
- Earth and Mineral Sciences
- Eberly College of Science
- Education
- Engineering
- Health and Human Development
- Information Sciences and Technology
- Intercollege
- International Affairs
- Liberal Arts
- Medicine
- Nursing
- Penn State Erie, The Behrend College
- Penn State Great Valley
- Penn State Harrisburg, The Capital College
- Smeal College of Business

Agricultural Sciences

About the College

Richard Roush, Dean, College of Agricultural Sciences

The College of Agricultural Sciences (CAS) was the first college established at Penn State and awarded the nation's first baccalaureate degrees in agriculture in 1861. Students can earn degrees related to animal and plant sciences; ecosystems and the environment; food and fuel; human and veterinary health and medicine; business, government, and nonprofits; teaching and extension; engineering; and more. The CAS is home to nine academic units with eighteen graduate programs and participates in eleven Intercollege Graduate Degree Programs (IGDP) and ten Dual-Title degree programs. The CAS had research expenditures in excess of $112.8 million and faculty received over $103.7 million in grants and contracts awarded in fiscal year 2017. Graduate students have received numerous fellowships and awards from both federal and state agencies and other private foundations. More than one-third of masters' degree recipients go into government or public-sector jobs, another third in industry or private sector positions, and the remainder continue their graduate education. More than half of doctoral degree recipients go into academia, one-third enter industry or the private sector, and the remainder work in government or public-sector positions.

Mission and Goals

The mission of Penn State's College of Agricultural Sciences is to discover, integrate, translate, and disseminate knowledge to enhance the food and agricultural system, natural resources and environmental stewardship, and economic and social well-being, thereby improving the lives of people in Pennsylvania, the nation, and the world. Our goal is to assert leadership and foster innovation through organizational improvement and change. By strategic investment of resources, we aim to address the changing needs of the Commonwealth.

Departments and Schools

Department of Agricultural and Biological Engineering

Founded in 1930, the Department of Agricultural and Biological Engineering in Penn State's Colleges of Agricultural Sciences and Engineering, provides high quality engineering education, research, and outreach. Our mission is to advance the engineering sciences, business, and technical management of biological and agricultural systems by promoting scholarship and engaging our students and stakeholders.

The Department of Agricultural and Biological Engineering offers two graduate programs: Agricultural and Biological Engineering and Bio Renewable Systems.

The Agricultural and Biological Engineering graduate program helps prepare students for careers involving the application of engineering principles to agricultural and biological production systems, processing systems, and conservation of land and water resources. The curriculum covers all areas of biological engineering, including development of machines for biological processing and agriculture, postharvest handling and processing of natural resource management and utilization, biological processes, food engineering, and structures and their environmental modifications.

The Bio Renewable Systems graduate program integrates science and technology with business (marketing, management, entrepreneurship, and leadership) for bio-based products/materials and their supply chains; provides an alternative high-quality graduate degree program for students without an engineering undergraduate degree; and prepares graduates to lead the development and advancement of the growing bio-based economy in key industry sectors: bio-based fuels, energy, chemicals, plastics, and packaging; pharmaceuticals; and cosmetics.

Department of Agricultural Economics, Sociology, and Education

The scholarship in AESE is related to people, society, and economic systems grounded in theory and methods from the social, behavioral and economic sciences. We develop and employ approaches to discover fundamental and applied principles that advance science and improve the health, prosperity and welfare of people in Pennsylvania and beyond.

The Department of Agricultural Economics, Sociology, and Education has five graduate programs: Energy, Environmental, and Food Economics, Rural Sociology, Agricultural and Extension Education, Applied Youth, Family, and Community Education, and Community and Economic Development.

The Energy, Environmental, and Food Economics (EEFE) is a unique intercollege graduate degree program providing state-of-the-art training in economics and quantitative methods as applied to the energy economics, policy and systems, natural resources and the environment, and food industrial organization.
The Rural Sociology program provides students with the highest quality educational and research experiences in rural sociology. Graduates of the program have gone on to launch highly successful careers in academe, in government, and in non-governmental research organizations.

The Agricultural and Extension Education program offers the following core areas of study: Educational Processes, Leadership Development and Communications, Program Development, and Research.

The Applied Youth, Family, and Community Education focuses on educational programming for youth and families within communities. The curriculum prepares students to assume leadership roles in educational and human services organizations.

The Community and Economic Development program provides individuals with the knowledge and skills to work with citizens and leaders to establish and maintain viable communities and community organizations.

**Department of Animal Science**

The Department of Dairy and Animal Science originated in 1887, when Henry Armsby became director of the Agricultural Experiment Station. Today the department encompasses all food production animals and companion animals. We offer world-class teaching, research, and extension programs in a variety of key areas in animal agriculture and the food system.

The Department of Animal Science has one graduate program which specializes in animal management, breeding and genomics, growth and development biology, meat science, nutrition, and nutritional, lactational and reproductive physiology.

**Department of Ecosystem Science and Management**

The Department of Ecosystem Science and Management is Pennsylvania’s leader in preparing students for careers in sustainable management of natural resources. We conduct research to create new knowledge about forests, wildlife and fisheries, soils, and watersheds, and disseminate that knowledge through the classroom and extension education programs serving various stakeholders. The Department of Ecosystem Science and Management offers three graduate programs: Forest Resources, Soil Science, and Wildlife and Fisheries Science.

The Forest Resources program addresses one or more of the following areas in forestry: forest resource management, forest biology, environmental concerns, and wood products.

The Soil Science program provides opportunities for candidates interested in soil and related water resources to become a professional leader and an independent scholar.

The Wildlife and Fisheries program focuses on habitat evaluation, ecology and management of game and nongame wildlife, animal damage control, urban wildlife, wildlife responses to altered ecosystems, conservation biology, fish systematics, fisheries management, ichthyology, fish behavior and ecology, freshwater ecology, aquaculture, landscape ecology, terrestrial and wetland ecosystems.

**Department of Entomology**

The diverse members of the Department of Entomology investigate fundamental and applied biological questions from the level of the molecule to population and community. The Department of Entomology offers one graduate program that is committed to conduct outstanding research on insect science that will improve human health, quality of life, and the sustainability of our food and ecosystems.

**Department of Food Science**

The Department of Food Science at Penn State is one of the premier food science departments in the country. Our undergraduate food science major offers students hands-on science dealing with real-world applications; small, friendly atmosphere; world-class internship experiences; excellent scholarship opportunities, and near-100% job placement. The graduate program in the Department of Food Science delivers in-depth training in the core disciplines of food chemistry, food microbiology, food engineering and processing. There are also opportunities for students interested in nutrition education studies.

**Department of Plant Pathology and Environmental Microbiology**

The Department of Plant Pathology provides students with top-ranked educational and research opportunities in a collegial and friendly atmosphere. A major goal of our department is to support growth of healthy plants to beautify our living spaces, sustain our food supply, and maintain an inhabitable ecosystem. The graduate program in the Department of Plant Pathology encompasses many diverse and related sciences including microbiology, microbial ecology, plant disease epidemiology, molecular biology, genetics, and associated plant sciences.

**Department of Plant Science**

The Department of Plant Sciences encompasses horticulture, agronomy and crops and soils sciences. Our mission is to enhance our understanding and management of agronomic and horticultural crops and managed landscapes that are the foundation for managed ecosystems, food and fiber production, landscapes and environmental quality to enhance human environments. The Department of Plant Sciences offers two residential graduate programs, Agronomy and Horticulture and one online program, Turfgrass Management.

The Agronomy graduate program emphasizes research that increases the efficiency of production of agronomic crops; improves the quality of food, feed, and fiber; assists in the use and development of land resources; develops an understanding of the basic plant-animal climate complex; and improves the overall quality of the human environment.

The Horticulture graduate program allows students to perform their research in the department’s state-of-the-art research locations on- and off-campus, including cutting-edge laboratories, greenhouses, research farms, and our own functional campus green roofs with an emphasis on ecology of agricultural ecosystems, landscape horticulture, marketing and production of horticultural crops, molecular biology, plant genetics and breeding, plant nutrition, and plant physiology.

In the Turfgrass online graduate program students learn business concepts, personnel management theories, and how to manage the day-to-day challenges of running a turfgrass facility through the Master of Professional Studies (MPS) in Turfgrass Management.

**Department of Veterinary and Biomedical Sciences**

The Department of Veterinary and Biomedical Sciences at Penn State achieves excellence in research, teaching, and outreach in biomedical sciences and veterinary medicine. Our Department offers three undergraduate degrees at Penn State: Immunology and Infectious Disease, Toxicology, and Veterinary and Biomedical Sciences. The Department of Veterinary and Biomedical Sciences offers one graduate program in Pathobiology which seeks to understand the molecular basis
of human and animal disease with a focus on immunology, toxicology, and infectious disease.

Resources

Career Services and Experiential Learning

Students in the College of Agricultural Sciences are encouraged to seek out opportunities that will enrich their academic experience, outside of the classroom. The College of Agricultural Sciences offers programs and support for career readiness, including internship and job placement, undergraduate research opportunities, and professional growth and development.

Study Abroad

Where will your education take you? The college offers an array of international experiences aligned with your interests. Global experience broadens your horizons, giving you a deeper understanding of what you learn, prepares you professionally, and changes how you see the world. Visit our website for courses, programs, funding, and more!

The Office of International Programs offers many resources for graduate students interested in international research or study. Programs such as the Tag Along Fund provide opportunities for students to join their advisors on international trips. Students are also encouraged to submit proposals for travel related to individual research projects, which are considered on a case-by-case basis. Finally, the department houses the INTAD Dual Title Degree program, which enables students to earn a degree in International Agriculture and Development (INTAD) concurrently with many majors offered by the College.

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GradEd@psu.edu

Arts and Architecture

About the College

Barbara O. Komer, Dean, College of Arts and Architecture

The College of Arts and Architecture at Penn State is a comprehensive arts community including academic programs in music, theatre, visual arts, art history, architecture, landscape architecture, and graphic design. The college is committed to artistic and scholarly creativity, research, and the preparation of specialized practitioners in all of the arts and design disciplines. As the administrative home of the Center for the Performing Arts, Palmer Museum of Art, Penn State Centre Stage, and Penn's Woods Music Festival, the college serves as a premier cultural destination in central Pennsylvania, offering numerous opportunities for community engagement along with its academic programs.

Research centers at both the academic unit and college level provide opportunities for graduate students to work closely with faculty and other scholars. The College of Arts and Architecture is proud of its close-knit community where students experience the best of both worlds—small class sizes, with all the resources of a Big 10 university. It is a dynamic and vibrant place, propelling the energy and initiative of students like you.

MORE INFORMATION ABOUT THE COLLEGE (https://artsandarchitecture.psu.edu/about)

Mission and Goals

The College of Arts and Architecture is committed to providing the highest quality training for artists, designers, scholars, teachers, and arts professionals, and to advancing research and creative activity in our disciplines. Our goals are to create transformative experiences for students; maximize visibility of the arts and design at Penn State; engage communities through research, curricula, and arts presentation; and lead in technology in the arts and design.

MORE INFORMATION (https://artsandarchitecture.psu.edu/about/strategic-plan)

Accreditation

Our schools and programs are accredited by the top bodies in their fields, including the National Architectural Accrediting Board (NAAB), the National Association of Schools of Art and Design (NASAD), the Landscape Architecture Accreditation Board (LAAB), National Association of Schools of Music (NASM), National Association of Schools of Theatre (NAST), National Council for Accreditation of Teacher Education (NCATE), and more.

Departments and Schools

Department of Art History

The Department of Art History offers lecture/discussion courses and seminars on a broad range of topics, from ancient to contemporary art and architecture in Europe, the Americas, Asia, Africa, and Oceania. Courses are also offered in museum studies, historiography, iconology, criticism, connoisseurship, and research methods. The department maintains a close relationship with the Palmer Museum of Art through courses in museum studies, assistantships, and other hands-on experiences for students. Graduate degrees offered include the M.A. and Ph.D.

MORE INFORMATION (http://arthistory.psu.edu)

School of Music

With approximately 325 students enrolled, the School of Music offers degrees that help develop students as performers, teachers, and scholars. The school hosts nearly 400 public events each year, providing students with ample opportunities to perform, from small chamber groups to large ensembles. Graduate degrees offered include the M.A. (musicology, music theory, and music theory/history), M.Mus. (composition/theory, conducting, performance, and pedagogy/performance), M.F.A. (voice pedagogy for musical theatre), D.M.A. (piano performance), and M.M.E. and Ph.D. (music education).

MORE INFORMATION (http://music.psu.edu)

H. Campbell and Eleanor R. Stuckeman School of Architecture and Landscape Architecture

The Stuckeman School is home to the departments of Architecture and Landscape Architecture, and the Graphic Design program.

MORE INFORMATION (http://stuckeman.psu.edu)
Department of Architecture
The architecture department offers focused opportunities for inquiry, research, and study in key areas of culture, space, and society; design computing; material matters; and sustainability. Graduate degrees offered include the M.S. and Ph.D. in architecture, dual-title M.S. and Ph.D. in architecture and human dimensions of natural resources and the environment (HDNRE), and the professional Master of Architecture.

MORE INFORMATION (http://stuckeman.psu.edu/arc)

Department of Landscape Architecture
The landscape architecture program is consistently ranked among the best in the country. The department is guided by its bold mission: Great work grounded in commitment to environmental and social good. Degrees offered include the M.L.A. (Master of Landscape Architecture), M.S. in landscape architecture, and M.P.S. (Master of Professional Studies) and graduate certification in geodesign.

MORE INFORMATION (http://stuckeman.psu.edu/larch)

Graphic Design
The graphic design program offers a close-knit community and individualized instruction through small class sizes. Graduates of the graphic design program hold leadership positions in design studios, advertising agencies, and corporate in-house design offices throughout the United States and abroad. The M.F.A. degree is offered for graphic design students interested in pursuing a master's degree.

MORE INFORMATION (http://stuckeman.psu.edu/gd)

School of Theatre
The School of Theatre offers undergraduate degrees in acting, musical theatre, design and technology, stage management, and theatre studies, and graduate degrees in design and technology, directing and music directing, and voice pedagogy. Students study, perform, and produce classics, musicals, and new and devised theatre works, while developing skills that will help them sustain full lives and careers in theatre. The school offers the M.F.A. in design and technology, directing, and voice pedagogy for musical theatre, music directing for musical theatre, and voice pedagogy for musical theatre.

MORE INFORMATION (http://theatre.psu.edu)

School of Visual Arts
The School of Visual Arts (SoVA) offers degree programs in three areas of study: studio art, art education, and digital arts and design. SoVA's visual arts and design programs offer students opportunities to respond imaginatively to social and cultural change through exploration, expression, and communication in visual art and design forms. Graduate degrees include the M.F.A., M.P.S. (Master of Professional Studies) in art education, and M.S. and Ph.D. dual degrees in art education and women’s, gender, and sexuality studies.

MORE INFORMATION (http://sova.psu.edu)

Resources

International Programs
International study goes hand-in-hand with study of the arts and design. The college is committed to providing international education opportunities. We work closely with Global Penn State to offer full semester and summer experiences all over the world.

MORE INFORMATION (https://artsandarchitecture.psu.edu/students/current/study_abroad)

Multicultural Programs
The arts and design fields have always valued diversity and inclusion, and our college is no different. We are committed to developing and maintaining a student body, faculty, and staff that represent our diverse society. Learn more about how we create space where all individuals are valued on our college website.

MORE INFORMATION (https://artsandarchitecture.psu.edu/students/multicultural)

University and College Awards
We want the best possible student candidates from our college to be considered for college and University-level awards. There are a number of awards in research, service, leadership, and performance—a full listing is on our college website.

MORE INFORMATION (https://artsandarchitecture.psu.edu/aa-awards)

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COLLEGE OF ARTS AND ARCHITECTURE
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https://artsandarchitecture.psu.edu

Donald P. Bellisario College of Communications

About the College
Marie Hardin, Dean, Donald P. Bellisario College of Communications

The Donald P. Bellisario College of Communications provides the opportunities and resources of a large university with the personalized feel and support of a small school. As the largest accredited program of its kind in the nation, students can find numerous opportunities to fit in and succeed. The Bellisario College uses a proven approach to help students prepare for success. An emphasis on the combination of classroom instruction, campus media opportunities and career preparation represents the core of our educational philosophy. Faculty members blend strong academic and professional backgrounds and possess a commitment to excellence in teaching. In skills classes and internships, students use state-of-the-art technology to gain hands-on experience on their way to becoming the next generation of great digital storytellers.

The Donald P. Bellisario College of Communications offers an M.A. (Master of Arts) in media studies, a joint degree offering with Penn State Law (J.D./M.A.), an integrated B.A./M.A. in media studies, an M.P.S. (Master of Professional Studies) in strategic communications, and Ph.D. in mass communications. As graduate programs that use the resources of the entire Bellisario College, our curriculum allows students to design

MORE INFORMATION (https://artsandarchitecture.psu.edu/students/multicultural)
a program of study tailored to their interests, choosing from an array of classes each semester that explore theory and cutting-edge research methods in mass communication.

MORE INFORMATION ABOUT THE COLLEGE (http://bellisario.psu.edu/about)

**Mission and Goals**

The mission of the Donald P. Bellisario College of Communications is to prepare students to take their place in an information-rich society and in the professions as active, critical and ethical participants. We promote effective, responsible use of communications media and technologies by individuals, organizations, industries and government.

Offering both a thesis and non-thesis option, the M.A. program prepares students for doctoral study in mass communications and for professional positions in business and government requiring a comprehensive understanding of the historical, social and political implications of the media in society and advanced research skills to critically evaluate the processes and effects of the media. Students graduating from this program will be especially well qualified to organize research projects, to critically evaluate research reports and to directly influence mass media practices by the application of research findings.

For academically qualified students enrolled in a Bachelor of Arts program in the College of Communications, there is the opportunity to earn both the B.A. and the M.A. upon completion of five years of study. The Integrated Undergraduate-Graduate (I.U.G.) Program in Media Studies facilitates the advanced study of communications research and thesis development through a carefully organized selection of undergraduate courses, graduate seminars, and directed research projects. The program accelerates and enhances undergraduate students’ appreciation for graduate level scholarship by involving them in the seminars, research activities, and the scholarly discourse of the college’s community of master’s- and doctoral-level scholars.

Penn State Law (PSL) and the Donald P. Bellisario College of Communications (COMM) offer a joint degree program leading to a Juris Doctor (J.D.) and a Master of Arts (M.A.) in Media Studies. In combining the J.D. in the School of Law with an M.A. in Media Studies, enrolled students would earn the two degrees in less time than taking them separately, and would integrate the credentials of the two degrees as well as the research skills and media-specific knowledge in the College of Communications with the legal expertise offered by a J.D. in the Penn State Law. The program will credential students who wish to pursue legal careers in media law or in areas of law in which media and/or communication industries are a significant component in a field related to legal aspects of the media and communications industries.

The online M.P.S. in Strategic Communications explores the importance of messaging. In this 30-credit degree program, you will learn the methods and practices used to conduct effective research in examining practical and theoretical questions in strategic communications. Course material in collecting, analyzing, and utilizing audience data for practical and theoretical questions in strategic communications.

The Ph.D. program in Mass Communications preparea graduates for entry into college and university teaching and research and for a variety of communications-related professions. Doctoral education in the Bellisario College of Communications is committee-driven and highly flexible and emphasizes the cultivation of research skills leading to the development and implementation of innovative and impactful research on mediated communication.

MORE INFORMATION (http://bellisario.psu.edu/about/plans-reports)

**Accreditation**

The Donald P. Bellisario College of Communications is evaluated regularly by the Accrediting Council on Education in Journalism and Mass Communications and has consistently met the high standards of the Council. For undergraduate students, accreditation most practically means that most upper-level professional classes are small, the College uses the latest in technology, and provides outstanding student service.

MORE INFORMATION (http://www.ajemc.org)

**Departments and Schools**

The M.A., I.U.G., J.D./M.A. and Ph.D. in the Bellisario College of Communications draw from the faculty of all four departments. The M.P.S. in strategic communications is housed in the Department of Advertising and Public Relations.

**Department of Advertising/Public Relations**

Faculty in this department research the effectiveness and social implications of strategic communication, from both quantitative and qualitative perspectives. The M.P.S. in strategic communications is housed in this department and faculty also contribute to the other graduate programs in the College.

MORE INFORMATION (http://bellisario.psu.edu/adpr)

**Department of Film-Video and Media Studies**

Emphasizing social science-based media effects, critical-cultural perspectives, and film studies, faculty in this department focus their research on media’s role in individual well-being, society and culture. Faculty in this program contribute to college level graduate degree programs.

MORE INFORMATION (http://bellisario.psu.edu/fvms)

**Department of Journalism**

Journalism is a vital institution for a democracy. Faculty in this department study the historical, legal, professional and ethical implications of journalism. Journalism faculty contribute to all of the college level graduate degree programs the College offers.

MORE INFORMATION (http://bellisario.psu.edu/journ)

**Department of Telecommunications**

Focusing on a variety of electronic media, including radio and TV, cable and satellite, the internet, and wired and mobile technologies, faculty in Telecommunications research such media from policy, economic, technological and managerial perspectives Faculty contribute to all college level graduate degree programs.

MORE INFORMATION (http://bellisario.psu.edu/departments/department-of-telecommunications)

**Resources**

**Research Centers**

The Bellisario College of Communications houses several research centers that richly contribute to the graduate students’ experience and offer support as students advance through their program of study. These

Office of Academic Services
A dedicated, eight-person staff supports students through scheduled appointments, drop-in hours and a variety of support services. At the graduate level, typically I.U.G. student utilize this resource.
MORE INFORMATION (http://bellisario.psu.edu/current/advising)

Office of Internships and Career Services
Graduate students are encouraged to use the resources provided by this office. The office conducts two job fairs and offers additional support through resume workshops, mock interviews and “career conversations” with alumni who return to campus.
MORE INFORMATION (http://bellisario.psu.edu/career-services-and-internships)

Office of Diversity and Inclusion
The Office of Diversity and Inclusion strives to make the Bellisario College a comfortable, welcoming home for all students, staff and faculty. This office assists in acclimating graduate students new to Penn State to navigate Penn State infrastructure, while also providing additional insight and perspective on the State College area. Professional and career guidance is also offered.
MORE INFORMATION ABOUT THE OFFICE OF DIVERSITY AND INCLUSION (http://bellisario.psu.edu/current/diversity)
MORE INFORMATION ABOUT BELLISARIO COLLEGE ALUMNI (http://bellisario.psu.edu/alumni)

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http://bellisario.psu.edu

Earth and Mineral Sciences
About the College
Lee Kump, Dean, College of Earth and Mineral Sciences

For more than a century, Penn State’s College of Earth and Mineral Sciences has been a beacon of intellectual leadership on issues of utmost importance to the welfare of the Commonwealth, the nation, and beyond. The college is creating tomorrow’s leaders in Earth, energy, and materials sciences and engineering and plays an important role in preparing a diverse and talented workforce, as well as providing new knowledge that will drive the economic vitality of the state and the nation. With its top ranked programs and five academic departments, the college provides a comprehensive, high-quality education and is at the forefront of both innovative teaching and path-breaking research focused on meeting the needs of our global society.

Distinguished researchers and educators at the cutting edge of their disciplines are dedicated to supporting hands-on learning and research that provides each student with invaluable, experiential knowledge.
MORE INFORMATION ABOUT THE COLLEGE (https://www.ems.psu.edu/about)

Mission and Goals
By building on its reputation for scientific leadership in the earth, energy, and materials sciences and engineering, the College of Earth and Mineral Sciences’ mission is to develop new discoveries about how the Earth’s systems interact with one another and with people and their institutions and to use the knowledge gained from those discoveries to inspire students to become new generations of leaders.
MORE INFORMATION (https://www.ems.psu.edu/about/who-we-are/mission-vision-and-strategic-plan)

Departments and Schools
John and Willie Leone Family Department of Energy and Mineral Engineering

The John and Willie Leone Family Department of Energy and Mineral Engineering offers academic programs addressing scientific, technological, business, and social challenges related to energy and earth resources and systems. The EME undergraduate B.S. majors address the effective production, conversion, use, and management of energy and mineral resources and include Energy Business and Finance (EBF), Energy Engineering (ENENG), Environmental Systems Engineering (ENVSE), Mining Engineering (MNGE), and Petroleum and Natural Gas Engineering (PNGE). The EME graduate program offers advanced degrees in Energy and Mineral Engineering (M.S. and Ph.D.) with research concentration options in energy system engineering (E SysE), fuel science (FSC), mining and mineral process engineering (MMPE), and petroleum and natural gas engineering (PNGE). The B.A. degree in Energy and Sustainability Policy (ESP) and graduate certificates and associated M.S in Renewable Energy and Sustainability Systems (RESS) complement our programs by integrating areas of study in energy security, sustainability management, renewable energy, foreign and domestic energy and sustainability policy analysis. The EME graduate program also offers integrated undergraduate-graduate (IUG) degree programs that combine the M.S. in Energy and Mineral Engineering with each of the five B.S. degree programs.
MORE INFORMATION (http://www.eme.psu.edu)

Department of Geography
The Department of Geography offers academic programs (M.S., M.G.I.S., Ph.D. in Geography) that conducts theoretical and applied research in all four major subfields of geography: human, physical, environment and society, and GIScience. Across these subfields we emphasize the geography of global change. Our perspectives span local to global levels across spatial and temporal scales. Addressing these components of global change, we also advance geographical information science and technology needed to use new spatial data generated
from combinations of specialized sensors and the Internet of things. Research and specialization clusters include: Environmental Change and Prediction; Food Security and Human Health; Geospatial Big Data Analytics; Justice, Ethics, and Diversity; Population, Environment, and Governance; Spatial Modeling and Remote Sensing. The department also offers online certificate and master’s degree programs in Geographic Information Systems (GIS), Remote Sensing and Earth Observation (RS), and Geospatial Intelligence (GEOINT).

MORE INFORMATION (http://www.geog.psu.edu)

Department of Geosciences
The Department of Geosciences offers M.S. and Ph.D. degrees in geosciences, dual titles in Astrobiology and Biogeochemistry, and an M.Ed. in Earth sciences all designed to provide students with an integrated, interdisciplinary study of the whole Earth, afford them with the skills and knowledge needed to solve real-world problems, and prepare them for careers at the forefront of geosciences.

MORE INFORMATION (http://www.geosc.psu.edu)

Department of Meteorology and Atmospheric Science
The Department of Meteorology and Atmospheric Science offers academic programs (M.S., Ph.D. in Meteorology and Atmospheric Science; dual-title Ph.D. in Climate Science; dual-title Ph.D. in Astrobiology) that explore fundamental aspects of cloud physics, turbulence, numerical weather prediction, climate change, weather risk, atmospheric chemistry, atmospheric convection, and atmospheric dynamics on a range of scales using theory, observations, and numerical simulations.

MORE INFORMATION (http://www.met.psu.edu)

Resources
Office of Educational Equity
Diversity among students and faculty is a top priority for the College of Earth and Mineral Sciences and the Office of Educational Equity takes an active role in promoting respect and embracing diversity and inclusion in the college.

MORE INFORMATION (https://www.ems.psu.edu/undergraduate/beyond-classroom/diversity-programs)

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https://www.ems.psu.edu/graduate

Eberly College of Science
About the College
Douglas R. Cavener, Verne M. Willaman Dean, Eberly College of Science

The Eberly College of Science provides instruction and research opportunities in the biological, mathematical, physical and interdisciplinary sciences. The college offers undergraduates sixteen majors that lead to the B.S. degree, with several options, and Mathematics can lead to either the B.S. or B.A. degree. Fourteen minors for undergraduates that can broaden their learning are also offered. The college strives to provide students with the knowledge and experiences that will enable them to be scientifically-trained leaders and innovators who advance the frontiers of science and make a difference in the world. Our faculty, staff, and students work together to learn, create, and apply knowledge in the basic sciences. Graduates of our programs use their strong foundation and critical thinking skills in a wide range of careers. Many graduates continue their education in graduate or professional schools, while others choose from a variety of careers in industry, government, or education.

MORE INFORMATION ABOUT THE COLLEGE (http://science.psu.edu)

Mission and Goals
The mission of the college is to improve society and address global challenges through excellence in science education and research. We train tomorrow's scientific leaders and innovators, and provide rich science education for all Penn State students. We enhance public understanding of science by sharing our knowledge and discoveries with the people of the Commonwealth, nation, and world. We make discoveries that expand fundamental knowledge in science, and are applied to solve real-world challenges.

MORE INFORMATION (http://science.psu.edu/about/college-vision-mission-and-goals)

Departments and Schools
Department of Astronomy and Astrophysics
The Department of Astronomy & Astrophysics seeks to expand our knowledge of the universe through undergraduate and graduate education, research, and public outreach. Students are active and vital#participants#in the research programs conducted in the department, providing important training for progression into graduate education. In addition, with its depth and breadth in research opportunities, the department offers pathways to#careers#in research and teaching in astronomy and related fields. The Department is involved in a wide variety of observational, experimental,#and theoretical projects that cover most active areas of astrophysical research.#The Department also has an extensive program of public outreach that#promotes science including public lectures, workshops, planetarium shows, and public open houses.

MORE INFORMATION (http://astro.psu.edu)
Department of Biochemistry and Molecular Biology
The Department of Biochemistry and Molecular Biology (BMB) is enthusiastically engaged in basic research to probe fundamental principles of the behaviors of molecules and cells, the organization of biological systems, and promoting applied research to identify scientific solutions to pressing problems in areas such as cancer, bacterial and viral pathogenesis, antibiotic resistance, and energy production. BMB is dedicated to educating the next generation of scientists, and is the departmental home to students from four undergraduate majors: Biochemistry and Molecular Biology, Microbiology, Biotechnology, and Forensic Science. BMB also trains Ph.D. students in the Biochemistry, Microbiology and Molecular Biology Program, and Master’s degree programs in Biotechnology and Forensic Science.
MORE INFORMATION (http://bmb.psu.edu)

Department of Biology
The Department of Biology is internationally recognized in teaching and research in the biological sciences. The research and instructional mission of the department spans ecology to molecular biology, and represents the most diverse program in the biological and life sciences at Penn State. Over the past 35 years more than 6,000 students have earned bachelors degrees in Biology from Penn State, and over 400 graduate students have earned advanced degrees with Biology faculty members. Departmental students, faculty, and alumni contribute to the welfare of our society through their activities including education, public health and services, business, and basic and applied research.
MORE INFORMATION (http://bio.psu.edu/undergraduate-portal)

Department of Chemistry
The Department of Chemistry is a leader in many significant areas of chemistry research and discovery, including materials chemistry, life sciences and nanoscience. The department has nationally acclaimed strengths in faculty research, graduate and undergraduate education. With a dedicated staff and state-of-the-art research support facilities, Penn State Chemistry is an excellent place to work, study or pursue your love of research. The department is dedicated to a core set of values: excellence in teaching and research, respect for all members of the Department and University, diversity in our students, faculty and staff, and service to the citizens of the world.
MORE INFORMATION (http://chem.psu.edu)

Department of Mathematics
The Mathematics Department is a thriving research and teaching community of faculty, undergraduate and graduate students, and postdoctoral researchers. The department is committed to excellence in mathematics instruction for all Penn State undergraduates, and houses the Mathematics bachelors, masters, and doctoral degrees. The Department is housed in the McAllister Building on the University Park Campus, and it is one of the few in the nation with a physical laboratory where research and educational laboratory experiments are conducted.
MORE INFORMATION (http://math.psu.edu)

Department of Physics
The Department of Physics is home to innovative scientists, inspiring teachers, creative students, and accomplished alumni making exciting discoveries at the frontiers of knowledge. According to a multi-year study released by the National Research Council (NRC) in 2010, the Department of Physics is in the top echelon of physics departments in the United States. Developments in science and technology move very fast, the undergraduate and graduate degrees in Physics provide the fundamental tools with which to attack the scientific and technological problems of the next millennium.
MORE INFORMATION (http://www.phys.psu.edu/undergraduate)

Department of Statistics
The Department of Statistics is committed to teaching the theory and practice of statistics to undergraduate and graduate students and to conducting original research. Our world-renowned faculty are members of international collaborations making significant discoveries that will make life better throughout the world. Penn State Statistics has recently been ranked among the best programs in the nation according to the National Research Council.
MORE INFORMATION (http://stat.psu.edu)

Premedical Professions Programs
The Premedical Professions Programs are the academic home for undergraduate students interested in pursuing professional careers in medicine and related health professions. The programs include the undergraduate major Premedicine and the accelerated Premedicine-Medicine program. In addition, the program's advisers provide academic and career counseling for all students, regardless of their major, who wish to apply to medical schools and professional health programs.

PreMedical Medical Program
MORE INFORMATION (http://science.psu.edu/premed/accelerated-programs/premedmed)

Premedical Program
MORE INFORMATION (http://science.psu.edu/premed)

Science B.S. Programs
The Science B.S. Programs are the academic home for undergraduate students interested in pursuing broad, integrative studies in science. The program includes the general science major (Science B.S.) as well as the accelerated Science/MBA program for students interested in leadership positions in science and technology industries.

Science B.S. Program
MORE INFORMATION (http://science.psu.edu/sciencebs)

Science B.S./M.B.A. Program
MORE INFORMATION (http://science.psu.edu/bsmba)

Resources
Academic Advising
The goal of academic advising in the college is to assist with students’ transition to college, and provide guidance that will lead to being a successful science student. We provide assistance with policies and procedures, courses, academic programs, and requirements related to our majors and career goals.
MORE INFORMATION (http://science.psu.edu/current-students/support-network/find-your-academic-adviser)

Health Professions Advising
This office provides health professions advising to any Penn State student, enrolled in any college, who is interested in medicine and allied
health professions, including podiatry, dentistry, optometry, pharmacy, physician assistant, and others.

MORE INFORMATION (http://science.psu.edu/premed/advising)

**Center for Excellence in Science Education**
The Center for Excellence in Science Education (CESE) in the Eberly College of Science provides faculty and students with a collaborative educational network that promotes excellence in science teaching and learning. CESE offers a variety of evidence-based teaching workshops and other activities for faculty professional development as well as learning skills workshops for student academic development. It also houses the Eberly College of Science Learning Assistant (LA) Program that offers over 700 undergraduate peer teaching positions each academic year.

MORE INFORMATION (http://cese.science.psu.edu)

**Office of Science Engagement**
The Office of Science Engagement connects students with opportunities to enhance and extend their learning in co-curricular experiences such as research and educational abroad. We also offer career counseling and development for students, emphasize academic and professional growth, and offer a range of resources to support students’ success.

MORE INFORMATION (http://scienceengagement.psu.edu)

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**Education**

**About the College**

David Monk, Dean, College of Education

The Penn State College of Education offers you unique experiences that can be found only here. As a student, you get a solid foundation from your courses. But that’s not all. You are surrounded by a support system of faculty members, advisers, and more who will help you succeed. You can be involved in multiple educational experiences on and off campus, from across the street to across the globe. You’ll discover new cultures and innovative ideas while at Penn State. Soon enough, those new ideas will be coming from you. It is going to be an invaluable chapter in your life.

MORE INFORMATION ABOUT THE COLLEGE (https://ed.psu.edu)

**Mission and Goals**
The mission of the College of Education at Penn State is to deepen and extend knowledge about the formation and utilization of human capabilities. This broad and exciting mission permits us to focus on teaching and learning in many different content areas and with learners of many different ages, ranging from early childhood to adults. Our interest in the utilization of human capabilities connects us with many fields such as rehabilitation and human services and workforce education and development.

MORE INFORMATION (https://ed.psu.edu/dean-monk)

**Accreditation**
The College of Education educator preparation program is currently NCATE accredited and is seeking accreditation by the Council for the Accreditation of Education Preparation (CAEP) in Spring 2019. CAEP advances excellence in educator preparation through evidence-based accreditation that assures quality and supports continuous improvement to strengthen P-12 student learning.

MORE INFORMATION (https://ed.psu.edu/internal/associate-dean-undergrad/accreditation-and-program-review)

**Departments and Schools**

**Department of Curriculum and Instruction**
The Department of Curriculum and Instruction (CI) at Penn State offers undergraduate and graduate degrees and many options for teacher certification. There is a growing demand for graduates of teacher education programs. This department offers professional programs leading to certification in early childhood (PK-4), middle-level education (grades 4-8), and in a variety of discipline areas leading to certification at the secondary-school level.

MORE INFORMATION (https://ed.psu.edu/c-and-i)

**Department of Education Policy Studies**
The Education and Public Policy program gives undergraduates a comprehensive understanding of the challenges and opportunities in education today. A robust community of students have access to online programs wherever they happen to reside, guided by the same faculty and the same curriculum as in-person students find at University Park.

MORE INFORMATION (https://ed.psu.edu/eps)

**Department of Education Psychology, Counseling, and Special Education**
The EPCSE programs aim to help you prepare to work as school counselors, clinical mental health counselors, school psychologists, and special education educators as well as faculty in higher education institutions.

MORE INFORMATION (https://ed.psu.edu/epcse)

**Department of Learning and Performance Systems**
MORE INFORMATION (https://ed.psu.edu/lps)
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https://ed.psu.edu/

Engineering

About the College

Justin Schwartz, Harold and Inge Marcus Dean of Engineering

For over a century, our college has been a leader in engineering education and research, preparing young people to become leaders within their professions and communities. Our faculty and students produce game-changing research that advances our society and solves global problems, creating jobs that grow our economy and inform policy to shape our world. Today we look forward, seeing endless possibilities ahead. We are driven to maintain an inclusive and diverse community where everyone thrives. We are driven to perform research that impacts the lives of people around the world. We are committed to impacting society and embracing the challenges ahead with a passion for a bright future for humankind. We invite you to join us and be part of this exciting future.

MORE INFORMATION ABOUT THE COLLEGE (http://www.engr.psu.edu)

Accreditation

All College of Engineering baccalaureate majors at University Park, with the exception of Computer Science, are accredited by the Engineering Accreditation Commission of ABET, Inc (http://www.abet.org).

Departments and Schools

Department of Acoustics

The Graduate Program in Acoustics is an interdisciplinary program that applies broad academic offerings to a variety of scientific and technological fields. Personalize your education by selecting from an array of courses such as physical acoustics, underwater acoustics, signal processing, medical, aeroacoustics, vibrations, wave propagation, physiological acoustics, and more.

MORE INFORMATION (http://www.acs.psu.edu)

Department of Aerospace Engineering

Aerospace engineering is the primary field of engineering concerned with the design, development, testing, and production of aircraft, spacecraft, and related systems and equipment. The field has traditionally focused on problems related to atmospheric and space flight, with two major and overlapping branches: aeronautical engineering and astronautical engineering.

MORE INFORMATION (https://aero.psu.edu)

Department of Agricultural and Biological Engineering

Biological and agricultural engineering is the integration of engineering fundamentals with biological, agricultural, and environmental sciences. A holistic approach is taken in studying agricultural production, processing of food and other bio-based materials, and natural resource protection, then applied to grand engineering challenges such as providing safe food and clean water.

MORE INFORMATION (https://abe.psu.edu)

Department of Architectural Engineering

Architectural Engineering focuses on the scientific and engineering aspects of planning, designing, constructing, and analyzing buildings. Architectural engineers focus on building structure, stability, and systems, including: Planning, designing, and analyzing acoustics; building sustainability and safety aspects; construction management; heating, ventilating, and air conditioning systems; and lighting and electrical systems.

MORE INFORMATION (http://www.ae.psu.edu)

Department of Biomedical Engineering

The Department of Biomedical Engineering is built upon the apex of engineering, medicine, healthcare policy and biological discovery. Biomedical engineering prepares students to become future leaders in the areas of medical device design, instrumentation, medical imaging, healthcare management, biomedical research and academia.

MORE INFORMATION (http://www.bme.psu.edu)

Department of Chemical Engineering

Chemical engineering combines the principles of chemistry, biology, mathematics and physics to solve some of today's most pressing societal issues in human health, environmental sustainability, and energy.

MORE INFORMATION (http://www.che.psu.edu)

Department of Civil and Environmental Engineering

Civil engineering educates future engineers through solid science and engineering principles by identifying engineering challenges, creating pioneering solutions, and leading the industry with research discoveries and design innovations. We tackle some of the major problems facing society today in order to advance the fields of civil and environmental engineering.

MORE INFORMATION (http://www.cee.psu.edu)

School of Electrical Engineering and Computer Science

The School of Electrical Engineering and Computer Science (EECS) was created in 2015 to allow greater access to courses offered by both departments in exciting collaborative research in fields. EECS focuses on the convergence of technologies and disciplines to meet today’s industrial demands.

MORE INFORMATION (http://www.eecs.psu.edu)

Department of Engineering Science and Mechanics

The Penn State Department of Engineering Science and Mechanics (ESM) is an internationally distinguished department that is recognized for its globally competitive excellence in engineering and scientific accomplishments, research, and educational leadership.

Our engineering science program is the official undergraduate honors program of the College of Engineering, attracting the University's brightest engineering students. We also offer graduate degrees in ESM,
engineering mechanics, engineering at the nano-scale, and an integrated undergraduate/graduate program.

MORE INFORMATION (http://www.esm.psu.edu)

Department of Industrial and Manufacturing Engineering
Industrial engineers (IEs) design systems and processes to eliminate wastefulness and improve efficiencies. IEs are trained to be problem solvers that have an eye toward innovation and sustainability. They work in a variety of fields to develop solutions for challenges in management, manufacturing, logistics, health systems, retail, service, and ergonomics.

MORE INFORMATION (http://www.ime.psu.edu)

Department of Mechanical and Nuclear Engineering
Mechanical engineering provides the foundation for almost all other engineering majors, designing everything from athletic equipment, medical devices, theme park rides, and personal computers to engines and powerplants. Nuclear engineers may apply skills to treat diseases, operate nuclear energy systems, develop regulations to ensure safety, or facilitate space exploration.

MORE INFORMATION (http://www.mne.psu.edu)

School of Engineering Design, Technology, and Professional Programs
The School of Engineering Design, Technology, and Professional Programs (SEDTAPP) delivers effective engineering education through active, collaborative, project-based, and professionally oriented classroom experiences. SEDTAPP offers a variety of programs that partner faculty, students, and industry in the study of real-life engineering problems and solve them with innovative, humanitarian solutions.

MORE INFORMATION (http://sedtapp.psu.edu)

Resources

Center for Engineering Outreach and Inclusion
The Center for Engineering Outreach and Inclusion assists women and multicultural students in the pursuit of their degrees, through support and student programs, scholarships, professional development, and academic assistance.

MORE INFORMATION (http://inclusion.engr.psu.edu)

Career Resources & Employer Relations
The Career Resources & Employer Relations provides career advising for all students within the College of Engineering. We also help connect students and employers at a wide variety of career events each academic year, including Career Fairs, information sessions, student envoys, eCareer, and more.

MORE INFORMATION (http://career.engr.psu.edu)

Global Engineering Engagement
Engineering students at Penn State have so many options available to them - from semester-long programs to global experiences embedded in classes. Student Study Abroad representatives offer students peer-to-peer information, advice, and insight on the study abroad experience.

MORE INFORMATION (http://global.engr.psu.edu)

Contact
Peter Butler
Associate Dean for Education and Graduate Professional Programs
102A Hammond Building
University Park, PA 16802
814-863-3750
pjb28@psu.edu

George Lesieutre
Associate Dean for Research and Graduate Research Programs
102B Hammond Building
University Park, PA 16802
814-863-1033
gal4@psu.edu

COLLEGE OF ENGINEERING
208 Hammond Building
University Park, PA 16802
814-863-1033
adviser@engr.psu.edu

Health and Human Development

About the College
Kathryn Drager, Interim Dean, College of Health and Human Development
Improving human lives through innovative research, teaching, and outreach activities is the defining goal of the College of Health and Human Development. Our educational programs emphasize interdisciplinary approaches and engaged experiential learning. We truly are "committed to improving the quality of your life." Our faculty represent some of the most respected scholars in their disciplines, outstanding researchers, teachers, and leaders in numerous national academies and organizations. Their accomplishments speak volumes about the stimulating intellectual environment that the college has created and sustained. The college attracts intelligent, motivated and passionate students. In addition to outstanding courses in the classroom, students engage in internships, study abroad experiences, research projects, and service-learning activities that bring them into direct contact with industry, patients, clients, families, and consumers. These experiences provide students with real-world opportunities to hone their professional skills and expand their education while improving the world in which we live.

MORE INFORMATION ABOUT THE COLLEGE (http://hhd.psu.edu/college/overview)

Mission and Goals
The College of Health and Human Development is a collaborative community of faculty, staff, students, and alumni that seeks to improve human health, development, and the quality of life for all people through innovative education, interdisciplinary research, and effective outreach with a scope that encompasses “cells to society” and conception through the end of life.

Departments and Schools

Department of Biobehavioral Health
Innovative and interdisciplinary in nature, the Biobehavioral Health graduate program focuses on the unique space where biological, psychological, environmental, and cultural factors converge to affect health and disease across the lifespan.
MORE INFORMATION (https://hhd.psu.edu/bbh/biobehavioral-health-graduate-program)

Department of Communications Sciences and Disorders
Communication Sciences and Disorders graduate students learn how to assess, diagnose, and treat speech, language, and hearing disorders while mastering core knowledge of the communication disorders that affect nearly 10 percent of the world’s population.
MORE INFORMATION (https://hhd.psu.edu/csd/communication-sciences-and-disorders-graduate-program)

Department of Health Policy and Administration
The graduate program in Health Policy and Administration provides a solid foundation for students who want to profoundly shape health policy, make vital future changes to global health-related organizations, and successfully navigate our increasingly complex health care environment—including managing the facilities, services, programs, staff, and budgets that providers rely on.
MORE INFORMATION (https://hhd.psu.edu/hsa/health-policy-and-administration-graduate-program)

School of Hospitality Management
One of the first programs of its kind in the world, the graduate Hospitality Management program at Penn State is also widely considered one of the best. Our advanced degree programs rigorously prepare top-tier professionals for a wide array of careers in top-level service management, research, and academia through a combination of in-depth, research-based study and hands-on experience working alongside industry-leading practitioners and faculty.
MORE INFORMATION (https://hhd.psu.edu/shm/hospitality-management-graduate-program)

Department of Human Development and Family Studies
The innovative doctoral program in Human Development and Family Studies takes a true lifespan approach to examining the complex intersection of human development and societal relationships, offering choices in core research areas, along with a rich variety of dynamic cross-cutting research themes.
MORE INFORMATION (https://hhd.psu.edu/hdfs/human-development-and-family-studies-graduate-program)

Department of Kinesiology
One of the top-ranked programs of its kind, the Kinesiology graduate program has a long and distinguished record of producing leaders in the field. The national and international prominence of the program is due to the excellence of our graduate faculty, the production and dissemination of quality research, and the mentoring and graduation rates of excellent graduate students.
MORE INFORMATION (https://hhd.psu.edu/kines/kinesiology-graduate-program)

Department of Nutritional Sciences
Through advanced training in research, leadership, education, and community engagement, Nutritional Sciences graduate students, take part in a breadth of experiences that include applied research in clinical and community settings, as well as a robust body of research focusing on cellular and molecular mechanisms of specific nutrients in relation to metabolism and other physiological properties.
MORE INFORMATION (https://hhd.psu.edu/nutrition/nutritional-sciences-graduate-program)

Department of Recreation, Park, and Tourism Management
Thanks to a cutting-edge curriculum—and unique research and hands-on learning opportunities offered through exclusive relationships with industry partners and professional organizations—graduate students will exit the program with a deep understanding of how the social, environmental, psychological, and economic aspects of a broad array of leisure activities and pursuits can truly transform people’s lives and sense of well-being.
MORE INFORMATION (https://hhd.psu.edu/rptm/recreation-park-and-tourism-management-graduate-program)

Resources

HHD Graduate Student Council
The College’s Graduate Student Council is a group of student representatives from each of the academic units that meets on a monthly basis with the Associate Dean for Research and Graduate Education. The mission of this council is to serve as a vehicle to enhance graduate student representation to the College; to foster inter-departmental collaboration among students and faculty in research areas of mutual interest within the College; and to provide a mechanism for direct communication between department-selected graduate student representatives and College administration.
MORE INFORMATION (https://hhd.psu.edu/hhd/graduate/hhd-graduate-student-council)

Office for Diversity and Inclusion
The mission of the Office for Diversity and Inclusion is to promote and enhance the diversity of the college’s faculty and student body, and to foster a welcoming and inclusive environment for everyone. We support the college’s efforts to recruit, retain, and graduate underrepresented students in our majors.
MORE INFORMATION (http://hhd.psu.edu/college/diversity)

Research and Research Centers
Faculty in the College of Health and Human Development are world renowned for multidisciplinary research on all aspects of human health, developmental sciences, and management in hospitality, healthcare, human services, recreation and other service organizations. Graduate students have opportunities to work with some of the brightest and most well-respected researchers in the world.
MORE INFORMATION (https://hhd.psu.edu/hhd/research/research-centers)
Career Resources
Graduates from the College of Health and Human Development work in nearly every segment of the services economy—healthcare, hospitality, recreation, academia, research, management and/or policymaking. The rapidly growing career paths offer meaningful and purposeful work improving the quality of life for people.
MORE INFORMATION (https://hhd.psu.edu/hhd/graduate/career-opportunities)

Contact
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Associate Dean for Research and Graduate Education
Professor of Communication Sciences and Disorders
College of Health and Human Development
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814-863-2426
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Information Sciences and Technology
About the College
Andrew Sears, Dean, Information Sciences and Technology

In the College of Information Sciences and Technology (IST) graduate programs, we are committed to research and applications that focus on real-world technology-related problems that impact people's everyday lives. Our students are challenged to think critically and to recruit interdisciplinary perspectives and skills to tackle the greatest research challenges of the 21st century. Our internationally distinguished faculty bring formal training and research expertise from business, computer science, education, information science, psychology, engineering, sociology, mathematics, law, and other fields. Our masters and doctoral graduates bring their research and problem-solving skills to both cutting-edge information technology companies and traditional academic careers. In the graduate programs of IST, we identify and pursue problems that are a novel combination of human, information and computer science, investigating difficult and inter-connected problems. Our goal is to generate scientifically-grounded solutions that will improve the way people live, work, and play.
MORE INFORMATION ABOUT THE COLLEGE (https://ist.psu.edu/college/about)

Mission and Goals
Our mission is to educate students who can meet the challenges of the 21st century information age; to conduct leading-edge research by integrating people and information and technology; and to carry out service activities that address global problems and challenges.
MORE INFORMATION (https://ist.psu.edu/college/about/mission)

Resources
Career Solutions
The Office of Career Solutions and Corporate Engagement assists students with pursuing their career-related goals. They offer a variety of programs, services, and resources to help students pursue professional opportunities such as resume reviews, career fairs, networking events, and job and internship postings.
MORE INFORMATION ABOUT THE SCHOOL (https://www.sia.psu.edu)

MORE INFORMATION (https://ist.psu.edu/students/careers)

Inclusion and Diversity Engagement
The Office of Inclusion and Diversity Engagement works to support a welcoming and inclusive community in the College of IST. They aim to create and maintain an equitable climate by developing strategies that engage and retain students, faculty, and staff from underrepresented groups, including women.
MORE INFORMATION (https://ist.psu.edu/college/about/diversity/oide)

Contact
Mary Beth Rosson
Associate Dean, Graduate and Undergraduate Studies, College of Information Sciences and Technology
E397 Westgate Building
University Park, PA 16802
814-865-3528
https://ist.psu.edu

Intercollege
About the College
When faculty members from departments in two or more colleges collaborate in offering a graduate major degree program, the program may be designated as an intercollege graduate degree program. A committee of graduate faculty members approved by the Graduate School is responsible for administering an intercollege program under a program chair. Some intercollege graduate degree programs are academically housed in the Graduate School; some are housed in other colleges or academic units. Since intercollege graduate degree programs draw on faculty and courses from several colleges, specific college contact information can be found on each individual program page.

International Affairs
About the School
Hari Ososky, Dean, School of International Affairs
Scott Gartner, Director, School of International Affairs

The School of International Affairs (SIA) is uniquely situated to provide an innovative education for the next generation of global leaders. Our Master of International Affairs (M.I.A.) degree is a small, hands-on, customizable, interdisciplinary program with access to all of the resources of a leading public research institution. The SIA faculty is comprised of internationally recognized scholars and seasoned former officials from a variety of disciplines, which allows us to offer a curriculum that can be tailored to meet students’ individual career goals. Through our program, students can take advantage of myriad opportunities including internships in Washington, D.C., New York, and across the globe; and optional concentrations in focus areas based on the student’s personal interests. To further prepare students for a professional career, SIA offers a dedicated Office of Career Services that helps students identify goals and develop a plan for attaining them. Our Career Services team also coordinates career exposure trips, professional development workshops, and visits by recruiters. When our students graduate, they are ready to help shape the future of our complex world.
MORE INFORMATION ABOUT THE SCHOOL (https://www.sia.psu.edu)
Mission and Goals
Offering a professional master’s degree in international affairs with several specialty areas of study, our mission is to prepare exceptional students for careers and leadership positions in both the private and public sectors of an increasingly interdependent world. The School of International Affairs fulfills this mission through:

- A flexible degree program taught by elite, interdisciplinary faculty
- Experiential learning, including internship and international opportunities
- A dedicated Office of Career Services that works with each individual student

MORE INFORMATION (https://www.sia.psu.edu/explore-sia/welcome)

Resources

Academic Advising
Throughout the program, M.I.A. students will periodically meet with the director of academic advising to review their plan of study, intended concentration, elective course selections, and address any academic or student-related issues. In addition, incoming students are assigned a full-time faculty member who will help to guide their academic interests based on their professional aspirations.

Faculty
The School of International Affairs has brought international experts from a variety of fields into the Penn State community. The current faculty include former ambassadors, senior government advisors, higher education leaders, senior officials of international organizations, and foreign policy experts, each of whom bring unique regional and subject matter expertise in addition to their other exceptional accomplishments. Together, they represent a unique combination of world-class scholars and highly acclaimed practitioners in their respective disciplines.

Office of Career Services
Professional career opportunities have the highest priority at the School of International Affairs. Students will work, from their first semester, with the director of career services. Career Services will connect students to the strongest possible network of opportunities prior to and upon graduation, through the resources offered by Penn State, its faculty and alumni worldwide, as well as a range of multinational organizations, institutions, and enterprises.

Contact
Scott Gartner  
Director, School of International Affairs  
245 Lewis Katz Building  
814-867-2789  
ssg13@psu.edu

MORE INFORMATION (https://laus.la.psu.edu)

Liberal Arts

About the College
Susan Welch, Dean, College of the Liberal Arts

Students in the College of the Liberal Arts have access to a world-class education in the core values of the Liberal Arts, to enriching out-of-class experiences, and to a Penn State family invested in your success. We call this unique combination of opportunities the Liberal Arts Edge. Training in the Liberal Arts tradition helps students to think critically and creatively, to communicate artfully, and to motivate and inspire others. Working with their departments, graduate students have many opportunities to conduct research appropriate for their disciplines, and obtain appropriate experiences teaching and apprenticing with faculty.

MORE INFORMATION ABOUT THE COLLEGE (http://laus.la.psu.edu)

Mission and Goals
Building upon its status as one of the premier public liberal arts institutions, the College of the Liberal Arts seeks to offer a transformative 21st-century education that prepares students to thrive in today's society. The College will fulfill this mission by:

- Providing an education that combines core liberal arts values with research, teaching, and global experiences that allow students to apply skills in real-world contexts and grow personally and professionally
- Recruiting and retaining the best liberal arts faculty to help students develop wisdom and skills to influence and respond to change
- Supporting graduate students with placement in academic and non-academic careers as they complete their educational experience.

MORE INFORMATION (http://www.la.psu.edu/about/message-from-the-dean)

Departments and Schools

Department of African American Studies
Department of African American Studies is a meeting ground for American and African-descended peoples in the Americas. As we foster meaningful engagement with the economic, social and political conditions of black life on campus and beyond, we seek to build a vibrant community of inquiry and innovation at Penn State.

MORE INFORMATION (http://afam.la.psu.edu)

African Studies Program
The African Studies Program offers many opportunities for students to learn about important historical, social, political, and economic features of the African continent. The African Studies Program seeks to expand student knowledge of Africa by, among other things, highlighting Africa’s place in the global community, the vital geo-resources sustaining the world’s ecosystems, the depth of its artistic creativity and the resourcefulness of its peoples.

MORE INFORMATION (http://afr.la.psu.edu)

Department of Anthropology
Anthropology is the study of humanity—our biology and behavior, past and present. Anthropologists study living people across cultures and populations; past people through fossil, archeological, and historical
records; as well as living and extinct nonhuman primates. Our students gain holistic, integrative social science training in and out of the classroom.

MORE INFORMATION (http://anth.la.psu.edu)

Department of Applied Linguistics
Our mission is to advance understandings of language use and language learning from a range of anthropological, sociological, and psychological perspectives. Our faculty are committed to teaching and mentoring students. They are recognized worldwide for their topically and geographically diverse research involving a broad spectrum of languages and settings.

MORE INFORMATION (http://apling.la.psu.edu)

Department of Asian Studies
The Asian Studies program offers students opportunities to study in Asian Studies, Chinese and Japanese. At the graduate level, we offer dual-title doctoral programs in partnership with History, Comparative Literature, Applied Linguistics, and Political Science. Students who take courses in our department learn to think critically, to make literary, political, and historical judgments, to understand the impact of the past on the present, and of present choices on the future. Our language programs offer deep immersion in new cultural contexts and broaden linguistic and social horizons.

MORE INFORMATION (http://asian.la.psu.edu)

Department of Classics and Ancient Mediterranean Studies
CAMS is the study of ancient civilizations that arose and flourished around the Mediterranean basin (including Egypt, Greece, Rome, Anatolia, Israel, Mesopotamia, and North Africa) from the “cradle of civilization” in Mesopotamia (ca. 4000 BCE) to the end of Greco-Roman antiquity (ca. 600 CE). CAMS investigates the whole scope of the ancient Mediterranean world and trains students to interpret the linguistic and archaeological evidence of the greatest ancient cultures.

MORE INFORMATION (http://cams.la.psu.edu)

Department of Communication Arts and Sciences
CAS is committed to the study, teaching, and practice of human communication for the betterment of Pennsylvania, the nation, and the world. Using methods and theories that span the humanities and social sciences, we create knowledge about the role of communication in diverse interpersonal, communal, national, international, and cultural settings.

MORE INFORMATION (http://cas.la.psu.edu)

Department of Comparative Literature
Our department offers exciting ways to study literature and culture in a global context, to examine global media (print, visual, electronic), and to explore questions of ethics, human rights, and the real-world contexts of literary and cultural production. Training students in important skills such as analytical writing, argumentation, and communication in an international context, Comparative Literature provides many of the key components to success in the global economy.

MORE INFORMATION (http://complit.la.psu.edu)

Department of Economics
Economics studies the allocation of scarce resources. At the core of economics are theories of how individuals, firms, and other organizations make choices and interact, taking into account constraints on their behaviors. Among the topics studied in economics are: the determination of prices and quantities in various types of markets; the effects of taxes, subsidies, and regulations; economic growth and income distribution; international trade and international finance; and more.

MORE INFORMATION (http://econ.la.psu.edu)

Department of English
Our students explore the imaginative and practical uses of English through courses in literature, writing, rhetoric, and language. They develop perspectives on human nature and cultural values through American, British, and other English literatures; they learn how to gather, analyze, synthesize, and communicate information; they gain mastery over their language. These skills help English majors find careers in such fields as publishing, business, industry, government, and teaching.

MORE INFORMATION (http://english.la.psu.edu)

Department of French and Francophone Studies
The French language is the most direct route to 150,000,000 people in over 40 countries and territories of Europe, Africa, Asia, North America, and Latin America. If your goals include a future that requires contact with these diverse peoples or if your plan is to teach French, we offer a variety of options that will fit your needs: French/business, French/engineering, French language and culture, French language and literature, French language and linguistics, and applied French.

MORE INFORMATION (http://www.french.psu.edu)

Department of Germanic and Slavic Languages and Literatures
We offer undergraduate and graduate degrees in German and Russian. Other Slavic languages offered include Ukrainian, Polish, and Czech. Our award-winning faculty is committed to teaching and research in the areas of language, literature and culture.

MORE INFORMATION (http://german.la.psu.edu)

School of Global Languages, Literatures, and Cultures
The School’s purpose is to promote the study and knowledge of languages, literatures, and cultures worldwide. Its member departments offer graduate and undergraduate degrees, study abroad programs, student research opportunities, internships, and more.

MORE INFORMATION (http://sll.la.psu.edu)

Department of History
The Penn State Department of History offers a small, focused, PhD program designed to prepare students for careers inside or outside academia. Our program admits students in four primary fields, which reflect faculty strength: 1) the United States; 2) Latin America; 3) Early modern global; and 4) China & South Asia.

MORE INFORMATION (http://history.psu.edu)

Jewish Studies Program
Our interdisciplinary program ranges globally in scope from the Israelite origins of the Jewish people to the experiences of postmodern Jews in
the 21st century. Our distinguished faculty offer courses across a diverse array of fields and topics, with perspectives that combine the humanities and the social sciences. We offer a major and minor in Jewish Studies, a minor in Hebrew, and a certificate in Holocaust and Genocide Studies.

MORE INFORMATION (http://jewishstudies.la.psu.edu)

School of Labor and Employment Relations

The School of Labor and Employment Relations offers Masters Programs that focus on human resources, employment relations, and labor. Students in our programs benefit from being part of the school's tight-knit academic and practitioner community, while enjoying the benefits of being associated with a large, world-class university known around the globe.

MORE INFORMATION (http://lser.la.psu.edu)

Department of Philosophy

The graduate program in Philosophy has particular strengths in Continental Philosophy, Critical Philosophy of race, and Feminist Philosophy. Graduate training in Philosophy at Penn State focuses on these areas while providing all graduate students with a strong foundation in the history of philosophy and encouraging genuine dialogue across multiple philosophical traditions, including continental, analytic, and American Philosophy. Graduate students have the option of pursuing dual-title doctoral degrees in Women's, Gender, and Sexuality Studies or African American and Diaspora Studies. Doctoral minors in social thought and literary theory, criticism, and aesthetics are available as well.

MORE INFORMATION (http://philosophy.la.psu.edu)

Department of Political Science

The Department of Political Science at Penn State provides doctoral students with opportunities to develop their expertise as researchers and as teachers in four areas: American politics, comparative politics, international relations, and political methodology. We also offer dual-title doctoral degrees with Asian Studies, Women's Studies, African Studies, and Social Data Analytics.

MORE INFORMATION (http://polisci.la.psu.edu)

Department of Psychology

Penn State's Department of Psychology trains the next generation of leaders, innovators, and cutting-edge professionals in five areas: clinical (adult and child), cognitive, developmental, industrial-organizational, and social psychology. Students in our program become first-rate scientists and thinkers; learn through active participation (conducting their own research, using state of the art research methodologies, teaching the next generation of students, and effectively using their expertise to assist and improve the community) and translating research into action to help improve people's lives.

MORE INFORMATION (http://psych.la.psu.edu)

Department of Sociology and Criminology

 Ranked among the top programs in the nation, Penn State's Department of Sociology and Criminology offers 3 MA programs (MA in Sociology; MA in Criminology; MA in Sociology and Demography) and among PhD programs (PhD in Sociology; PhD in Criminology; PhD in Sociology and Demography; PhD in Sociology and Social Data Analytics).

MORE INFORMATION (http://www.sociology.la.psu.edu)

Department of Spanish, Italian and Portuguese

Our department is at the forefront of literary, linguistic and cultural studies in the United States. Our mission is to provide training that not only meets the highest standards of professional research but also prepares students for civic engagement and intellectual autonomy.

MORE INFORMATION (http://sip.la.psu.edu)

Department of Women's, Gender, and Sexuality Studies

Women's Studies is an interdisciplinary field of research and teaching that places women's lives, perspectives, and experiences at the center of inquiry. Women's Studies asks questions regarding the diversity of women's lives and experiences throughout history, contemporary problems from the perspectives of women and gender, and how changes in fundamental assumptions about the production of knowledge have transformed conventional areas of study. We offer dual-title masters and doctoral degree programs with Art Education, Comparative Literature, Curriculum & Instruction, English, French, Geography, History, Philosophy, Political Science, Psychology, and Rural Sociology.

MORE INFORMATION (http://www.womenstudies.la.psu.edu)

Contact

D. Scott Bennett
Associate Dean for Research and Graduate Studies
College of The Liberal Arts
105 Sparks Building
University Park, PA 16802
814-865-1439

http://la.psu.edu

Medicine

About the College

A. Craig Hillemeier, Dean, College of Medicine

Graduate Programs at the Penn State College of Medicine permit students to choose their dissertation adviser and committee members from the approximately 150 faculty members of the Program who represent more than 20 basic science and clinical departments. Research interests of Program faculty members are wide-ranging in both scientific disciplines and specific research interests. Graduate students benefit from the opportunity to tailor both their coursework and research to align closely with their particular interests. The objective of Graduate Programs at The Penn State College of medicine is to train individuals for advanced professional careers in the Biomedical Sciences, Neuroscience, Anatomy, Public Health Sciences and related fields.

MORE INFORMATION ABOUT THE COLLEGE (https://med.psu.edu/about)

Mission and Goals

At Penn State College of Medicine we are committed to educating graduate students in basic medical sciences and others in public health-related professions. We seek to enroll students of exceptional quality, and provide them with a rigorous education and research environment allowing them to develop the skills necessary to be future leaders in their field.

MORE INFORMATION (https://med.psu.edu/mission-values)
Departments and Schools

The College of Medicine has seven basic science departments that include Biochemistry and Molecular Biology, Cellular and Molecular Physiology, Comparative Medicine, Microbiology and Immunology, Neural and Behavioral Sciences, Pharmacology, and Public Health Sciences. Additionally, a number of other departments house basic scientists and physician-scientists that train graduate students. These include: Anesthesiology, Dermatology, Medicine, Neurology, Neurosurgery, Obstetrics and Gynecology, Ophthalmology, Orthopaedics, Pathology, Pediatrics, Physical Medicine and Rehabilitation, Psychiatry and Surgery.

Graduate Programs

At the College of Medicine, there are no department-based graduate programs, with the exception of Public Health Sciences. The following represent the integrative doctoral programs at the College of Medicine:

The doctoral degree in Anatomy provides coursework to help students achieve advanced understanding of specific knowledge related to human anatomic sciences, including medical gross anatomy, human embryology and human microscopic anatomy.

MORE INFORMATION (http://med.psu.edu/anatomy-phd)

The doctoral degree program in Biomedical Sciences (BMS), with its options in Biochemistry and Molecular Genetics, Translational Therapeutics, Cellular and Integrative Physiology, and Virology and Immunology, is a nationally and internationally recognized interdisciplinary graduate program that provides students curricular and research training with a unique focus on human health and disease. Students receive rigorous training that provides the skills necessary to be leaders in biomedical research and other endeavors including business, education, law, journalism, and public policy.

MORE INFORMATION (http://med.psu.edu/biomedical-sciences-phd)

The doctoral degree program in Biostatistics focuses on preparing students to develop new means of uncovering key scientific discoveries using cutting edge analytical and bioinformatics. Technological advances in areas such as imaging, high throughput omics, and electronic medical records constantly add demand for graduate training in Biostatistics.

MORE INFORMATION (http://med.psu.edu/biostatistics-phd)

The doctoral degree program in Neuroscience brings together scientists from different basic and clinical disciplines to focus on the nervous system. Some researchers seek to clarify the development or function of the brain at the cellular, molecular, or genetic levels. Others seek to understand how the nervous system processes information, controls autonomic functions, regulates states of consciousness, or determines behavior. Still others search for the means to diagnose, prevent, and successfully treat malignant brain tumors, congenital and acquired brain diseases, neurodegenerative diseases, or dysfunctions caused by pathologic states in brain structure.

MORE INFORMATION (http://med.psu.edu/neuroscience-phd)

Public Health Sciences offers the following degrees: Master of Public Health (MPH), Doctor of Public Health (DrPH), Master’s degree in Public Health Sciences and Homeland Security – Public Health Preparedness. As a national leader in research, education and outreach, the Department of Public Health Sciences aims to advance theory and practice that prepares future public health professionals, improves population health, and reduces health disparities across communities in Pennsylvania, the nation, and internationally.

MORE INFORMATION (http://med.psu.edu/phs)

Resources

Career Services

Penn State College of Medicine Career Services assists graduate students in preparing for and pursuing meaningful and rewarding careers through a comprehensive array of programs and services. The College has a full-time career counselor dedicated to assisting graduate students.

Graduate Student Association

The Graduate Student Association (GSA) is a group of students made up of elected and appointed students who help run student life at Penn State College of Medicine. The GSA helps to facilitate communication between the student body and program administration, as well as coordinate events such as the annual Research Forum to provide educational opportunities for all members of the Penn State College of Medicine community. Members of the GSA also try to help new students adjust to graduate school life through social and academic services.

Office of Diversity and Inclusion

Penn State Health and Penn State College of Medicine address diversity and inclusion from a measurable, strategic perspective that includes, as a foundation, equal employment regulatory compliance. Our commitment is communicated in the University’s diversity statement, which provides the foundation for our initiatives, as well as in our campus’ mission and vision statements on diversity, equity and inclusion. Penn State Health and Penn State College of Medicine are change agents and leaders in Hershey and the surrounding communities, promoting diversity and inclusion as a way to make the educational, work and local communities better and our businesses more successful.

Student Mental Health and Counseling

The Office of Student Mental Health and Counseling (OSMHC) is designed to meet the needs of Penn State College of Medicine students with compassion, honesty, and confidentiality. All issues are taken seriously – no problem is “too small” to talk about. This includes crisis and support services.

Student Housing

University Manor is a housing complex situation on the campus of the Penn State College of Medicine and which graduate students can live.

Student Health

Healthcare is available to students and their immediate families through Student Health Services. Student Health is a division of the Department of Family and Community Medicine at Milton S. Hershey Medical Center, Penn State College of Medicine.

Core Facilities and Research Resources

Penn State College of Medicine has shared-service core research facilities that provide specialized instrumentation and analytical services for the conduct of basic, clinical, and translational research. These include, but are not limited to, flow cytometry, genomic analysis, imaging, informatics and data analysis, mass spectrometry and proteomics, pathology and specimen processing, drug discovery, supply center, transgenics and animal services.
Contact
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Distinguished Professor of Cellular and Molecular Physiology and Surgery
Department of Cellular and Molecular Physiology
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Nursing
About the College
Laurie Badzek, Dean, College of Nursing
Penn State's Nursing program began in 1964 to provide an academically-grounded, clinical training program for future nurses. Since then, the College of Nursing (CON) has steadily evolved to meet the demands of modern healthcare and provide diverse, hands-on clinical experiences, a well-rounded classroom curriculum and cutting-edge technology to today's students. The CON features a complete range of educational programs in nursing.

The bachelor's degree program has three options for study: the B.S.N., for those students who are entering the four-year program of study for an initial professional degree, the second-degree option for those who already have a bachelor's degree in another field, and the RN to B.S.N. The master's programs include an M.S.N. program, with five options for advanced nursing roles. There are three advanced practice options: Family Nurse Practitioner, Adult Gerontology Primary Care Nurse Practitioner and Adult Gerontology Acute Care Nurse Practitioner. Two options - Nurse Administrator and Nurse Educator - are offered fully online through Penn State World Campus. There is also a B.S.N. - Ph.D. program.

The interdisciplinary Ph.D. program is designed to prepare highly qualified advanced practice nurses to be leaders and deliver expert nursing care and ultimately improve health care outcomes. This degree is designed for nurses who plan to continue in a practice role, and have already received a bachelor's or master's degree with a major in nursing. Offered online through Penn State World Campus, the program also requires three in-person intensives.

Mission and Goals
The mission of the College of Nursing is to improve healthcare for all people in the Commonwealth of Pennsylvania, the nation and the world through the development of qualified nurse leaders at all levels of practice, the development of nursing science, and the provision of nursing care to individuals, families and communities. This is accomplished through the integrated programs of nursing, education, research, scholarship and outreach.

Accreditation
The Bachelor of Science in Nursing, Master of Science in Nursing, Master of Science (nursing) and Doctor of Nursing Practice Degree Programs are accredited by the Commission on Collegiate Nursing Education (CCNE).

Resources
Academic Advising
All students are assigned an academic faculty adviser and a graduate adviser once admitted to the program. The University Park/World Campus Academic Advising office is located in 203 Nursing Sciences Building and can be reached by calling (814)-863-2211 or emailing nursgrad@psu.edu.

Diversity and Inclusion Initiatives
The faculty and staff of the College of Nursing value and are committed to fostering diversity in the classroom, the University, and the profession. We support the College’s efforts related to recruitment, retention, development and graduation of underrepresented students in Nursing. The office can be reached at (814) 863-6207.
Beta Sigma Chapter, Sigma Theta Tau International

Sigma Theta Tau International, today known as Sigma, is the international honor society for nursing. The purposes of Sigma are to recognize superior achievement, recognize the development of leadership qualities, foster high professional standards, encourage creative work, and strengthen commitment to the ideals and purposes of the profession.

The Pennsylvania State University's Beta Sigma Chapter was chartered in 1974. For acceptance of into Beta Sigma Chapter, graduate students must have a 3.5 GPA and demonstrated superior scholastic achievement and potential for professional leadership. Invitations for membership are given out during the year of graduation. The induction ceremony into Sigma is held during the Spring Semester.

MORE INFORMATION (http://betasigma.nursingsociety.org/home)

Doctoral Student Organizations (DSO)

The purpose of the College of Nursing Doctoral Student Organizations (Ph.D. DSO and D.N.P. DSO) is to support the academic achievement and enhance the academic environment of doctoral students throughout their enrollment at Penn State by providing a forum for collegial support, free exchange of ideas, and discussion of critical issues related to the respective doctoral programs.

All students enrolled in the Ph.D. or D.N.P. program are members of the respective DSO. There are no financial obligations related to membership. Each DSO is facilitated by one College of Nursing graduate faculty member and led by doctoral students. Meetings, held four times during the academic year, are scheduled and directed by student leaders.

MORE INFORMATION (http://www.nursing.psu.edu/graduate/dso)

Center for Nursing Research

The Center for Nursing Research provides faculty and graduate students with consulting services on quantitative and analytic approaches, assistance with grant proposal, mock grant reviews, and proposal submissions.

MORE INFORMATION (http://www.nursing.psu.edu/research/resources)

Study Abroad

Graduate student opportunities for international experiences are varied and are planned collaboratively with other units in the University. International experiences also can be arranged through Global Penn State.

MORE INFORMATION (https://www.nursing.psu.edu/international)

Contact

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nursgrad@psu.edu
http://www.nursing.psu.edu/

Penn State Erie, The Behrend College

About the College

Ralph M. Ford, Chancellor, Penn State Erie, The Behrend College

Penn State Erie, The Behrend College, gives undergraduate and graduate students the best of two worlds: The friendly, student-centered environment of a smaller college with the academic resources of a major research university. We offer an academically rigorous, globally respected Penn State education in a setting where students can have close interaction with faculty and meaningful out-of-classroom experiences. With more than 4,500 undergraduate and graduate students, 80-plus academic programs, and an inspiring 854-acre campus, Penn State Behrend is among the largest campuses in the Penn State system. We’re one of the top public colleges and universities in Pennsylvania for student-to-faculty ratio, SAT scores, first-year student retention rate, and graduation rate, based on U.S. News & World Report data. Penn State Behrend's faculty-to-student ratio is 1:16, and the average class size is 26.

MORE INFORMATION ABOUT THE COLLEGE (http://behrend.psu.edu)

Mission and Goals

There are six hallmarks of the Penn State Behrend experience:

- High Quality: Excellence in academics, research, and outreach
- Student-Centeredness
- Advanced Technology: State-of-the-art classrooms and labs.
- Inspiring Campus Environment
- Diversity: Behrend is a laboratory for ideas, and the more perspectives that can be brought to bear, the greater the learning
- Land-Grant Commitment: We are an economic, social, and cultural catalyst in northwestern Pennsylvania and beyond

MORE INFORMATION (http://behrend.psu.edu/about-the-college/college-strategy-1/penn-state-behrend-hallmarks)

Departments and Schools

Black School of Business

The Black School of Business is the only institution in northwestern Pennsylvania accredited by AACSB International, the premier accrediting agency for management education. A technology-rich environment and unique learning opportunities are made possible by a $20 million endowment from the late insurance executive Samuel P. Black Jr. and his wife, Irene. Graduate programs offered by the Black School include Master of Business Administration, Master of Professional Accounting, Master of Project Management, and Master of Manufacturing Management, which is offered jointly with the School of Engineering.

MORE INFORMATION (http://behrend.psu.edu/school-of-business)

School of Engineering

The School of Engineering is ranked among the top 29 undergraduate engineering programs nationwide. Why? State-of-the-art facilities, award-winning faculty, ABET-accredited programs in both engineering and engineering technology, small class sizes, emphasis on meaningful student design and research experiences, and superior internship and job placement. The school offers an interdisciplinary Master of Manufacturing Management, with program delivery primarily online.

MORE INFORMATION (http://behrend.psu.edu/school-of-business)
 MORE INFORMATION (http://behrend.psu.edu/school-of-engineering)

School of Humanities and Social Sciences
The School offers diverse four-year degree programs that develop both intellect and practical skills. Our students are tomorrow's historians, writers, communicators, and educators, exploring and reflecting on our society and the larger world beyond. Highly accomplished faculty are scholars, writers, and skilled teachers with years of practical professional experience. The School offers a Master of Arts in Applied Clinical Psychology.

MORE INFORMATION (http://behrend.psu.edu/school-of-humanities-social-sciences)

School of Science
School of Science students receive a transdisciplinary, hands-on education in basic and applied sciences guided by experienced faculty using state-of-the-art instruments. Students have opportunities for community engagement, service learning, and internships. The hallmark of Science programs is the opportunity to conduct substantive research not typically offered at the undergraduate level.

MORE INFORMATION> (http://behrend.psu.edu/school-of-science)

Resources
Graduate Programs Office
Not sure how to get started in graduate education The Graduate Programs Office can answer questions regarding program offerings, admissions requirements, and direct you to the faculty coordinator for the graduate program that interests you.

MORE INFORMATION (https://behrend.psu.edu/admissions-financial-aid/graduate-admissions)

Educational Equity and Diversity Programs
Penn State Behrend is committed to promoting diversity. The Office of Educational Equity and Diversity Programs supports and serves as an advocate for diverse populations within the college community, creating an environment that promotes respect for differences while fostering caring relationships and cross-cultural understanding and appreciation.

MORE INFORMATION (http://behrend.psu.edu/student-life/educational-equity-and-diversity)

English Language Study Center
The English Language Study Center offers classes and support services designed to help multicultural learners develop the reading, writing, and speaking skills needed to succeed on the job or in the university-level classroom.

MORE INFORMATION (http://behrend.psu.edu/school-of-humanities-social-sciences/programs-events-1/the-english-language-study-center)

Health and Wellness Center
Penn State Behrend has two on-campus Health and Wellness Centers that can diagnose and treat most illnesses and minor injuries. The centers also help students to manage chronic health conditions or obtain needed immunizations. Most major insurances are accepted.

MORE INFORMATION (http://behrend.psu.edu/student-life/student-services/health)

Open-Lab Learning
Penn State Behrend’s open-lab philosophy creates relevant learning experiences by bringing business and industry together with students and faculty members. Together, these academic-professional teams work to solve business, industry, and community challenges and pursue research and development initiatives.

MORE INFORMATION (http://behrend.psu.edu/academics/academic-programs/open-lab-learning)

Personal Counseling
The Office of Personal Counseling offers free individual counseling, support groups, and psychiatric and crisis intervention services to Penn State Behrend students. All services are free and confidential.

MORE INFORMATION (http://behrend.psu.edu/student-life/student-services/personal-counseling)

Contact
Ivor Knight
Associate Dean for Research and Graduate Studies
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Erie, PA 16563
itk2@psu.edu

Penn State Great Valley
About the Campus
For over 50 years, Penn State Great Valley has been dedicated to providing high-quality educational programs to professionals in southeastern Pennsylvania. Located in Malvern, the campus offers graduate degrees and certificates in accounting, business, data analytics, engineering, finance, and leadership in addition to a variety of noncredit professional development programs. Evening and hybrid courses are held in a flexible, seven week format, allowing students to meet the demands of work, family, and life in general.

MORE INFORMATION (https://greatvalley.psu.edu/this-is-penn-state)

Mission and Goals
To directly respond to the learning needs of working adult professionals and their organizations, Penn State Great Valley strives to develop and offer convenient, competitively priced, and technically advanced programming that improves the career potential and enhances the work effectiveness of our students and graduates.

Through the research of our faculty, our graduate programming, our continuing education programs, and conferences organized by Penn State Great Valley, we seek to promote the intellectual and economic vitality of our region. In all of our teaching, research, and service endeavors, the rigor, quality, and relevance of our programs bridge the gap between theory and practice.

MORE INFORMATION (https://greatvalley.psu.edu/this-is-penn-state/mission-and-strategic-plan)

Departments and Schools
- Engineering Division
- Management Division
Penn State Harrisburg, The Capital College

About the College
John M. Mason Jr., Chancellor, Penn State Harrisburg

Penn State Harrisburg is an undergraduate college and graduate school of the University. The Harrisburg campus enrolls nearly 800 graduate students and offers more than 40 graduate programs, including master’s and doctoral degrees and graduate and postbaccalaureate certificates. The college has nationally accredited programs, award-winning faculty who are accomplished teachers and scholars, and the resources of a world-class research university. Penn State Harrisburg is located on a suburban campus in Middletown, Pennsylvania, eight miles east of Harrisburg.

MORE INFORMATION (https://harrisburg.psu.edu/about-us/vision-mission-and-values)

Mission and Goals
The mission of Penn State Harrisburg is to provide an integrated and responsive approach to education that benefits society. As the largest and most comprehensive of the University’s Commonwealth Campuses, we strive to achieve national and international standing in academic quality and impact upon the progress of society.

MORE INFORMATION (https://harrisburg.psu.edu/career-services)

School of Humanities
The School of Humanities offers graduate degrees in American studies (M.A. and Ph.D.), communications (M.A.), and humanities (M.A.), as well as graduate certificates in Folklore and Ethnography and Heritage and Museum Practice.

MORE INFORMATION (https://harrisburg.psu.edu/humanities)

School of Public Affairs
The School of Public Affairs offers high quality graduate education in multiple disciplines in the form of four graduate degrees, five graduate certificates, and a doctoral degree. Its programs are grounded in applied research and an interdisciplinary approach, foster public service, and provide students with the knowledge and skills to solve society’s complex problems.

MORE INFORMATION (https://harrisburg.psu.edu/public-affairs)

School of Science, Engineering, and Technology
The School of Science, Engineering, and Technology offers master’s degree study in Civil, Electrical, Environmental, and Mechanical Engineering; Computer Science; Engineering Science; Engineering Management; and Environmental Pollution Control.

MORE INFORMATION (https://harrisburg.psu.edu/science-engineering-technology)

Resources

Career Services
Career Services provides career planning and development services to current students and alumni at no charge.

MORE INFORMATION (https://harrisburg.psu.edu/career-services)

Counseling and Psychological Services
Psychologists, counselors, and a drug and alcohol specialist are available to work with any current student to address personal concerns. This office offers evening hours and operates under strict confidentiality guidelines.

MORE INFORMATION (https://harrisburg.psu.edu/counseling-psychological-services)

Graduate and Professional Student Council (GPSC)
The GPSC is the voice for graduate and professional students, providing representation to the Student Government Association, the Graduate School, and all other entities that have an impact on graduate and professional students.

MORE INFORMATION (http://sites.psu.edu/gpsc)

Graduate Studies Office
The Graduate Studies Office offers support for graduate students and represents the Graduate School at Penn State Harrisburg. Additionally, the office sponsors travel grants for grad students, implements academic policies for graduate programs, and works with the Graduate and Professional Student Council (GPSC).

MORE INFORMATION (https://harrisburg.psu.edu/graduate-studies)
Housing and Food Services
Housing and Food Services provides student resident services, catering, and operates several dining options on campus.
MORE INFORMATION (http://harrisburgcampusliving.psu.edu)

International Programs (Study Abroad)
International Programs provides and facilitates international educational opportunities for faculty and students, including study tours and study abroad.
MORE INFORMATION (https://harrisburg.psu.edu/international-programs)

International Student Support Services
Acts as a liaison between Penn State Harrisburg international students and the Office of Global Programs/DISSA at University Park, assisting with immigration issues, hosting employment information sessions, and providing personal development and growth opportunities for students.
MORE INFORMATION (https://harrisburg.psu.edu/international-student-support-services)

Learning Center
The Learning Center provides tutoring to undergraduate and graduate students in quantitative courses (mathematics, science, business), writing, speeches and presentations, study skills, American and academic literacy. Our mission is to support students' self-management of academic and professional goals through collaboration, guidance, and practice in an environment of inclusive excellence.
MORE INFORMATION (https://harrisburg.psu.edu/learning-center)

Library
This technology advanced, academic research library includes 300,000 volumes and more than 200 print journals. The library also includes computer labs, multimedia production studios, classrooms, and a variety of study spaces.
MORE INFORMATION (http://www.libraries.psu.edu/psul/harrisburg.html)

Recreation and Aquatics
The campus has a modern fitness facility that includes: a 5,000-square-foot cardio/weight room, a full-size gymnasium, racquetball courts, group exercise rooms, and a variety of equipment that can be signed out. The Aquatics Center offers class and recreational swimming options including lap and open swim hours.
MORE INFORMATION (https://harrisburg.psu.edu/recreation-and-aquatics)

Research and Outreach
ORO serves as the primary point of contact for external grant submissions, providing assistance with budget preparation, ensuring grants meet sponsor requirements and submitting grants to sponsors on behalf of the University. Additionally, it develops and maintains relationships with individuals and entities from the public, organizations and private sectors.
MORE INFORMATION (https://harrisburg.psu.edu/research-and-outreach)

Residence Life
Residence Life provides resources and activities to enhance the personal, physical, educational, and social development of campus residents.
MORE INFORMATION (https://harrisburg.psu.edu/disability-services)

Student Disability Resources
The Student Disability Resources office provides students with disability accommodations to minimize the effects of their disabilities.
MORE INFORMATION (https://harrisburg.psu.edu/disability-services)

Student Health Services
Assesses and treats student illnesses and provides wellness counseling and preventive health services. Clinician services are offered by appointment.
MORE INFORMATION (https://harrisburg.psu.edu/student-health-services)

Student Life
More than 100 student clubs and organizations fit any interest, whether you’re looking to get involved in service projects, join a fraternity or sorority, participate in decision-making for the college through Student Government, or join a club that will help you with your major or career goals.
MORE INFORMATION (https://harrisburg.psu.edu/student-life)

University Police and Public Safety
The Department of University Police and Public Safety is staffed with sworn police officers and civilian personnel charged with the responsibility of providing a safe environment to the campus community. The police officers of the department enforce state laws as well as University rules and regulations.
MORE INFORMATION (https://harrisburg.psu.edu/safety-police-services)

Contact
Omid Ansary, Ph.D.
Senior Associate Dean for Academic Affairs
Peter B. Idowu, Ph.D. (https://harrisburg.psu.edu/faculty-and-staff/peter-idowu-phd)
Assistant Dean for Graduate Studies
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https://harrisburg.psu.edu

Smeal College of Business
About the College
Charles H. Whiteman, John and Becky Surma Dean, Smeal College of Business
The Penn State Smeal College of Business is a vibrant intellectual community offering highly ranked undergraduate, graduate, doctoral,
and executive education opportunities to more than 6,000 students from across the country and around the world. Since our formation in 1953, we have prepared more than 85,000 students for professional success, annually adding to Penn State’s vast alumni network. We are a destination of choice for top global organizations seeking talent that will make a positive difference. Through our leading faculty and network of research centers and institutes, we are a source of knowledge that influences the business practices of tomorrow. We are forging connections, creating opportunities, and producing results.

MORE INFORMATION ABOUT THE COLLEGE (http://www.smeal.psu.edu/about-smeal)

Mission and Goals
As an extension of the core values of the University, the Smeal College of Business is committed to a set of strategic priorities including delivering extraordinary educational experiences, conducting research with impact, fostering a culture that prioritizes integrity, embraces unique ideas and strengthens connections via diversity enhancement initiatives and programs, and promotes sustainability in education, research, and business practice.

MORE INFORMATION (http://www.smeal.psu.edu/about-smeal)

Departments
Department of Accounting
Accounting faculty are engaged in a robust range of research topics including disclosure regulation, executive compensation, credit ratings, and tax policy.

MORE INFORMATION (https://www.smeal.psu.edu/accounting)

Department of Finance
Finance faculty provide research and teaching expertise in a variety of areas emphasizing corporate finance, international finance, investment management, and financial services. Smeal has built an international reputation for financial research, especially in the areas of corporate financial policy and the operation and regulation of securities markets.

MORE INFORMATION (https://www.smeal.psu.edu/finance)

Department of Management and Organization
Management faculty address modern business challenges, including new organizational design such as self-managing teams and multi-firm collaborative networks. Faculty are also exploring creative ways of thinking about a firm’s strategies and management processes that involve new methods of performance management, talent management, and ethical leadership.

MORE INFORMATION (https://www.smeal.psu.edu/management)

Department of Marketing
Marketing faculty combines rigorous and relevant research with an approach to education that is grounded in the fundamentals while embracing leading-edge concepts and tools.

MORE INFORMATION (https://www.smeal.psu.edu/marketing)

Department of Risk Management
The research and disciplinary focus of the department is on risk assessment, mitigation, and management, connecting disciplines such as actuarial science, business law, decision analysis, insurance, international business, and real estate. The department also works closely with the Institute for Real Estate Studies to promote education, scholarship, and outreach in the area of real estate.

MORE INFORMATION (https://www.smeal.psu.edu/risk-management)

Department of Supply Chain and Information Systems
The department’s faculty pursue both theoretical and applied research, often working closely with research centers within the college and collaborating with colleagues in other disciplines or in industry.

MORE INFORMATION (https://www.smeal.psu.edu/scis)

Resources
Professional Graduate Programs
The Penn State Smeal College of Business delivers a flexible portfolio of graduate degrees and certificates to help students advance in their careers. Smeal offers an assortment of one-year residential specialty masters programs, three MBA programs, and a range of online specialty masters and certificates.

MORE INFORMATION (http://www.smeal.psu.edu/pgp)

Ph.D. Program
The doctoral program in the Penn State Smeal College of Business enrolls a limited number of candidates each year. The program is designed to prepare students for academic careers and offers numerous areas of emphasis.

MORE INFORMATION (http://www.smeal.psu.edu/phd)

Contact
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GENERAL INFORMATION

The General Information section in the Graduate Bulletin is designed to give you an overview of the purpose and features of the bulletin, answer frequently asked questions about the bulletin, and provide information about the University structure and leadership. In addition to the information found in this area and on graduate major degree program pages, graduate education policies can be found on the Graduate School website (http://gradschool.psu.edu/graduate-education-policies).

Click on topics of interest below or the tabs to the right to explore different information areas. In addition, the General Information section can be accessed from any page in the Bulletin from the navigation bar.

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Using this Bulletin (p. 35)

About Penn State

This is Penn State

Penn State is in the top 1 percent of universities worldwide and has the largest alumni network in the nation. Founded in 1855, the University combines academic rigor with a vibrant campus life as it carries out its mission of teaching, research, and service with pride and focuses on the future throughout Pennsylvania and the world. Granted the highest rating for research universities by the Carnegie Foundation, Penn State teaches students to be leaders with a global perspective.

Our leadership in administration, faculty, and staff make our mission come alive every day. The Board of Trustees reviews and approves the budget of the University and guides general goals, policies, and procedures from a big-picture perspective. The President’s office ensures that all aspects of the University are running smoothly and promotes overall principles that students, faculty, and staff abide by for the long term. The University Faculty Senate represents the Penn State faculty with legislative authority on all matters regarding the University’s educational interests.

Penn State strives to celebrate diversity in all aspects of its educational and operational activities and the University’s strategic plans are designed to result in ongoing improvements that help prepare future generations of leaders.

Board of Trustees

The Board of Trustees of The Pennsylvania State University is the corporate body established by the charter with complete responsibility for the government and welfare of the University and all the interests pertaining thereto including students, faculty, staff, and alumni.

In the exercise of this responsibility, the Board is guided by the following policies:

1. The authority for day-to-day management and control of the University, and the establishment of policies and procedures for the educational program and other operations of the University, shall be delegated to the President, and by him/her, either by delegation to or consultation with the faculty and the student body in accordance with a general directive of the Board.

This delegation of authority requires that the Board rely on the judgment and decisions of those who operate under its authority.

However, this reliance of the Board must be based upon its continuing awareness of the operations of the University. Therefore, the Board shall receive and consider thorough and forthright reports on the affairs of the University by the President or those designated by the President. It has a continuing obligation to require information or answers on any University matter with which it is concerned.

Finally, upon request, the Board shall advise the President on any University matter of concern to him/her.

2. The Board of Trustees shall carry out certain responsibilities as a Board, without delegation. These responsibilities are:
   a. The selection of the President of the University
   b. The determination of the major goals of the University and the approval of the policies and procedures for implementation of such goals.
   c. The review and approval of the operating and capital budget of the University.
   d. Such other responsibilities as law, governmental directives, or custom require the Board to act upon.

3. The Board of Trustees shall inform the citizens of the Commonwealth of Pennsylvania of the University’s performance of its role in the education of the youth of Pennsylvania.

4. The Board of Trustees shall assist the President in the development of effective relationships between the University and the various agencies of the Commonwealth of Pennsylvania and the United States of America which provide to the University assistance and direction.

MORE INFORMATION (https://trustees.psu.edu)

President’s Council

• Eric J. Barron, President (http://president.psu.edu)
• Nicholas P. Jones, Executive Vice President and Provost (http://provost.psu.edu)
• Janine S. Andrews, Director, Office of the Board of Trustees and Associate Secretary (http://www.psu.edu/trustees)
• Anne (Sandy) Barbour, Director of Intercollegiate Athletics (http://www.gopsusports.com)
• Mary G. Beahm, Interim Vice President for Human Resources (http://ohr.psu.edu)
• Kathleen Bieschke, Vice Provost for Faculty Affairs (http://www.vpfa.psu.edu)
• O. Richard Bundy III, Vice President for Development and Alumni Relations (http://giveto.psu.edu)
• Stephen S. Dunham, Vice President and General Counsel (http://ogc.psu.edu)
• David J. Gray, Senior Vice President for Finance and Business/Treasurer (http://www.fandb.psu.edu)
• Madlyn L. Hanes, Vice President for Commonwealth Campuses and Executive Chancellor (http://www.campuses.psu.edu)
• A. Craig Hillemeier, Chief Executive Officer, Penn State Milton S. Hershey Medical Center; Senior Vice President for Health Affairs, Penn State University; and Dean, Penn State College of Medicine (http://www.pennstatehershey.org)
• Tracey D. Huston, Interim Vice President for Outreach (http://outreach.psu.edu)
• Michael J. Kubit, Vice President for Information Technology/Chief Information Officer (http://pennstateit.psu.edu)
• Lawrence H. Lokman, Vice President for Strategic Communications (https://strategiccommunications.psu.edu)
• Zachary P. Moore, Vice President for Government and Community Relations (http://www.govt.psu.edu)
• Robert N. Pangborn, Vice President and Dean for Undergraduate Education (http://undergrad.psu.edu)
• Thomas G. Poole, Vice President for Administration/Secretary (http://www.psu.edu/ur/poole)
• Neil A. Sharkey, Vice President for Research (http://www.research.psu.edu)
• Damon Sims, Vice President for Student Affairs (http://studentaffairs.psu.edu)
• Marcus A. Whitehurst, Vice Provost for Educational Equity (http://equity.psu.edu)

MORE INFORMATION (http://www.psu.edu/this-is-penn-state/leadership-and-mission/our-administration)

Mission
The Pennsylvania State University is a multi-campus, land-grant, public research University that educates students from around the world, and supports individuals and communities through integrated programs of teaching, research, and service.

Our instructional mission includes undergraduate, graduate, professional, continuing, and extension education, offered through both resident instruction and distance learning. Our educational programs are enriched by the talent, knowledge, diversity, creativity, and teaching and research acumen of our faculty, students, and staff.

Our discovery-oriented, collaborative, and interdisciplinary research and scholarship promote human and economic development, global understanding, and advancement in professional practice through the expansion of knowledge and its applications in the natural and applied sciences, social and behavioral sciences, engineering, technology, arts and humanities, and myriad professions.

As Pennsylvania’s land-grant university, we provide unparalleled access to education and public service to support the citizens of the Commonwealth and beyond. We engage in collaborative activities with private sector, educational, and governmental partners worldwide to generate, integrate, apply, and disseminate knowledge that is valuable to society.

History
As Pennsylvania’s only land-grant university. Penn State has a broad mission of teaching, research, and public service. But that mission was not so grandly conceived in 1855, when the Commonwealth chartered it as one of the nation’s first colleges of agricultural science, with a goal to apply scientific principles to farming.

Centre County became the site of the new college in response to a gift of 200 acres from gentleman farmer and ironmaster James Irvin of Bellefonte. Founding President Evan Pugh drew on the scientific education he had received in Europe to plan a curriculum that combined theoretical studies with practical applications.

Pugh and similar visionaries in other states championed Congressional passage of the Morrill Land-Grant Act in 1862. The act enabled states to sell federal land, invest the proceeds, and use the income to support colleges “where the leading object shall be, without excluding scientific and classical studies ... to teach agriculture and the mechanic arts [engineering] ... in order to promote the liberal and practical education of the industrial classes in all the pursuits and professions of life.” The state legislature designated Penn State the land-grant institution of Pennsylvania.

But not until the 1880s, under the leadership of President George W. Atherton, did the college expand its curriculum to match the Land-Grant Act’s broad mandate. From that time onward, curricula in engineering, the sciences, the liberal arts, and more began to flourish. In the early 1900s, Penn State introduced cooperative extension and additional outreach programming, extending the reach of its academic mission.

An even greater segment of the Commonwealth’s population had opportunities for engagement in the 1930s when Penn State established a series of undergraduate branch campuses, primarily to meet the needs of students who were location-bound during the Great Depression. Those campuses were predecessors of today’s system of 24 Penn State campuses located throughout the Commonwealth.

Penn State began offering systematic advanced-degree work in 1922 with the formation of the Graduate School. Graduate education and research evolved hand in hand. By 1950 the University had won international distinction for investigations in dairy science, building insulation, diesel engines, and acoustics, and other specialized fields.

A college of medicine and teaching hospital were established in 1967 with a $50 million gift from the charitable trusts of renowned chocolate magnate Milton S. Hershey. In 1989 the Pennsylvania College of Technology in Williamsport became an affiliate of the University. Penn State’s online World Campus graduated its first students in 2000 and now enrolls more than 12,000. Also in 2000, Penn State and the Dickinson School of Law merged. In 2015, two Penn State law schools, Dickinson Law (in Carlisle, Pennsylvania) and Penn State Law (on University Park campus) were established.

MORE INFORMATION (http://www.psu.edu/this-is-penn-state/our-history)

Accreditation Notice
The Pennsylvania State University is accredited by the Middle States Commission on Higher Education, 3624 Market Street, Philadelphia, PA 19104 (267-284-5000). The Middle States Commission on Higher Education (MSCHE) is a regional accrediting agency recognized by the U.S. Secretary of Education and the Council for Higher Education Accreditation.

The Pennsylvania State University was first accredited in 1921 and accreditation was reaffirmed in June 2015.

The next Annual Institutional Update will be submitted in spring 2018. The Midpoint Peer Review will occur in 2020 and the next Self-Study evaluation is scheduled for 2023-2024.

According to MSCHE’s policy statement, Accreditation Review Cycle and Monitoring, “The Commission’s eight-year cycle of review of accredited institutions begins with an in-depth institutional self-study that is reviewed by peer evaluators during an on-site evaluation visit. The self-study and on-site review are used to assess the institution’s compliance with Commission standards and requirements of affiliation, verify compliance with accreditation-relevant federal regulations, and identify areas needing improvement. The review process results in an accreditation decision in accordance with the Commission Policy
Accreditation actions. Institutions submit annually an update of institutional data and other information requested by the Commission. In the fourth year following the self-study visit, the Commission conducts an off-site mid-point peer review based on the cumulative information provided by the institution. Institutions are provided a report on the institution’s performance with respect to student achievement and financial sustainability.


MORE INFORMATION (http://middlestates.psu.edu)

Research
The Office of the Vice President for Research is responsible for facilitating the $863-million-per-year research enterprise at Penn State by working with a broad range of units across the University.

The mission of the Office of the Vice President for Research is to support a rigorous program of faculty and student research and creative accomplishment by enhancing the environment for scholarly and artistic endeavors, encouraging the highest standards of quality, and fostering ethical conduct in research.

The office is responsible for:

• the effective administration of sponsored programs which provide the financial support for a substantial share of the research activity at the University;
• serving as the University’s advocate and spokesperson on research issues, and as a representative in activities that may produce major new programs and facilities for research;
• facilitating strong programs for interdisciplinary research.

MORE INFORMATION (https://www.research.psu.edu)

University Structure

Undergraduate Campuses
Penn State has more than twenty campuses across Pennsylvania that serve undergraduate students and communities through teaching, research, and service. Through its network of undergraduate campuses and World Campus, Penn State provides students the opportunity to begin and complete a Penn State degree at one campus, transition to complete a degree at another campus or complete a program completely online—this is the hallmark of Penn State’s unique one University concept.

The University Park campus, the administrative and research hub of the University is the largest of Penn State’s campuses. Across Pennsylvania, Penn State campuses play a critical role in the land-grant mission of the University, by providing access and opportunity—a commitment that remains at the core of each campus’s mission. In addition to providing the first two years of more than 160 Penn State majors, campuses confer some 5,000 Penn State degrees annually to students who complete their academic programs at a Penn State campus.

MORE INFORMATION (http://bulletins.psu.edu/undergraduate/campuses)

Graduate and Professional Campuses
Penn State’s wide range of graduate programs includes traditional residential Ph.D. research programs through part-time degree programs aimed at working professionals. Penn State offers graduate programs at six campuses: Penn State Erie, Penn State Great Valley, Penn State Harrisburg, Penn State College of Medicine, Penn State University Park, and Penn State World Campus. Penn State College of Medicine in Hershey, PA offers a complete medical education program leading to the Doctor of Medicine (M.D.) degree. Penn State has two separately accredited Law Schools: Dickinson Law in Carlisle, PA and Penn State Law at University Park.

MORE INFORMATION (p. 8)

Colleges
Penn State’s undergraduate majors are divided among academic colleges, which are the units from which students receive their degrees. Examples of colleges are Arts and Architecture, Eberly College of Science, and Education, among others. Academic colleges offer graduate programs as well; however, graduate degrees are awarded by the Graduate School. In addition to the 12 academic colleges at the University Park campus, Penn State has six academic colleges across Pennsylvania that allow students to finish their undergraduate degrees at a campus other than University Park.

With the exception of a few specialized programs, undergraduate students interested in majors offered by the above academic colleges can start their education at any Penn State campus and then transition to University Park following their second year to complete their degree as part of the 2+2 Plan.

In addition, the Pennsylvania College of Technology in Williamsport offers undergraduate enrollments in selected degree programs.

For a list of academic colleges, enrollment units, and special academic programs visit the Undergraduate Bulletin Colleges (http://bulletins.psu.edu/undergraduate/collages) page.

Academic Colleges at Campuses
Six Penn State colleges, located throughout the state, offer undergraduate majors that are typically completed at campuses other than University Park. These colleges are:

• Abington College, at the Penn State Abington campus
• Altoona College, at the Penn State Altoona campus
• Behrend College, at the Penn State Erie campus
• Berks College, at the Penn State Berks campus
• Capital College, at the Penn State Harrisburg campus
• University College, is comprised of the following 14 campuses:
  • Penn State Beaver
  • Penn State Brandywine
  • Penn State DuBois
  • Penn State Fayette, The Eberly Campus
  • Penn State Greater Allegheny
  • Penn State Hazleton
  • Penn State Lehigh Valley
  • Penn State Mont Alto
  • Penn State New Kensington
  • Penn State Schuylkill
  • Penn State Shenango
  • Penn State Wilkes-Barre
  • Penn State Scranton
  • Penn State York
Students interested in undergraduate majors offered by these colleges can typically start at one campus and finish at another through the 2+2 plan, or they can choose to stay at one campus for all four years if their campus of choice offers the major they want. To see the specific undergraduate majors available at each campus, search majors by campus in the Undergraduate Bulletin (http://bulletins.psu.edu/undergraduate).

**Student Services and Programs**

Penn State offers thousands of resources to support students, faculty, staff, and alumni both locally and around the world. This partial list of centers, offices, and programs was developed based on past inquiries from Bulletins users.

To discover additional services explore Penn State's home page (http://www.psu.edu), the Office of Student Affairs (https://studentaffairs.psu.edu), and the Office of Undergraduate Education (http://undergrad.psu.edu), and The Graduate School (http://gradschool.psu.edu).

- Affirmative Action Office (http://www.psu.edu/dept/aaoffice)
- Adult Learner Programs & Services (http://studentaffairs.psu.edu/adults)
- Campus Recreation (http://studentaffairs.psu.edu/campusrec)
- Career Services (http://studentaffairs.psu.edu/career)
- Child Care Resources (https://hr.psu.edu/employee-and-family-resources/your-family/child-care-resources)
- Counseling and Psychological Services (http://studentaffairs.psu.edu/counseling)
- Disability Services Resources (http://equity.psu.edu/student-disability-resources)
- Spiritual and Ethical Development, Center for (http://studentaffairs.psu.edu/spiritual)
- Financial Literacy and Wellness Center (https://financialliteracy.psu.edu)
- Fraternity and Sorority Life (https://studentaffairs.psu.edu/greek-life)
- Gender Equity Center (http://studentaffairs.psu.edu/genderequity)
- Global Programs, Office of (https://global.psu.edu)
- Graduate Educational Equity Programs, Office of (http://gradschool.psu.edu/diversity)
- Graduate Writing Center (http://gwc.psu.edu)
- Health Services (http://studentaffairs.psu.edu/health)
- Honor and Professional Societies
  - Phi Kappa Phi (http://pkk.psu.edu)
  - Phi Eta Sigma (http://phietasigmapsu.weebly.com)
  - Golden Key (http://pennstategoldenkey.org)
- Penn State Information Technology (https://pennstateit.psu.edu)
- LGBTQA Student Resource Center (http://studentaffairs.psu.edu/lgbtqa)
- Multicultural Resource Center (http://equity.psu.edu/mrc)
- Off-Campus Student Support (https://studentaffairs.psu.edu/offcampus)
- Outreach and Online Education (https://www.outreach.psu.edu)
- Paul Robeson Cultural Center (http://studentaffairs.psu.edu/cultural)
- Penn State Learning (https://pennstatelearning.psu.edu)
- Residence Life (https://studentaffairs.psu.edu/reslife)
- Student Affairs, Office of (https://studentaffairs.psu.edu)
- Student Care & Advocacy (https://studentaffairs.psu.edu/studentcare)
- Student Conduct, Office of (https://studentaffairs.psu.edu/conduct)
- Student Organization Directory (https://studentaffairs.psu.edu/hub/studentorgs/orgdirectory)
- Summer Session (https://summersession.psu.edu)
- Undergraduate Research (https://undergradresearch.psu.edu)
- University Fellowships Office (https://ufo.psu.edu)
- Veterans Programs, Office of (http://equity.psu.edu/veterans)
- University Libraries (https://libraries.psu.edu)

**Using this Bulletin**

**Introduction**

The Graduate Bulletin is Penn State's comprehensive source for graduate academic information and program requirements.

**New Features**

**Program Page Layout**

- Consistent layout of graduate major degree program information organized within the following tabs:
  - Overview (including the Program Code and Campus)
  - Admission Requirements
  - Degree Requirements
  - Dual-Titles (if any)
  - Integrated Undergrad-Grad Program (if any)
  - Joint Degrees (if any)
  - Student Aid
  - Courses
  - Learning Outcomes
  - Contact

Please note that the University may make changes to policies, procedures, educational offerings, and requirements.

**Changes Page**

- Real-time amendments to information in the Bulletin will be tracked on the Changes page.
- The Bulletin is updated every semester. The Bulletin Archive (http://undergraduate.bulletins.psu.edu/undergraduate/archive) contains previous versions of graduate program information.

**Course Bubble**

When a course link is clicked, a course bubble will appear with important course information including, but not limited to:

- course title, description, and credits;
- prerequisites and recommended preparation;
- if the course is repeatable;
- if the course is cross-listed.

**Statement of Nondiscrimination**

The University is committed to equal access to programs, facilities, admission, and employment for all persons. It is the policy of the University to maintain an environment free of harassment and free of discrimination against any person because of age, race, color, ancestry, national origin, religion, creed, service in the uniformed services (as
defined in state and federal law), veteran status, sex, sexual orientation, marital or family status, pregnancy, pregnancy-related conditions, physical or mental disability, gender, perceived gender, gender identity, genetic information, or political ideas. Discriminatory conduct and harassment, as well as sexual misconduct and relationship violence, violates the dignity of individuals, impedes the realization of the University's educational mission, and will not be tolerated. Direct all inquiries regarding the nondiscrimination policy to the Affirmative Action Office, The Pennsylvania State University, 328 Boucke Building, University Park, PA 16802-5901; Email: aao@psu.edu; Tel 814-863-0471.

Penn State encourages qualified persons with disabilities to participate in its programs and activities. If you anticipate needing any type of accommodation or have questions about the physical access provided, please contact the Student Disability Resources, 814-863-1807, in advance of your participation or visit.

**Academic Authority**

The Graduate Council has responsibility for, and authority over, all academic information contained in the Graduate Bulletin.

Each step of the educational process, from admission through graduation, requires continual review and approval by University officials. The University, therefore, reserves the right to change the requirements and regulations contained in this Bulletin and to determine whether a student has satisfactorily met its requirements for admission or graduation, and to reject any applicant for any reason the University determines to be material to the applicant’s qualifications to pursue higher education.

MORE INFORMATION ABOUT ACADEMIC AUTHORITY (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/postbaccalaureate-credit-certificate-programs) for more details.

**Definitions and Abbreviations**

Described below are definitions related to graduate major degree programs:

**Graduate / Postbaccalaureate Certificate Program**

A graduate or postbaccalaureate credit certificate program is a group of courses that focuses upon an area of specialized knowledge or information and is developed, supervised, and evaluated by the faculty members of the academic unit offering the program. Postbaccalaureate certificate programs reflect emerging academic areas, and may supplement or enhance existing degree programs. Postbaccalaureate certificates and graduate certificates differ in the number of graduate credits required; see the Postbaccalaureate Credit Certificate Programs policy (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/postbaccalaureate-credit-certificate-programs) for more details.

**Graduate Dual-Title Degree Program**

A dual-title program is a fully integrated program of study that integrates course work and research in the graduate major and dual-title fields early in the student’s program. Dual-title programs are adopted by existing graduate major programs; after entering those graduate major programs, students can apply to the dual-title and earn a degree in both their graduate major and the dual-title field. See the Dual-Title Graduate Degree Program policy (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs) for more details.

**Graduate Joint Degree Program**

A joint degree program allows students to pursue work simultaneously towards an existing, specific graduate degree and a professional degree (J.D. or M.D.) offered at Penn State. Joint degree programs enhance students’ educational and research opportunities within the graduate and professional programs, provide students with valuable complementary training for a variety of career opportunities, and enable students to complete both degrees in less time than it would take to complete them separately. See the Joint Degree Programs policy (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/joint-degree-programs) for more details.

**Graduate Minor Program**

A graduate minor may be taken in any of the approved graduate major degree programs. In addition, there are stand-alone graduate minors which are unaffiliated with a graduate major. Graduate minors are available for both master’s and doctoral degrees; see the following Graduate Minor Programs for more details: Minor - Research Master’s Degrees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/graduate-minor-research-masters), Minor - Research Doctorate Degrees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/doctoral-minor-professional-doctorate), Minor - Professional Doctoral Degrees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/minor-professional-doctorate), Minor - Research Master’s Degrees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-700/minor-professional-masters).

**Integrated Undergraduate-Graduate (IUG) Degree Program**

An Integrated Undergraduate-Graduate (IUG) degree program combines a Penn State baccalaureate degree with a master’s degree as a continuous program of study. An IUG program allows qualifying students to:

• create a cohesive plan for baccalaureate and master’s degree studies, with advising informed by requirements for both degree programs;
• complete the combined degree program in less time than it would take to complete each program separately;
• become familiar with the expectations of graduate studies in their programs;
• access the resources of the Graduate School; and
• learn from current graduate students who share academic interests.

See the Integrated Undergraduate-Graduate (IUG) Degree Programs policy (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/integrated-undergraduate-graduate-degree-programs) for more details.

**Option**

An option is a distinct curricular specialization within a graduate major. It is the only formal curricular specialization within a graduate major that is recognized on the transcript and diploma for students in the major. Options are defined by certain minimum requirements related to the distinctiveness and commonality of the course work in the major; see the Degree Program Options policy (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/degree-program-options) for more details.
# Abbreviations, Acronyms, and Codes

Described below are common codes, abbreviations, acronyms, and other types of academic shorthand used at Penn State, along with a brief explanation of each.

<table>
<thead>
<tr>
<th>Code</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Special topics (course suffix; indicates different versions of the same course, e.g., CAS 100A, CAS 100B, CAS 100C)</td>
</tr>
<tr>
<td>A &amp; A</td>
<td>Arts and Architecture (college abbreviation)</td>
</tr>
<tr>
<td>AA</td>
<td>Arts and Architecture (college code)</td>
</tr>
<tr>
<td>AAPPM</td>
<td>Academic Administrative Policies and Procedures Manual</td>
</tr>
<tr>
<td>AB</td>
<td>Abington (campus code)</td>
</tr>
<tr>
<td>AB</td>
<td>Abington (college code)</td>
</tr>
<tr>
<td>ACUE</td>
<td>Administrative Council on Undergraduate Education</td>
</tr>
<tr>
<td>AG</td>
<td>Agricultural Sciences (college code)</td>
</tr>
<tr>
<td>AL</td>
<td>Altoona (campus code)</td>
</tr>
<tr>
<td>AL</td>
<td>Altoona (college code)</td>
</tr>
<tr>
<td>AP</td>
<td>Advanced Placement Program</td>
</tr>
<tr>
<td>APPL</td>
<td>Course requires an application with the School of Music (course characteristic)</td>
</tr>
<tr>
<td>APPT</td>
<td>By appointment (class meeting time)</td>
</tr>
<tr>
<td>AU</td>
<td>Audit, attended regularly (grade reporting symbol)</td>
</tr>
<tr>
<td>AUDN</td>
<td>Course requires an audition (course characteristic)</td>
</tr>
<tr>
<td>AUU</td>
<td>Audit, did not attend regularly (grade reporting symbol)</td>
</tr>
<tr>
<td>B</td>
<td>Special topics (course suffix; indicates different versions of the same course, e.g., CAS 100A, CAS 100B, CAS 100C)</td>
</tr>
<tr>
<td>BA</td>
<td>Business, Smeal College of (college code)</td>
</tr>
<tr>
<td>BC</td>
<td>Behrend (college code)</td>
</tr>
<tr>
<td>BK</td>
<td>Berks (campus code)</td>
</tr>
<tr>
<td>BK</td>
<td>Berks (college code)</td>
</tr>
<tr>
<td>BR</td>
<td>Beaver (campus code)</td>
</tr>
<tr>
<td>BW</td>
<td>Brandywine (campus code)</td>
</tr>
<tr>
<td>C</td>
<td>Special topics (course suffix; indicates different versions of the same course, e.g., CAS 100A, CAS 100B, CAS 100C)</td>
</tr>
<tr>
<td>CA</td>
<td>Capital (college code)</td>
</tr>
<tr>
<td>CALC</td>
<td>Course requires a calculator (course characteristic)</td>
</tr>
<tr>
<td>CAMP</td>
<td>College Assistance Migrant Program</td>
</tr>
<tr>
<td>CAT</td>
<td>Online catalog, University Libraries</td>
</tr>
<tr>
<td>CC</td>
<td>Commonwealth Campuses</td>
</tr>
<tr>
<td>CCP</td>
<td>College Contact Person</td>
</tr>
<tr>
<td>CCRR</td>
<td>College Contact and Referral Representative</td>
</tr>
<tr>
<td>CCGS</td>
<td>Council of Commonwealth Student Governments</td>
</tr>
<tr>
<td>CE</td>
<td>Continuing Education</td>
</tr>
<tr>
<td>CGPA</td>
<td>Cumulative grade-point average</td>
</tr>
<tr>
<td>CIC</td>
<td>Committee on Institutional Cooperation</td>
</tr>
<tr>
<td>CLEP</td>
<td>College-Level Examination Program</td>
</tr>
<tr>
<td>CM</td>
<td>Communications (college code)</td>
</tr>
<tr>
<td>CNCR</td>
<td>Course is scheduled concurrently with another course (course characteristic)</td>
</tr>
<tr>
<td>CNTL</td>
<td>Course is controlled (course characteristic)</td>
</tr>
<tr>
<td>COMM</td>
<td>Communications (college abbreviation)</td>
</tr>
<tr>
<td>CORD</td>
<td>Course is coordinated with other course(s) (course characteristic)</td>
</tr>
<tr>
<td>COST</td>
<td>Course requires an additional fee (course characteristic)</td>
</tr>
<tr>
<td>D</td>
<td>Special topics (course suffix; indicates different versions of the same course, e.g., HIST 297D, HIST 297E)</td>
</tr>
<tr>
<td>DAA</td>
<td>Dean/Director of Academic Affairs</td>
</tr>
<tr>
<td>DF</td>
<td>Deferred grade (grade reporting symbol)</td>
</tr>
<tr>
<td>DN</td>
<td>Dickinson School of Law (campus code)</td>
</tr>
<tr>
<td>DS</td>
<td>DuBois (campus code)</td>
</tr>
<tr>
<td>DU</td>
<td>Division of Undergraduate Studies (college code)</td>
</tr>
<tr>
<td>D U S</td>
<td>Division of Undergraduate Studies (college abbreviation)</td>
</tr>
<tr>
<td>E</td>
<td>Special topics (course suffix; indicates different versions of the same course, e.g., HIST 297D, HIST 297E)</td>
</tr>
<tr>
<td>ECoS</td>
<td>Eberly College of Science</td>
</tr>
<tr>
<td>ED</td>
<td>Education (college code)</td>
</tr>
<tr>
<td>EM</td>
<td>Earth and Mineral Sciences (college code)</td>
</tr>
<tr>
<td>EM SC</td>
<td>Earth and Mineral Sciences (college abbreviation)</td>
</tr>
<tr>
<td>EN</td>
<td>Engineering (college code)</td>
</tr>
<tr>
<td>ENGR</td>
<td>Engineering (college abbreviation)</td>
</tr>
<tr>
<td>EOP</td>
<td>Educational Opportunity Program</td>
</tr>
<tr>
<td>EPR</td>
<td>Early Progress Report</td>
</tr>
<tr>
<td>EPS</td>
<td>Educational Planning Survey</td>
</tr>
<tr>
<td>ER</td>
<td>Behrend (campus code)</td>
</tr>
<tr>
<td>ESL</td>
<td>English as a Second Language</td>
</tr>
<tr>
<td>EVEX</td>
<td>Course has evening exams (course characteristic)</td>
</tr>
<tr>
<td>Code</td>
<td>Description</td>
</tr>
<tr>
<td>------</td>
<td>-------------</td>
</tr>
<tr>
<td>F</td>
<td>Special topics (course suffix; indicates different versions of the same course, e.g., HIST 297F, HIST 297G)</td>
</tr>
<tr>
<td>FE</td>
<td>Fayette (campus code)</td>
</tr>
<tr>
<td>FINL</td>
<td>Course has a final exam (course characteristic)</td>
</tr>
<tr>
<td>FL</td>
<td>Failure under pass/fail option (grade reporting symbol)</td>
</tr>
<tr>
<td>FYS</td>
<td>First-Year Seminar</td>
</tr>
<tr>
<td>G</td>
<td>Special topics (course suffix; indicates different versions of the same course, e.g., HIST 297F, HIST 297G)</td>
</tr>
<tr>
<td>GA</td>
<td>Arts (General Education code)</td>
</tr>
<tr>
<td>GA</td>
<td>Greater Allegheny (campus code)</td>
</tr>
<tr>
<td>GH</td>
<td>Humanities (General Education code)</td>
</tr>
<tr>
<td>GHW</td>
<td>Health and Wellness (General Education code)</td>
</tr>
<tr>
<td>GN</td>
<td>Graduate non-degree (college code)</td>
</tr>
<tr>
<td>GR</td>
<td>Graduate (level code)</td>
</tr>
<tr>
<td>GR ND</td>
<td>Graduate non-degree (college code)</td>
</tr>
<tr>
<td>GS</td>
<td>Social and Behavioral Sciences (General Education code)</td>
</tr>
<tr>
<td>GV</td>
<td>Great Valley (campus code)</td>
</tr>
<tr>
<td>GVS</td>
<td>Writing/Speaking (General Education code)</td>
</tr>
<tr>
<td>H</td>
<td>Honors course or section (course suffix)</td>
</tr>
<tr>
<td>HB</td>
<td>Harrisburg (campus code)</td>
</tr>
<tr>
<td>H HD</td>
<td>Health and Human Development (college abbreviation)</td>
</tr>
<tr>
<td>HH</td>
<td>Health and Human Development (college code)</td>
</tr>
<tr>
<td>HN</td>
<td>Hazleton (campus code)</td>
</tr>
<tr>
<td>HY</td>
<td>Hershey Medical Center (campus code)</td>
</tr>
<tr>
<td>I</td>
<td>Incomplete (grade reporting symbol)</td>
</tr>
<tr>
<td>I</td>
<td>Special topics (course suffix; indicates different versions of the same course, e.g., HIST 297I, HIST 297K)</td>
</tr>
<tr>
<td>I COL</td>
<td>Intercollegiate programs (college abbreviation)</td>
</tr>
<tr>
<td>IB</td>
<td>International Baccalaureate Program</td>
</tr>
<tr>
<td>IC</td>
<td>Intercollegiate programs (college code)</td>
</tr>
<tr>
<td>IL</td>
<td>International Cultures (General Education code)</td>
</tr>
<tr>
<td>INCP</td>
<td>Incomplete (grade reporting symbol)</td>
</tr>
<tr>
<td>INTG</td>
<td>Course is integrated with other courses (course characteristic)</td>
</tr>
<tr>
<td>IS</td>
<td>Information Sciences and Technology (college code)</td>
</tr>
<tr>
<td>IST</td>
<td>Information Sciences and Technology (college abbreviation)</td>
</tr>
<tr>
<td>ITS</td>
<td>Information Technology Services</td>
</tr>
<tr>
<td>IUG</td>
<td>Integrated undergraduate/graduate degree programs</td>
</tr>
<tr>
<td>IVID</td>
<td>Course uses interactive video (course characteristic)</td>
</tr>
<tr>
<td>J</td>
<td>Individualized instruction (course suffix)</td>
</tr>
<tr>
<td>K</td>
<td>Special topics (course suffix; indicates different versions of the same course, e.g., HIST 297I, HIST 297K)</td>
</tr>
<tr>
<td>L</td>
<td>Lecture section (course suffix)</td>
</tr>
<tr>
<td>LA</td>
<td>Liberal Arts (college code)</td>
</tr>
<tr>
<td>LEAP</td>
<td>Learning Edge Academic Program</td>
</tr>
<tr>
<td>LIAB</td>
<td>Course has liability attendance policy (course characteristic)</td>
</tr>
<tr>
<td>LV</td>
<td>Lehigh Valley (campus code)</td>
</tr>
<tr>
<td>LW</td>
<td>Law (level code)</td>
</tr>
<tr>
<td>M</td>
<td>Writing Across the Curriculum and Honors (course suffix)</td>
</tr>
<tr>
<td>MA</td>
<td>Mont Alto (campus code)</td>
</tr>
<tr>
<td>MAC</td>
<td>Morgan Academic Center (for Student-Athletes)</td>
</tr>
<tr>
<td>MD</td>
<td>Medical (level code)</td>
</tr>
<tr>
<td>MD</td>
<td>Medicine (college code)</td>
</tr>
<tr>
<td>MED</td>
<td>Medicine (college abbreviation)</td>
</tr>
<tr>
<td>MEP</td>
<td>Multicultural Engineering Program</td>
</tr>
<tr>
<td>MRC</td>
<td>Multicultural Resource Center</td>
</tr>
<tr>
<td>MS</td>
<td>Military Science (ROTC) (college code)</td>
</tr>
<tr>
<td>NACADA</td>
<td>National Academic Advising Association</td>
</tr>
<tr>
<td>NC</td>
<td>Non-credit (level code)</td>
</tr>
<tr>
<td>NDEGR/C/H</td>
<td>Nondegree Regular/Conditional/High School (Classification of Undergraduate Students)</td>
</tr>
<tr>
<td>NG</td>
<td>No grade (grade reporting symbol)</td>
</tr>
<tr>
<td>NK</td>
<td>New Kensington (campus code)</td>
</tr>
<tr>
<td>NR</td>
<td>Nursing (college code)</td>
</tr>
<tr>
<td>NSO</td>
<td>New Student Orientation</td>
</tr>
<tr>
<td>OCLC</td>
<td>Course meets at an off-campus location (course characteristic)</td>
</tr>
<tr>
<td>ODS</td>
<td>Office for Disability Services</td>
</tr>
<tr>
<td>GSA</td>
<td>Office of the University Registrar</td>
</tr>
<tr>
<td>OUR</td>
<td>Office of the University Registrar</td>
</tr>
</tbody>
</table>
### Common Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>P, Pass</td>
<td>Pass (noncredit course) (grade reporting symbol)</td>
</tr>
<tr>
<td>PC, Penn</td>
<td>Practicum (or laboratory) section (course suffix)</td>
</tr>
<tr>
<td>PR</td>
<td>Semester classification (degree-seeking provisional)</td>
</tr>
<tr>
<td>PREQ</td>
<td>Course has prerequisites (course characteristic)</td>
</tr>
<tr>
<td>PROV</td>
<td>Provisional (degree-seeking) student (Classification of Undergraduate Students)</td>
</tr>
<tr>
<td>PS</td>
<td>Pass (pass/fail option) (grade reporting symbol)</td>
</tr>
<tr>
<td>PSU</td>
<td>Pennsylvania State University</td>
</tr>
<tr>
<td>R, Recitation</td>
<td>Research (grade reporting symbol)</td>
</tr>
<tr>
<td>RAP</td>
<td>Recommended Academic Plan</td>
</tr>
<tr>
<td>RI</td>
<td>Resident Instruction</td>
</tr>
<tr>
<td>ROTC</td>
<td>Reserve Officers’ Training Corps</td>
</tr>
<tr>
<td>S, First-Year</td>
<td>Satisfactory achievement (grade reporting symbol)</td>
</tr>
<tr>
<td>SA</td>
<td>Course is offered at multiple locations via satellite uplink (course characteristic)</td>
</tr>
<tr>
<td>SC</td>
<td>Science, Eberly College of (college code)</td>
</tr>
<tr>
<td>SCIEN</td>
<td>Science, Eberly College of (college abbreviation)</td>
</tr>
<tr>
<td>SEGM</td>
<td>Course is segmented (course characteristic)</td>
</tr>
<tr>
<td>SGPA</td>
<td>Semester grade-point average</td>
</tr>
<tr>
<td>SH</td>
<td>Shenango (campus code)</td>
</tr>
<tr>
<td>SI</td>
<td>Supplemental Instruction</td>
</tr>
<tr>
<td>SITE</td>
<td>Schreyer Institute for Teaching Excellence</td>
</tr>
<tr>
<td>SL</td>
<td>Schuylkill (campus code)</td>
</tr>
<tr>
<td>SLO</td>
<td>Special Living Options</td>
</tr>
<tr>
<td>SOTP</td>
<td>Student Orientation and Transition Programs</td>
</tr>
<tr>
<td>SRTE</td>
<td>Student Ratings of Teacher Effectiveness</td>
</tr>
<tr>
<td>SSSP</td>
<td>Student Support Services Program</td>
</tr>
<tr>
<td>T</td>
<td>First-Year Seminar and Honors (course suffix)</td>
</tr>
<tr>
<td>TMDT</td>
<td>Course has additional meeting times/dates (course characteristic)</td>
</tr>
<tr>
<td>U, United</td>
<td>United States Cultures/International Cultures and Honors (course suffix)</td>
</tr>
<tr>
<td>UAO</td>
<td>Undergraduate Admissions Office</td>
</tr>
<tr>
<td>UC</td>
<td>University College (college code)</td>
</tr>
<tr>
<td>UE</td>
<td>Undergraduate Education</td>
</tr>
<tr>
<td>UFO</td>
<td>University Fellowships Office</td>
</tr>
<tr>
<td>UG</td>
<td>Undergraduate (level code)</td>
</tr>
<tr>
<td>UG ND</td>
<td>Undergraduate non-degree (college code)</td>
</tr>
<tr>
<td>UN</td>
<td>Undergraduate non-degree or degree-seeking provisional (college code)</td>
</tr>
<tr>
<td>UN</td>
<td>Unsatisfactory achievement (grade reporting symbol)</td>
</tr>
<tr>
<td>UP</td>
<td>University Park (campus code)</td>
</tr>
<tr>
<td>UPUA</td>
<td>University Park Undergraduate Association</td>
</tr>
<tr>
<td>US</td>
<td>United States Cultures (General Education code)</td>
</tr>
<tr>
<td>W</td>
<td>Official withdrawal (grade reporting symbol)</td>
</tr>
<tr>
<td>WB</td>
<td>Writing Across the Curriculum (course suffix)</td>
</tr>
<tr>
<td>WC</td>
<td>Wilkes-Barre (campus code)</td>
</tr>
<tr>
<td>WEB</td>
<td>World Campus</td>
</tr>
<tr>
<td>WEP</td>
<td>Web course; offered entirely through the Internet (course characteristic)</td>
</tr>
<tr>
<td>WISE</td>
<td>Women in Engineering Program</td>
</tr>
<tr>
<td>WF</td>
<td>Withdrew failing (grade reporting symbol)</td>
</tr>
<tr>
<td>WISE</td>
<td>Women in the Sciences and Engineering</td>
</tr>
<tr>
<td>WN</td>
<td>Withdrew no grade (grade reporting symbol)</td>
</tr>
<tr>
<td>WP</td>
<td>Withdrew passing (grade reporting symbol)</td>
</tr>
<tr>
<td>WS</td>
<td>Worthington Scranton (campus code)</td>
</tr>
<tr>
<td>X</td>
<td>Writing Across the Curriculum and First-Year Seminar (course suffix)</td>
</tr>
<tr>
<td>XC</td>
<td>State College Continuing Education (campus code)</td>
</tr>
<tr>
<td>XF</td>
<td>Failure, academic dishonesty (course grade)</td>
</tr>
<tr>
<td>XS</td>
<td>Foreign studies program (course code)</td>
</tr>
<tr>
<td>Y</td>
<td>Writing Across the Curriculum course and United States Cultures/International Cultures (course suffix)</td>
</tr>
<tr>
<td>YK</td>
<td>York (campus code)</td>
</tr>
</tbody>
</table>

Common abbreviations for course attributes and suffixes can be found in the University Course Descriptions (http://bulletins.psu.edu/university-course-descriptions) section.

### Changes to the Graduate Bulletin

Changes to the Graduate Bulletin will be tracked in real-time and listed below. At the end of every semester, these updates will be incorporated into the Bulletin.
FAQs

1. Where can I find the Undergraduate Bulletin?
   • The Undergraduate Bulletin is located at http://bulletins.psu.edu/undergraduate.

2. Where can I find a list of courses and course descriptions?
   • You may find courses and descriptions several different ways within the Bulletin. You may navigate to the full listing of courses and descriptions from the Courses (http://bulletins.psu.edu/university-course-descriptions) link in the top navigation menu. You may also scroll over any course number within the Bulletin to see the course description in a course bubble. Search for specific courses through the search option on the homepage or in the search functions throughout the Bulletin.

3. Where can I find past Bulletins?
   • Past Bulletins can be found on the Archive page (p. 7), which can be accessed from any page in the Bulletin’s top navigation menu.

4. When will the Graduate Bulletin be updated?
   • The Bulletin will be updated at the beginning of each semester (fall, spring, and summer). Changes that occur between updates are identified on the Changes page.

5. Why are there some courses listed in the Bulletin that I can’t schedule?
   • The Bulletin Course Description section displays all courses that are currently active at Penn State. Not all of these courses are taught every academic semester or year. To view courses that are available for enrollment by semester, please view the LionPATH Class Search (https://www.lionpath.psu.edu/psc/CSPRD/EMPLOYEE/HRMS/c/SA_LEARNER_SERVICES.CLASS_SEARCH.GBL?Page=SSR_CLSRCH_ENTRY&Action=U).

Have a question we didn’t include? Please let us know by emailing bulletins@psu.edu.
PROGRAMS

Graduate Major Degree Programs

• Accounting (Behrend)
• Accounting (Capital)
• Accounting (Great Valley)
• Accounting (Smeal)
• Acoustics
• Additive Manufacturing and Design
• Aerospace Engineering
• African American and Diaspora Studies
• African Studies
• Agricultural and Biological Engineering
• Agricultural and Extension Education
• Agronomy
• American Studies
• Anatomy
• Animal Science
• Anthropology
• Applied Behavior Analysis
• Applied Clinical Psychology
• Applied Demography
• Applied Linguistics
• Applied Psychological Research
• Architectural Engineering
• Architecture
• Art
• Art Education
• Art History
• Asian Studies
• Astrobiology
• Astronomy and Astrophysics
• Biobehavioral Health
• Biochemistry, Microbiology, and Molecular Biology
• Bioengineering
• Bioethics
• Biogeochemistry
• Bioinformatics and Genomics
• Biology
• Biomedical Engineering
• Biomedical Sciences
• BioRenewable Systems
• Biostatistics
• Biotechnology
• Business Administration (Behrend)
• Business Administration (Capital)
• Business Administration (Executive)
• Business Administration (Great Valley)
• Business Administration (Intercollege)
• Business Administration (Smeal)
• Chemical Engineering
• Chemistry
• Civil Engineering (Capital)
• Civil Engineering (Engineering)
• Classics and Ancient Mediterranean Studies
• Climate Science
• Clinical and Translational Sciences
• Communication Arts and Sciences
• Communication Sciences and Disorders
• Communications
• Community and Economic Development
• Community Psychology and Social Change
• Comparative and International Education
• Comparative Literature
• Computer Science
• Computer Science and Engineering
• Corporate Innovation and Entrepreneurship
• Counselor Education
• Criminal Justice
• Criminal Justice Policy and Administration
• Criminology
• Curriculum and Instruction
• Data Analytics
• Demography
• Earth Sciences
• Ecology
• Economics
• Educational Leadership
• Educational Psychology
• Educational Theory and Policy
• Electrical Engineering (Capital)
• Electrical Engineering (Engineering)
• Energy and Mineral Engineering
• Energy, Environmental, and Food Economics
• Engineering at the Nano-scale
• Engineering Design
• Engineering Leadership and Innovation Management
• Engineering Management (Capital)
• Engineering Management (Great Valley)
• Engineering Science
• Engineering Science and Mechanics
• English
• Enterprise Architecture and Business Transformation
• Entomology
• Environmental Engineering (Capital)
• Environmental Engineering (Engineering)
• Environmental Pollution Control
• Epidemiology
• Facilities Engineering and Management
• Finance
• Food Science
• Forensic Science
• Forest Resources
• French and Francophone Studies
• Geodesign
• Geographic Information Systems
• Geography
• Geosciences
• German
• Health Administration
• Health Education
• Health Policy and Administration
• Higher Education
• History
• Homeland Security
• Horticulture
• Hospitality Management
• Human Development and Family Studies
• Human Dimensions of Natural Resources and the Environment
• Human Resources and Employment Relations
• Humanities
• Industrial Engineering
• Informatics
• Information Science
• Information Sciences
• Information Sciences and Technology
• Information Systems
• Integrative and Biomedical Physiology
• International Affairs
• International Agriculture and Development
• Kinesiology
• Labor and Global Workers’ Rights
• Laboratory Animal Medicine
• Landscape Architecture
• Language Science
• Leadership Development
• Learning, Design, and Technology
• Lifelong Learning and Adult Education
• Literacy Education
• Management and Organizational Leadership
• Mass Communications
• Materials Science and Engineering
• Mathematics
• Mechanical Engineering (Capital)
• Mechanical Engineering (Engineering)
• Media Studies
• Meteorology and Atmospheric Science
• Molecular, Cellular and Integrative Biosciences
• Music
• Music Education
• Neuroscience
• Nuclear Engineering
• Nursing
• Nutritional Sciences
• Operations Research
• Organization Development and Change
• Pathobiology
• Philosophy
• Physics
• Piano Performance
• Plant Biology
• Plant Pathology
• Political Science
• Project Management
• Psychology
• Psychology of Leadership
• Public Administration
• Public Health
• Public Health Sciences
• Public Policy
• Quality and Manufacturing Management
• Recreation, Park, and Tourism Management
• Renewable Energy and Sustainability Systems
• Rural Sociology
• Russian and Comparative Literature
• School Psychology
• Social Data Analytics
• Sociology
• Software Engineering
• Soil Science
• Spanish
• Special Education
• Statistics
• Strategic Communications
• Supply Chain Management
• Systems Engineering
• Teaching and Curriculum
• Teaching English as a Second Language
• Theatre
• Turfgrass Management
• Visual Studies
• Wildlife and Fisheries Science
• Women’s Studies
• Workforce Education and Development

Graduate Minor Programs
• Computational Materials Graduate Minor
• Computational Science Graduate Minor
• Electrochemical Science and Engineering Graduate Minor
• Gerontology Graduate Minor
• Information and Communication Technologies for Development Graduate Minor
• Latin American Studies Graduate Minor
• Latina and Latino Studies Graduate Minor
• Linguistics Graduate Minor
• Literary Theory, Criticism, and Aesthetics Graduate Minor
• Science, Technology, and Society Graduate Minor
• Second Language Acquisition Graduate Minor
• Social Thought Graduate Minor

Graduate Certificate Programs

• Accounting Graduate Credit Certificate Program
• Adult Basic Education Post-baccalaureate Credit Certificate Program
• Adult Education in the Health and Medical Professions Graduate Credit Certificate Program
• Adult Gerontology Acute Care Nurse Practitioner Graduate Credit Certificate Program
• Adult Gerontology Primary Care Nurse Practitioner Graduate Credit Certificate Program
• Agricultural Biosecurity and Food Defense Graduate Credit Certificate Program
• Ancient Languages Postbaccalaureate Credit Certificate Program
• Applied Behavior Analysis Graduate Credit Certificate Program
• Applied Bioinformatics Graduate Credit Certificate Program
• Applied Demography Graduate Credit Certificate Program
• Applied Statistics Graduate Credit Certificate Program
• Bioenergy Graduate Credit Certificate Program
• Business Analytics Graduate Credit Certificate Program
• Children’s Literature Graduate Credit Certificate Program
• Clinical Research Graduate Credit Certificate Program
• Community and Economic Development Graduate Credit Certificate Program
• Corporate Accounting Foundations Graduate Credit Certificate Program
• Corporate Finance Graduate Credit Certificate Program
• Corporate Innovation and Entrepreneurship Graduate Credit Certificate Program
• Counterterrorism Graduate Credit Certificate Program
• Cyber Threat Analytics and Prevention Graduate Credit Certificate Program
• Data Analytics Graduate Credit Certificate Program
• Dietetic Internship Postbaccalaureate Credit Certificate Program
• Distance Education Postbaccalaureate Credit Certificate Program
• Distributed Energy and Grid Modernization Graduate Credit Certificate
• e-Learning Design Graduate Credit Certificate Program
• Educating Individuals with Autism Postbaccalaureate Credit Certificate Program
• Educational Technology Integration Postbaccalaureate Credit Certificate Program
• Engineering Leadership and Innovation Management Graduate Credit Certificate Program
• English as a Second Language (ESL) Program Specialist and Leadership Postbaccalaureate Credit Certificate Program
• English as a Second Language Program Specialist Postbaccalaureate Credit Certificate Program
• Enterprise Architecture Graduate Credit Certificate Program
• Enterprise Information and Security Technology Architecture Graduate Credit Certificate Program
• Family Literacy Postbaccalaureate Credit Certificate Program
• Family Nurse Practitioner Graduate Credit Certificate Program
• Financial Risk Management Graduate Credit Certificate Program
• Folklore and Ethnography Graduate Credit Certificate Program
• Fundraising Leadership Graduate Credit Certificate Program
• Geodesign Graduate Credit Certificate Program
• Geographic Information Systems Postbaccalaureate Credit Certificate Program
• Geospatial Intelligence Analytics Graduate Credit Certificate Program
• Geospatial Intelligence Applications Postbaccalaureate Credit Certificate Program
• Geospatial Programming and Web Map Development Graduate Credit Certificate Program
• Geriatric Nursing Education Graduate Credit Certificate Program
• Gerontology, Postbaccalaureate Credit Certificate Program
• Global Health, Graduate Credit Certificate Program
• Health Sector Management Graduate Credit Certificate Program
• Heritage and Museum Practice Graduate Credit Certificate Program
• Homeland Security Graduate Credit Certificate Program
• Hospital and Health System Preparedness Graduate Credit Certificate Program
• Human Factors Engineering and Ergonomics Graduate Credit Certificate Program
• Human Resource Management Graduate Credit Certificate Program
• Human Resources and Employment Relations Graduate Credit Certificate Program
• Information Systems Cybersecurity Postbaccalaureate Credit Certificate Program
• Institutional Research Graduate Credit Certificate Program
• Interdisciplinary Educational Intervention Research Postbaccalaureate Credit Certificate Program
• International Affairs Graduate Credit Certificate Program
• International Development Policy Graduate Credit Certificate Program
• International Human Resources and Employment Relations Graduate Credit Certificate Program
• International Public Policy Graduate Credit Certificate Program
• International Security Studies Graduate Credit Certificate Program
• Laser-Materials Processing and Laser-Based Manufacturing Graduate Credit Certificate Program
• Literacy Leadership Postbaccalaureate Credit Certificate Program
• Long-Term Care Administration and Policy Graduate Credit Certificate Program
• Marketing Analytics Graduate Credit Certificate Program
• Nanotechnology Systems and Device Development Graduate Credit Certificate Program
• New Ventures and Entrepreneurs Graduate Credit Certificate Program
• Nonprofit Administration Graduate Credit Certificate Program
• Nurse Administrator Graduate Credit Certificate Program
• Nurse Educator Graduate Credit Certificate Program
• Operations and Supply Chain Management Graduate Credit Certificate Program
• Organization Development and Change: Analytics Graduate Credit Certificate Program
• Organization Development and Change: Consulting Skills Graduate Credit Certificate Program
• Organization Development and Change: Essentials Graduate Credit Certificate Program
• Organization Development and Change: Occupational Safety and Health Graduate Credit Certificate Program
• Organization Development and Change: Operational Excellence Graduate Credit Certificate Program
• Primary Palliative Care Graduate Credit Certificate Program
• Principalship Graduate Credit Certificate Program
• Project Management Graduate Credit Certificate Program
• Psychology: Applications in Clinical Psychology Graduate Credit Certificate Program
• Public Budgeting and Financial Management Graduate Credit Certificate Program
• Public Health Graduate Credit Certificate Program
• Public Health Preparedness Graduate Credit Certificate Program
• Public Sector Human Resources Management Graduate Credit Certificate Program
• Remote Sensing and Earth Observation Graduate Credit Certificate Program
• Solar Energy Graduate Credit Certificate Program
• Supply Chain Management Graduate Credit Certificate Program
• Survey Research Methods Graduate Credit Certificate Program
• Sustainability Management and Policy Graduate Credit Certificate Program
• Sustainable Management Practices Graduate Credit Certificate Program
• Systems Engineering Graduate Credit Certificate Program
• Teaching and Learning Online in K-12 Settings Postbaccalaureate Credit Certificate Program
• Teaching Writing and Literacy Post-baccalaureate Credit Certificate Program
• Translational Science Graduate Credit Certificate Program
• Trauma-Informed Psychotherapy Graduate Credit Certificate Program
• Weather and Climate Analytics Graduate Credit Certificate Program
• Wind Energy Graduate Credit Certificate Program

Graduate Majors

Penn State offers more than 190 graduate major degree programs. Below you will find a full catalog of all graduate programs available across all campuses and every academic college at Penn State.

The graduate programs listed here are offered under the auspices of the Graduate School. Professional programs are also offered at Dickinson Law (http://bulletins.psu.edu/dickinsonlaw), Penn State Law, and the College of Medicine (http://bulletins.psu.edu/medicine).

• Accounting (Behavior)
• Accounting (Capital)
• Accounting (Great Valley)
• Accounting (Smeal)
• Acoustics
• Additive Manufacturing and Design
• Aerospace Engineering
• African American and Diaspora Studies
• African Studies
• Agricultural and Biological Engineering
• Agricultural and Extension Education
• Agronomy
• American Studies
• Anatomy
• Animal Science
• Anthropology
• Applied Behavior Analysis
• Applied Clinical Psychology
• Applied Demography
• Applied Linguistics
• Applied Psychological Research
• Architectural Engineering
• Architecture
• Art
• Art Education
• Art History
• Asian Studies
• Astrobiology
• Astronomy and Astrophysics
• Biobehavioral Health
• Biochemistry, Microbiology, and Molecular Biology
• Bioengineering
• Bioethics
• Biogeochmistry
• Bioinformatics and Genomics
• Biology
• Biomedical Engineering
• Biomedical Sciences
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• Biotechnology
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• Finance
• Food Science
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• Health Education
• Health Policy and Administration
• Higher Education
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• Homeland Security
• Horticulture
• Hospitality Management
• Human Development and Family Studies
• Human Dimensions of Natural Resources and the Environment
• Human Resources and Employment Relations
• Humanities
• Industrial Engineering
• Informatics
• Information Science
• Information Sciences
• Information Sciences and Technology
• Information Systems
• Integrative and Biomedical Physiology
• International Affairs
• International Agriculture and Development
• Kinesiology
• Labor and Global Workers’ Rights
• Laboratory Animal Medicine
• Landscape Architecture
• Language Science
• Leadership Development
• Learning, Design, and Technology
• Lifelong Learning and Adult Education
• Literacy Education
• Management and Organizational Leadership
• Mass Communications
• Materials Science and Engineering
• Mathematics
• Mechanical Engineering (Capital)
• Mechanical Engineering (Engineering)
• Media Studies
• Meteorology and Atmospheric Science
• Molecular, Cellular and Integrative Biosciences
• Music
• Music Education
• Neuroscience
• Nuclear Engineering
• Nursing
• Nutritional Sciences
• Operations Research
• Organization Development and Change
• Pathobiology
• Philosophy
• Physics
• Piano Performance
• Plant Biology
• Plant Pathology
• Political Science
• Project Management
• Psychology
• Psychology of Leadership
• Public Administration
• Public Health
• Public Health Sciences
• Public Policy
Accounting (Behrend)

Graduate Program Head: Greg Filbeck
Program Code: ACNTG
Campus(es): Erie (M.P.Acc.)
Degrees Conferred: Master of Professional Accounting (M.P.Acc.)

The Graduate Faculty: View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=ACNTG)

The Master of Professional Accounting (M.P.Acc.) degree program in Accounting requires 30 credit hours beyond the bachelor’s degree and will take one year to complete. This program will equip the students for the increasing legal and financial complexities faced by the accounting profession. This degree will also satisfy the requirements for taking the Certified Public Accountant (CPA) examination and becoming a CPA through the Pennsylvania State Board of Accountancy as well as most of the State Boards of the neighboring states.

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. See GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

Applicants should have an undergraduate degree in business and the course work should be substantially similar to the Penn State Erie undergraduate degree in business. If the degree is in business but not in accounting then applicants should have the following courses or their equivalents completed with B or better in every course:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCTG 211</td>
<td>Financial and Managerial Accounting for Decision Making</td>
<td>4</td>
</tr>
<tr>
<td>ACCTG 310</td>
<td>Federal Taxation I</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 340</td>
<td>Cost Accounting</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 371</td>
<td>Intermediate Accounting I</td>
<td>4</td>
</tr>
<tr>
<td>ACCTG 403</td>
<td>Auditing</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 472</td>
<td>Intermediate Financial Accounting II</td>
<td>3</td>
</tr>
</tbody>
</table>

Applicants should have a minimum 2.8 GPA (on a 4.0 scale) in the junior and senior years, and a minimum 3.0 GPA (on a 4.0 scale) in the accounting courses. Applicants are also required to take the Graduate Management Admission Test (GMAT) or Graduate Record Examination (GRE) and show GMAT (GMAT equivalent of GRE) scores of at least 400.

Applicants must submit the following documents:

1. Online Graduate School application (http://gradschool.psu.edu/prospective-students/how-to-apply) including nonrefundable application fee
2. Statement of intent
3. Official transcripts from all post-secondary institutions attended (http://gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission)
4. Official GMAT/GRE scores reported directly to Penn State University
5. TOEFL or IELTS scores, if applicable

Degree Requirements

Master of Professional Accounting (M.P.Acc.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

A minimum of 30 credits is required for the degree that must be acquired in 400-, 500-, or 800-level courses. At least 21 of the 30 credits must be 500 and 800 level courses, at least 9 credits (of the 21 credits) must be at the 500 level, and the remaining 9 credits must be at 400, 500, or 800 level.

The following courses need to be completed for a total of 30 credits.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Required Courses</td>
<td></td>
</tr>
<tr>
<td>BLAW 444</td>
<td>Advanced UCC and Commercial Transactions</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 806</td>
<td>Taxes and Business Planning</td>
<td>3</td>
</tr>
<tr>
<td>or ACCT 510</td>
<td>Business Tax Planning Theory and Practice</td>
<td></td>
</tr>
<tr>
<td>ACCTG 873</td>
<td>Advanced Topics in Financial Reporting</td>
<td>3</td>
</tr>
<tr>
<td>or ACCT 573</td>
<td>Financial Reporting II</td>
<td></td>
</tr>
<tr>
<td>ACCTG 881</td>
<td>Financial Statement Analysis</td>
<td>3</td>
</tr>
<tr>
<td>or ACCT 561</td>
<td>Financial Statement Analysis II</td>
<td></td>
</tr>
</tbody>
</table>
Accounting (Capital)

Graduate Program Head: Stephen Schappe
Program Code: IACCT
Campus(es): World Campus (M.P.Acc.)
Degrees Conferred: Master of Professional Accounting (M.P.Acc.)
The Graduate Faculty

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCTG 211</td>
<td>Financial and Managerial Accounting for Decision Making</td>
<td>4</td>
</tr>
<tr>
<td>ACCTG 310</td>
<td>Federal Taxation I</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 340</td>
<td>Cost Accounting</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 403</td>
<td>Auditing</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 471</td>
<td>Intermediate Financial Accounting I</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 472</td>
<td>Intermediate Financial Accounting II</td>
<td>3</td>
</tr>
<tr>
<td>FIN 301</td>
<td>Corporation Finance</td>
<td>3</td>
</tr>
</tbody>
</table>

Accreditation and Certification
The Master of Professional Accounting program requirements are designed to allow a student who has completed an undergraduate degree in Accounting (or equivalent) to satisfy the current educational requirements for CPA licensure in Pennsylvania and most if not all other states).

1 The degree to which Texas is willing to accept on-line courses is uncertain, and they require applicants to select an ethics course from a pre-approved list. FL, KS, NJ, and WV all require 6 credit hours of Business Law, so students who desire licensure in those states must have a 3 credit undergraduate course in Business Law to complement the graduate course contemplated in this program. Students with an undergraduate degree in business are assumed to meet this requirement.

Admission Requirements
Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Students who apply for admission should have course work substantially equivalent to an undergraduate degree in Business (or a business discipline) from Penn State University. If the undergraduate major is not Accounting, an applicant should have completed the following minimum core of accounting coursework (or its equivalent):

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCTG 211</td>
<td>Financial and Managerial Accounting for Decision Making</td>
<td>4</td>
</tr>
<tr>
<td>ACCTG 310</td>
<td>Federal Taxation I</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 340</td>
<td>Cost Accounting</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 403</td>
<td>Auditing</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 471</td>
<td>Intermediate Financial Accounting I</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 472</td>
<td>Intermediate Financial Accounting II</td>
<td>3</td>
</tr>
<tr>
<td>FIN 301</td>
<td>Corporation Finance</td>
<td>3</td>
</tr>
</tbody>
</table>

Students should have a grade point average of at least 3.0 (on a 4.0 scale) in their final 60 credits of undergraduate coursework, both overall as well as in Accounting courses. Students must submit scores from the Graduate Management Admissions Test (GMAT) or Graduate Record Examination (GRE).

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. See GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

Degree Requirements
Master of Professional Accounting (M.P.Acc.)
Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

Students must complete a minimum of 30 credit hours of instruction; all credits must be earned in 400 level, 500 level, or 800 level courses. A minimum of 21 credits at the 500- or 800-level is required, of which
at least 9 credits must be earned in 500-level courses. Students must complete the following courses:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 572</td>
<td>Financial Reporting I</td>
<td>3</td>
</tr>
<tr>
<td>PADM 523</td>
<td>Governmental and Nonprofit Accounting</td>
<td>3</td>
</tr>
<tr>
<td>ACCT 550</td>
<td>Professional Responsibilities and Ethics in Accounting</td>
<td>3</td>
</tr>
<tr>
<td>ACCT 532</td>
<td>Accounting Information and Decision Systems</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 881</td>
<td>Financial Statement Analysis</td>
<td>3</td>
</tr>
<tr>
<td>or ACCT 561</td>
<td>Financial Statement Analysis II</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 806</td>
<td>Taxes and Business Planning</td>
<td>3</td>
</tr>
<tr>
<td>or ACCT 510</td>
<td>Business Tax Planning Theory and Practice</td>
<td>3</td>
</tr>
<tr>
<td>ACCT 504</td>
<td>Auditing Theory and Practice</td>
<td>3</td>
</tr>
<tr>
<td>BLAW 444</td>
<td>Advanced UCC and Commercial Transactions</td>
<td>3</td>
</tr>
<tr>
<td>ACCT 545</td>
<td>Strategic Cost Management</td>
<td>3</td>
</tr>
</tbody>
</table>

**Culminating Experience**

| ACCTG 803 | Forensic Accounting and Litigation Support (Capstone Course) | 3       |

Total Credits: 30

ACCTG 803 is the capstone course for the program, integrating materials learned in the other program courses.

**Student Aid**

World Campus students in graduate degree programs may be eligible for financial aid. Refer to the Tuition and Financial Aid section (http://www.worldcampus.psu.edu/tuition-and-financial-aid) of the World Campus website for more information.

**Courses**

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**Contact**

Graduate Program Head: Stephen Schappe

Director of Graduate Studies/Professor-in-Charge: Thomas Amlie

Primary Program Contact: Sherri Harkins

Email: sxh749@psu.edu

Mailing Address: Graduate Admissions, 777 West Harrisburg Pike, Middletown, PA 17057

Telephone: (717) 948-6142

Program Website: Accounting at World Campus (http://www.worldcampus.psu.edu/degrees-and-certificates/penn-state-online-masters-in-professional-accounting-degree/overview)
ACCTG 831 serves as the capstone course for this degree. This capstone course taken at the end of the program uses all the knowledge gained from prior coursework and applies them through presentation and analysis of case studies. Students will study investigative accounting, consulting, and litigation support activities undertaken in forensic accounting engagements through the use of case studies. This capstone course includes a final capstone project which emphasizes case analysis to develop critical thinking and analytical skills in the use of accounting reports for broad-based business analysis. In this capstone project, students examine a current issue in accounting and regulation. Through this comprehensive capstone project, students acquire a big-picture understanding of accounting trends and regulatory issues, along with the critical-thinking skills to evaluate and debate them.

**Student Aid**

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

**Courses**

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**Contact**

**Graduate Program Head:** James A. Nemes

**Director of Graduate Studies/Professor-in-Charge:** Bo Ouyang

**Primary Program Contact:** Sharon Patterson

**Email:**svp40@psu.edu

**Mailing Address:** 30 East Swedesford Road, Malvern, PA 19355

**Telephone:** (610) 648-3250

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**Program Website:** Accounting at Great Valley (http://greatvalley.psu.edu/academics/masters-degrees/accounting)

**Accounting (Smeal)**

**Graduate Program Head:** Henock Louis

**Program Code:** ACCTG

**Campus(es):** University Park (M.Acc.)

**Degrees Conferred:**
- Master of Accounting in Accounting (M.Acc.)
- Integrated B.S. in Accounting and M.Acc. in Accounting

**The Graduate Faculty**

The Master of Accounting allows students to complete the educational requirements to become a certified public accountant in Pennsylvania, as well as most other states. Certified Public Accountants (CPAs) conduct independent audits and provide accounting, tax, and management advisory services. The program prepares students to enter into careers in public accounting, corporate accounting, management accounting, governmental accounting, financial analysis, and law enforcement.

**Admission Requirements**

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Admission to the program is competitive. Criteria for evaluating applicants can include: professional and academic accomplishments, GMAT scores, personal data from application forms and, possibly, interviews or examinations.

Students who apply to the program should have an undergraduate educational background equivalent to a Bachelor of Science degree from the Penn State University Smeal College of Business. Students who apply to the program should have completed the equivalent of the following Penn State University courses:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCTG 211</td>
<td>Financial and Managerial Accounting for Decision Making</td>
<td>4</td>
</tr>
<tr>
<td>ACCTG 403W</td>
<td>Auditing</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 404</td>
<td>Managerial Accounting: Economic Perspective</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 405</td>
<td>Principles of Taxation I</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 471</td>
<td>Intermediate Financial Accounting I</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 472</td>
<td>Intermediate Financial Accounting II</td>
<td>3</td>
</tr>
<tr>
<td>MIS 301</td>
<td>Business Analytics</td>
<td>3</td>
</tr>
</tbody>
</table>

Applicants to the program from outside Penn State may be required to take an entry exam to demonstrate mastery of the material covered in these courses prior to beginning course work in the master’s program.

Although the program has no fixed minimum grade-point requirement, an applicant is generally expected to have maintained a junior-senior grade-point average of at least 3.00 on Penn State’s grading scale of A (4.00) to
D (1.00). In addition, an applicant is expected to have maintained a grade-point average of 3.00 for the required accounting courses.

Applicants to the program are required to take the Graduate Management Admission Test (GMAT). The GMAT requirement is waived for applicants with an undergraduate GPA of 3.50 or higher, or whose undergraduate degree is awarded by Penn State.

In addition to the Graduate School application for admission (http://www.gradschool.psu.edu/prospective-students/how-to-apply), the program requires a completed Smeal College of Business application for graduate study, and official transcripts (http://gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission) from all post-secondary institutions attended.

**Degree Requirements**

**Master of Accounting in Accounting (M.Acc.)**

Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

Students must complete a minimum of 33 credits. The 33 credits must be earned in 400-, 500-, or 800-level courses. At least 18 credits must be earned in 500- and 800-level courses, and at least 6 credits must be earned in 500-level courses.

Students must complete the following 24 required credits:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCTG 432</td>
<td>Accounting Information Systems</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 495</td>
<td>Internship</td>
<td>3</td>
</tr>
<tr>
<td>BA 817</td>
<td>Communication Skills for Management</td>
<td>3</td>
</tr>
<tr>
<td>BA 840</td>
<td>Business Data Management</td>
<td>3</td>
</tr>
<tr>
<td>BA 841</td>
<td>Business Intelligence</td>
<td>3</td>
</tr>
<tr>
<td>BLAW 444</td>
<td>Advanced UCC and Commercial Transactions</td>
<td>3</td>
</tr>
<tr>
<td>FIN 531</td>
<td>Financial Management</td>
<td>3</td>
</tr>
</tbody>
</table>

**Electives**

Students must also complete an additional 9 credits of elective courses selected in consultation with their adviser. A list of approved elective courses is maintained by the graduate program office.

**Culminating Experience**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCTG 873</td>
<td>Advanced Topics in Financial Reporting (Capstone Course)</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits 33

The culminating experience for the degree is the capstone course ACCTG 873.

**Integrated Undergrad-Grad Programs**

**Integrated B.S. in Accounting and M.Acc. in Accounting**

Requirements listed here are in addition to requirements listed in GCAC-210 Integrated Undergraduate-Graduate (IUG) Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/integrated-undergraduate-graduate-degree-programs).

The Department of Accounting offers an integrated program allowing students to receive a B.S. in Accounting and Master of Accounting (M.Acc.) degrees within a five-year period. Students typically are admitted into the integrated program in the spring of the second year of the undergraduate program and the program is completed in the subsequent three years.

**Admission Requirements**

Students must apply to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply), and must meet all the admission requirements of the Graduate School and the Accounting graduate program for the Master of Accounting degree, listed above. Students shall be admitted to an IUG program no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree, as specified in the proposed IUG plan of study.

To apply for the program, students must be enrolled in the Smeal College of Business or the Division of Undergraduate Studies, and intend to complete the entrance-to-major requirements prior to completing 59 cumulative credits at Penn State.

Although the program has no fixed minimum grade-point requirement, an applicant is generally expected to have grade-point average of at least 3.20 on Penn State’s grading scale of A (4.00) to D (1.00).

In addition, the Department may request an interview with an applicant, or require a GMAT exam or other exam. Admissions decisions will be based upon the student’s application, undergraduate record, SAT scores and, if applicable, interviews and examination results.

Admitted students must have completed ACCTG 211 with superior performance by the end of the spring semester in which they apply for admission to the program.

In consultation with an adviser, students must prepare a plan of study appropriate to this integrated program, and must present their plan of study in person to the head of the graduate program or the appropriate committee overseeing the integrated program prior to being admitted to the program. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser as the student advances through the program.

**Degree Requirements**

Students must fulfill all degree requirements for each degree in order to be awarded that degree, subject to the alterations and double-counting of credits as outlined below. Degree requirements for the Bachelor of Science in Accounting are listed in the Undergraduate Bulletin (http://bulletins.psu.edu/bulletins/bluebook). Degree requirements for the Master of Accounting degree are listed above. Students must sequence their courses so all undergraduate degree requirements are fulfilled before taking courses to count towards the graduate degree. If students accepted into the IUG program are unable to complete the M.Acc. degree, they are still eligible to receive their undergraduate degree if all the undergraduate degree requirements have been satisfied.

Students must complete the requirements for a B.S. in Accounting with the following alterations. Some of prescribed courses for the B.S. must be taken in sections that are available only to students enrolled in the program. These prescribed courses, which all count toward the undergraduate degree in accounting, are:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCTG 403W</td>
<td>Auditing</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 404</td>
<td>Managerial Accounting: Economic Perspective</td>
<td>3</td>
</tr>
</tbody>
</table>
ACCTG 405 Principles of Taxation I 3
ACCTG 471 Intermediate Financial Accounting I 3
ACCTG 472 Intermediate Financial Accounting II 3

The student need not satisfy the requirement that 6 credits be completed from the following list of courses:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCTG 406</td>
<td>Principles of Taxation II</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 432</td>
<td>Accounting Information Systems</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 473</td>
<td>Advanced Financial Accounting</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 481</td>
<td>Financial Statement Analysis: Accounting Based</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Evaluation and Decision Making</td>
<td></td>
</tr>
</tbody>
</table>

The following courses cannot be used to satisfy the degree requirements of the integrated B.S./M.Acc. program:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCTG 406</td>
<td>Principles of Taxation II</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 410</td>
<td>Federal Taxation II</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 411</td>
<td>Accounting Practicum: VITA</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 417</td>
<td>Corporate and Managerial Communication</td>
<td>2-3</td>
</tr>
<tr>
<td>ACCTG 422</td>
<td>Accounting Systems</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 450</td>
<td>Advanced Accounting</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 473</td>
<td>Advanced Financial Accounting</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 481</td>
<td>Financial Statement Analysis: Accounting Based</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Evaluation and Decision Making</td>
<td></td>
</tr>
</tbody>
</table>

Up to 12 credits may be double-counted towards the degree requirements for both the graduate and undergraduate degrees; a minimum of 50% of the double-counted courses must be at the 500 or 800 level. Credits associated with the culminating experience for the graduate degree cannot be double-counted.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCTG 432</td>
<td>Accounting Information Systems</td>
<td>3</td>
</tr>
<tr>
<td>BA 840</td>
<td>Business Data Management</td>
<td>3</td>
</tr>
<tr>
<td>BLAW 444</td>
<td>Advanced UCC and Commercial Transactions</td>
<td>3</td>
</tr>
<tr>
<td>FIN 531</td>
<td>Financial Management</td>
<td>3</td>
</tr>
</tbody>
</table>

The aim of this program is to enable the student interested in acoustics to obtain an integrated program covering acoustical science and engineering applications of acoustics.

Student curricula are individually tailored and integrated through a selection of core and elective courses in areas such as:

- basic acoustics
- physical acoustics
- underwater acoustics
- signal processing
- optics
- architectural acoustics
- medical ultrasonics
- aeroacoustics
- vibrations
- wave propagation
- speech
- physiological acoustics
- psychoacoustics
- thermoacoustics
- hydroacoustics
- computational acoustics

The courses are offered by the graduate program in Acoustics and by other participating University departments, including:

- Aerospace Engineering
- Architectural Engineering
- Bioengineering
- Communication Sciences and Disorders
- Electrical Engineering
- Engineering Science and Mechanics
- Geosciences

Student Aid

Refer to the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School’s website. Students in this program are not eligible for graduate assistantships.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact

Graduate Program Head: Henock Louis

Primary Program Contact: Tammy Whitehill
Email: tas1@psu.edu
Mailing Address: 354 Business Building, University Park, PA 16802
Telephone: (814) 865-0041
Program Website: Accounting at University Park (http://www.smeal.psu.edu/macc)
• Mechanical Engineering
• Meteorology
• Physics

**Admission Requirements**

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Entering students should hold a bachelor’s degree in physics, engineering, mathematics, or a closely related field that would provide substantial preparation in mathematics (a minimum of two semesters of calculus-based physics and mathematics to include complex variables and differential equations). In addition, an undergraduate knowledge of statics and dynamics, linear algebra, and electronic circuit analysis, and the ability to use mathematical analysis software is expected. Students with a 3.00 junior/senior average (on a 4.00 scale), appropriate course backgrounds, and a B+ or better average in mathematics, physical science, and engineering courses will be considered for admission. The best-qualified applicants will be accepted up to the number of spaces that are available for new students. An individual with nontechnical background may also apply, but acceptance into the program will depend significantly on the applicant’s undergraduate background and motives to pursue advanced study in acoustics. Exceptions to the minimum 3.00 grade-point average may be made for students with special backgrounds and abilities.

Scores from the Graduate Record Examinations (GRE) are required.

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. See GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

In addition, the Acoustics Program requires a minimum speaking score on the TOEFL internet based test (iBT) of 25 or a minimum acceptable composite score from the International English Language Testing System of 6.5.

Admission to the Ph.D. program is a two-step process. First, the candidate must apply to the Acoustics Program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply) as a Ph.D. student, and the application is reviewed by the Admissions Committee. Admission will permit the student to begin working toward a doctoral degree. However, the student is not a doctoral candidate until he or she has passed the comprehensive examination and been admitted to candidacy.

**Degree Requirements**

**Master of Engineering (M.Eng.)**

Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

The Master of Engineering (M.Eng.) degree is a non-thesis professional master’s degree, and it may be earned by resident students at University Park or through distance education. The Master of Engineering degree is based on graduate course work and a written paper or a developmental study must be submitted to the Acoustics program. Normally, such a paper represents a study of a particular topic that is more limited than that necessary for a thesis. The paper is free of any formal requirements of the Graduate School, but it is expected that the student will use the Thesis Guide as an example of the appropriate format. The total number of credits required for the M. Eng. degree is 30 of which 18 credits must be from 500-level approved core courses in Acoustics. The 12 non-core course credits may be selected from the “Required and Approved” list of courses issued by the Acoustics Program Office. Students may take more than one credit of Colloquium (ACS 590) and more than six credits of Individual Study (ACS 596), but such additional credits cannot be applied to the total number of course credits required. Master of Engineering students may not apply research credits (ACS 600) to the total number of course credits required. The expected duration to complete the M.Eng. degree is 2 years for resident students.

**Master of Science (M.S.)**

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

The Master of Science (M.S.) degree program is based on a combination of graduate course work and research training that is documented and culminates (a) in a Master of Science thesis or (b) in a scholarly paper. The M.S. degree in Acoustics is only available for resident students at University Park. For track (a) both the course selection and research are directed by an adviser. When the student is working on the thesis research, at least two other faculty members, upon the adviser’s suggestion, will be recommended to the Program Chair who will approve the thesis committee. The total number of credits required for the M.S. degree is 30, and at least 20 of those credits must be taken at University Park. 24 course credits are required, of which 18 must be from approved 500-level acoustics core courses. 6 Thesis Research credits (ACS 600) are required for students writing a Master of Science Thesis.

The scholarly paper track (b) is only available for students participating in the one-year M.S. program that requires 12-month continuous registration. As part of the one-year M.S. program students must take one credit of Research Topics (ACS 594) in both the fall and spring semesters, and take a special summer course, Contemporary Research Topics in Acoustics (ACS 580). The scholarly paper will be developed in the ACS 594 classes and will normally be completed as part of ACS 580. This paper will typically be a study of a particular topic that is more limited than that necessary for a thesis. The paper is free of any formal requirements of the Graduate School, but it is expected that the student will use the formatting as described in the Thesis Guide. Students in the one-year M.S. program will not take any Thesis Research credits (ACS 600). The total number of credits required for the M.S. degree is 30, and at least 20 of those credits must be taken at University Park. 24 course credits are required, of which 18 must be from approved 500-level acoustics core courses.

The 6 non-core course credits for either track may be selected from the “Required and Approved” list of courses issued by the Acoustics Program Office. Students may take more than one credit of Colloquium (ACS 590) and more than six credits of Individual Studies (ACS 596) for the paper track or Thesis Research (ACS 600) for the thesis track, but such additional credits cannot be applied to the total number of course credits required for the M.S. degree. The expected duration to complete the M.S. degree with thesis is 2 to 2.5 years and approximately 1 year for students in the one-year resident M.S. program.
Doctor of Philosophy (Ph.D.)
Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

The Doctor of Philosophy (Ph.D.) degree is conferred in recognition of high attainment and productive scholarship. A candidate for the Ph.D. degree must pass the English proficiency and qualifying examinations, prepare and defend a dissertation proposal as part of the comprehensive examination, pass the final oral examination (dissertation defense), and the dissertation must be approved by the dissertation committee. Ph.D. students are required to take 21 credits of 500-level Acoustics core courses, but the dissertation committee may require the doctoral candidate to take specific additional courses. In addition, a Ph.D. candidate must satisfy the Graduate Council residency requirement by registering for two consecutive semesters, fall and spring, as a full-time student. Post-comprehensive exam, continuous registration is required until the thesis has been approved. Penn State's Graduate School allows eight years from successful completion of the qualifying exam for completion of a doctoral degree. The expected duration to complete the Ph.D. degree is 3 years after the completion of a master's degree or 5 years without a master's degree.

Student Aid
Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School's website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

World Campus students in graduate degree programs may be eligible for financial aid. Refer to the Tuition and Financial Aid section (http://www.worldcampus.psu.edu/tuition-and-financial-aid) of the World Campus website for more information.

Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet degree-granting international institution. An undergraduate cumulative grade point average of 3.0 or better on a 4.0 scale in the final two years of undergraduate studies is required.

Additive Manufacturing and Design

Graduate Program Head Timothy Simpson
Program Code AMD
Campus(es) University Park (M.S.) World Campus (M.Eng.)
Degrees Conferred Master of Science (M.S.) Master of Engineering (M.Eng.)
The Graduate Faculty View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fa&prog=AMD)

The overall goal of the Master of Science in Additive Manufacturing and Design and Master of Engineering in Additive Manufacturing and Design is to educate students and working engineers to become technically outstanding experts in additive manufacturing. Specifically, the objectives include:

1. Apply foundational knowledge, critical thinking, problem solving, and creativity in the uses of additive manufacturing and associated design tools and methods.
2. Grow as leaders in manufacturing while maintaining the highest ethical standards in applying additive manufacturing to industry-relevant problems and design challenges.
3. Strive for the advancement of the state-of-art in additive manufacturing and design.
4. Develop innovative solutions through new design paradigms in their respective industries.

Admission Requirements
Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. See GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-305/admission-requirements-international-students) for more information.

To maintain a high quality program, it is important that our students are of a caliber to succeed. As such, the admission requirements for the students enrolling in the M.S. and M.Eng. degree program will be based on: academic records, GRE scores, applicable work experience, their personal statement of interests in additive manufacturing design, and three letters of recommendation from a previous professor or supervisor who can attest to the applicant’s academic potential. Applicants will be expected to have a Bachelor of Science or four-year Associates degree in engineering, manufacturing, materials science, or related field from a U.S. regionally accredited institution or from an officially recognized degree-granting international institution. An undergraduate cumulative grade point average of 3.0 or better on a 4.0 scale in the final two years of undergraduate studies is required.

Contact
Graduate Program Head: Victor W. Sparrow, Director of Graduate Program
Primary Program Contact: Erin Ammerman
Email: exa7@psu.edu
Mailing Address: 201 Applied Science Building, University Park, PA 16802
Telephone: (814) 865-6364
Program Websites:
Acoustics at University Park (http://www.acs.psu.edu)
Acoustics at World Campus (http://www.acs.psu.edu)
Degree Requirements

Master of Engineering (M.Eng.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

A minimum of 30 credits at the 400, 500, or 800 level is required. At least 18 credits must be at the 500 or 800 level, with a minimum of 6 credits at the 500 level.

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td></td>
<td>Required Courses</td>
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<tr>
<td></td>
<td>Complete the following 5 required courses that total 19 credits</td>
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<tr>
<td></td>
<td>with a grade point average of 3.00 or higher:</td>
<td></td>
</tr>
<tr>
<td>ED562</td>
<td>Design for Additive Manufacturing</td>
<td>3</td>
</tr>
<tr>
<td>ESC545</td>
<td>Scientific and Engineering Foundations of Additive Manufacturing</td>
<td>3</td>
</tr>
<tr>
<td>IE527</td>
<td>Additive Manufacturing Processes</td>
<td>3</td>
</tr>
<tr>
<td>MAT567</td>
<td>Additive Manufacturing of Metallic Materials</td>
<td>3</td>
</tr>
<tr>
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<td>Metal Additive Manufacturing Laboratory</td>
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</tr>
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<td></td>
<td>Complete a minimum of 8 credits in 400 and/or 500 level courses</td>
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<td>Complete SARI (Scholarship and Research Integrity) training</td>
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Culminating Experience

A scholarly paper must be completed to meet the specific requirement of the culminating experience. This paper will demonstrate depth of knowledge to his/her adviser, a second reader, and the Associate Department Head of Graduate Studies in one of the five aforementioned Departments.

Complete 3 credits in one of the following offerings to complete the culminating project: 3

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<td>EDS596</td>
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Total Credits 30

1 Note that EDSGN 596, ESC 596, IE 596, MATSE 596, and ME 596 cannot be used to fulfill this requirement.

2 M.Eng. students can complete a three (3) credit course in one (1) semester.

3 The one-credit colloquium does not count toward the 30 graduate course credits required.

Culminating Experience

Candidates must write a culminating project paper on a topic mutually agreed upon with the adviser. Students will be encouraged to utilize an industry internship (resident students) or current employer (online students) to identify a relevant or practical problem of importance that additive manufacturing and appropriate design methods could address. The quality of the required paper is such that it must be suitable for publication in a professional journal or proceedings at a national or international conference, which generally requires a peer-review process.

Master of Science (M.S.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

A minimum of 30 credits at the 400, 500, or 800 level is required. At least 18 credits must be in 500-level courses.

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Culminating Experience

A scholarly paper must be completed to meet the specific requirement of the culminating experience. This paper will demonstrate depth of knowledge to his/her adviser, a second reader, and the Associate Department Head of Graduate Studies in one of the five aforementioned Departments.

Complete 3 credits in one of the following offerings to complete the culminating project: 3

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</table>

Total Credits 30

1 Note that EDSGN 596, ESC 596, IE 596, MATSE 596, and ME 596 cannot be used to fulfill this requirement.
M.S. students are required to complete one (1) credit in each of three (3) semesters. The one-credit colloquium does not count toward the 30 graduate course credits required.

The M.S. degree is designed to be completed in 3 semesters, or one calendar year (fall, spring, and summer). A research adviser will be assigned to students in their first semester. Students who need more time to complete the final paper will be allowed to complete the paper, and have it reviewed and approved after the third semester has ended. Students are not required to remain in residence while they complete the final paper. However, extensions granted to students in this program must comply with the Graduate Council policy on deferred grades.

Culminating Experience
Candidates must write a culminating project paper on a topic mutually agreed upon with the adviser. Students will be encouraged to utilize an industry internship (resident students) or current employer (online students) to identify a relevant or practical problem of importance that additive manufacturing and appropriate design methods could address. The quality of the required paper is such that it must be suitable for publication in a professional journal or proceedings at a national or international conference, which generally requires a peer-review process.

Student Aid
Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding section of The Graduate School's website. Students on graduate assistantships must adhere to the course load limits set by The Graduate School.

World Campus students in graduate degree programs may be eligible for financial aid. Refer to the Tuition and Financial Aid section (http://www.worldcampus.psu.edu/tuition-and-financial-aid) of the World Campus website for more information.

Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact
Graduate Program Head: Timothy Simpson
Primary Program Contact: Jaclyn Stimely
Email: juc52@psu.edu
Mailing Address: 314A Leonhard Building, Penn State University, University Park, PA 16802
Telephone: (814) 863-8069
Program Websites:

Additive Manufacturing and Design at University Park (http://www.amdprogram.psu.edu)
Additive Manufacturing and Design at World Campus (https://www.worldcampus.psu.edu/degrees-and-certificates/penn-state-online-additive-manufacturing-and-design-masters-degree/overview)

Aerospace Engineering
Graduate Program Head: Amy Pritchett
Program Code: AERSP
Campus(es): University Park (Ph.D., M.S., M.Eng.)
Degrees Conferred:
- Doctor of Philosophy (Ph.D.)
- Master of Science (M.S.)
- Master of Engineering (M.Eng.)

The Graduate Faculty: View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=AERSP)

Opportunities for graduate study are available in the following areas:
- low-speed aerodynamics
- airplane and helicopter aerodynamics
- V/STOL aircraft
- turbulence
- astrodynamics
- turbomachinery
- air breathing propulsion
- aeroacoustics
- gas dynamics
- stability and control of aerospace vehicles
- aerospace structures
- structural dynamics
- aeroelasticity
- rotorcraft engineering
- computational fluid dynamics
- experimental fluid dynamics
- space propulsion
- space vehicle dynamics
- high-performance computing

Admission Requirements
Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

The entering M.Eng. or M.S. student must hold a bachelor's degree in engineering, physical science, or mathematics, and may be required to complete (without degree credit) undergraduate course work in fluid and solid mechanics and intermediate mathematical analysis, if not already completed. The department will consider students with a 3.0 junior/senior grade-point average (GPA) on a 4.0 scale; students with special backgrounds, abilities, or interests may request a waiver to this GPA.
Degree Requirements
Master of Engineering (M.Eng.)
Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

Core Requirements
1. Basic field theories. Complete two courses for 6 credits, one from a prescribed list in each of two of the following categories: fluid mechanics, solid mechanics, or system dynamics.
2. Numerical/computational methods. Complete one 3-credit course that addresses the numerical analysis of differential equations, from a prescribed list.
3. Applied mathematics. Complete one 3-credit, 500-level course from a prescribed list.
4. Teaching assistants and teaching aides who have classroom or laboratory instructional responsibilities must satisfactorily complete ENGR 888. Those with responsibilities limited to grading, holding office hours, and offering problem sessions must take ENGR 888 or a grading seminar.

The M.Eng. degree is a non-thesis professional master's degree. A total of 30 credits are required, including courses in the core requirements. A minimum of 18 credits must be taken at the 500-level. At least 18 credits in Aerospace Engineering courses are required, and a student may count a maximum of 9 credits of 400-level course work toward the degree. Each student must complete the capstone course.

Master of Science (M.S.)
Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

Core Requirements
1. Basic field theories. Complete two courses for 6 credits, one from a prescribed list in each of two of the following categories: fluid mechanics, solid mechanics, or system dynamics.
2. Numerical/computational methods. Complete one 3-credit course that addresses the numerical analysis of differential equations, from a prescribed list.
3. Applied mathematics. Complete one 3-credit, 500-level course from a prescribed list.
4. Teaching assistants and teaching aides who have classroom or laboratory instructional responsibilities must satisfactorily complete ENGR 888. Those with responsibilities limited to grading, holding office hours, and offering problem sessions must take ENGR 888 or a grading seminar.

A total of 30 credits is required, including courses in the core requirements. Twelve credits must be in Aerospace Engineering courses with at least 6 credits at the 500 level. A student may count a maximum of 6 credits of 400-level course work toward the degree. Six credits of thesis research are also required. A completed M.S. thesis and its public presentation are required for graduation.

Doctor of Philosophy (Ph.D.)
Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

Core Requirements
1. Basic field theories. Complete two courses for 6 credits, one from a prescribed list in each of two of the following categories: fluid mechanics, solid mechanics, or system dynamics.
2. Numerical/computational methods. Complete one 3-credit course that addresses the numerical analysis of differential equations, from a prescribed list.
3. Applied mathematics. Complete one 3-credit, 500-level course from a prescribed list.
4. Teaching assistants and teaching aides who have classroom or laboratory instructional responsibilities must satisfactorily complete ENGR 888. Those with responsibilities limited to grading, holding office hours, and offering problem sessions must take ENGR 888 or a grading seminar.

There is no foreign language requirement for the Ph.D. degree; however, students must demonstrate proficiency in reading, writing, and speaking English through an examination administered by the department. This must be completed to satisfy the Graduate Council requirement before taking the comprehensive exam. The student's dissertation committee decides which, if any, courses are required in addition to those specified in the core requirements; this typically involves 24 course credits beyond the M.S. degree. Ph.D. students must also demonstrate evidence of experimental experience.

Over the course of a Ph.D. program, the department and dissertation committee administer three examinations: The qualifying examination is given as a preliminary aptitude test before the end of the second semester following admission to the program. A comprehensive examination, which covers the major and minor fields of study, is administered after the student has substantially completed the required course work. The final oral examination, which is related mainly to the dissertation, is given after the candidate has satisfied all other degree requirements. All Ph.D. students must maintain continuous registration until the dissertation is approved. A completed Ph.D. dissertation and its public defense are required for graduation.

Student Aid
Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School's website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by
graduate students. Courses below the 400 level may not. A graduate
student may register for or audit these courses in order to make up
deficiencies or to fill in gaps in previous education but not to meet
requirements for an advanced degree.

Contact
Graduate Program Head: Amy Pritchett
Director of Graduate Studies/Professor-in-Charge: Jacob Langelaan
Primary Program Contact: Michelle Barnyak (mlf1@psu.edu)
Program Email: gradaero@engr.psu.edu
Mailing Address: 229 Hammond Building, University Park, PA 16802
Telephone: (814) 863-6361
Program Website: Aerospace Engineering (http://www.aero.psu.edu)

African American and Diaspora Studies

Graduate Program Head: Cynthia A. Young
Program Code: AFAMD
Campus(es): University Park
Degrees Conferred: Dual-Title
The Graduate Faculty: View (https://
secure.gradsch.psu.edu/gpms/index.cfm?
searchType=fac&prog=AFAMD)

Students electing this program through participating departments will
earn a degree with a dual-title at the Ph.D. level, i.e., Ph.D. in (graduate
program name) and African American and Diaspora Studies.

The following graduate programs offer a dual-title Ph.D. degree in

The primary objective of the dual-title degree program in African
American Studies is to expand teaching, research, and scholarship on
the nearly one billion people of African descent scattered across several
regions of the world. As a program committed to integrating knowledge
produced across disciplines and to crediting the importance of historical
considerations, it will reinforce and broaden the knowledge that students
acquire and that scholars typically cultivate in the traditional disciplines.
This is accomplished through partnerships with allied disciplines, such
as History, Political Science, Philosophy, English, Comparative Literature,
and Art Education. Graduate students are trained to describe, analyze,
and evaluate the practices, phenomena, and policies that both issue from
and structure the experiences and possibilities of African-descended
peoples in the Americas and in African diasporic populations around the
world. Students in more traditional disciplines such as English or History
who want to acquire formal knowledge about African Americans and the
African Diaspora beyond what is offered by their home departments will
be able to acquire that knowledge through the seminars offered in this
program. The program aims to produce Penn State doctoral graduates
with a competitive advantage for African American and Diaspora Studies-
related employment in academia and elsewhere.

Admission Requirements
Requirements listed here are in addition to requirements listed
in GCAC-208 Dual-Title Graduate Degree Programs (http://
gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-
title-graduate-degree-programs).

For admission to the dual-title Ph.D. degree under this program, a
student must first apply and be admitted to an approved partnering
graduate program. Once accepted by the partnering graduate program,
the student can apply to the African American and Diaspora Studies
Admissions Committee, which will be composed of Graduate Faculty
in the Department of African American Studies. The application must
include a statement of purpose that addresses how the student's
research and professional goals intersect with the objectives of the dual-
title graduate degree program in African American and Diaspora Studies.
The Admissions Committee reviews applications and recommends
students for admission to the dual-title PhD program in African American
and Diaspora Studies.

Students may apply to the dual-title program when they request
admission to the partner department, or at any time prior to taking the
qualifying exam in the primary graduate program, provided that they
secure the approval of the graduate director of the partner department.
Practically speaking, this will likely mean applying to the dual-title
program before completing the second year of study in the partner
department. Students applying to the dual-title degree program should
be aware that participating in a dual-title program may require additional
time to complete the degree; students should plan ahead to secure
sufficient funding.

The African American and Diaspora Studies dual-title graduate degree
program will follow the timetable and admission requirements of its
partnering graduate programs.

GPA and GRE Requirements
Applicants entering with only an undergraduate degree should have a
junior/senior cumulative average of at least 3.00 (on a 4.00 scale), and,
where applicable, a minimum GPA of 3.50 for all graduate work previously
undertaken. Exceptions to the minimum GPA requirement may be made
for students with special backgrounds, abilities, and interests. Each
applicant must submit the scores of the Graduate Record Examination
(GRE) taken within five years previous to the date of application.

Degree Requirements
Requirements listed here are in addition to requirements listed
in GCAC-208 Dual-Title Graduate Degree Programs (http://
gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-
title-graduate-degree-programs).

The minimum course requirements for this dual-title Ph.D. degree are
as follows: 15 credits of course work related to African American and
Diaspora Studies, all at the 500 level or above. Of these 15 credits, 9 must
come from the required core course sequence in African American and
Diaspora Studies, which comprises the following courses:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AFAM 501</td>
<td>Seminar in African American Studies</td>
<td>3</td>
</tr>
<tr>
<td>AFAM 502</td>
<td>Blacks and African Diaspora</td>
<td>3</td>
</tr>
<tr>
<td>AFAM 503</td>
<td>Sexual and Gender Politics in the African Diaspora</td>
<td>3</td>
</tr>
</tbody>
</table>
Students must also take 6 elective credits, all of which must come either from the list below or otherwise have the prior approval of African American and Diaspora Studies supervising faculty. Over time, additional courses may be added to the list of acceptable electives. The director of graduate studies in the Department of African American Studies will maintain a comprehensive list of approved courses. Particular courses may simultaneously satisfy requirements in History and in African American and Diaspora Studies. Students who already hold a master’s degree from another institution may petition to have up to 6 equivalent course credits recognized.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AFR 501</td>
<td>Key Issues in African Studies</td>
<td>6</td>
</tr>
<tr>
<td>PHIL 539</td>
<td>Critical Philosophy of Race</td>
<td></td>
</tr>
<tr>
<td>HIST 547</td>
<td>Slavery in the Americas</td>
<td></td>
</tr>
<tr>
<td>HIST 551</td>
<td>The African American Freedom Struggle in the Twentieth Century</td>
<td></td>
</tr>
<tr>
<td>HIST 572</td>
<td>Race and Empire in the Americas, Caribbean &amp; Pacific</td>
<td></td>
</tr>
<tr>
<td>ENGL 565</td>
<td>Period Studies in African-American Literature</td>
<td></td>
</tr>
<tr>
<td>ENGL 566</td>
<td>Genre Studies in African-American Literature</td>
<td></td>
</tr>
<tr>
<td>ENGL 567</td>
<td>Thematic Studies in African-American Literature</td>
<td></td>
</tr>
<tr>
<td>ENGL 568</td>
<td>Gender Issues in African-American Literature</td>
<td></td>
</tr>
</tbody>
</table>

**Language Requirements**

Communication and foreign language requirements will be determined by the academic advisers from the primary department.

**qualifying examination**

The dual-title field must be fully integrated into the qualifying exam for the doctoral program. In addition, students in the dual-title Ph.D. in African American and Diaspora Studies will be required to present to their committee a portfolio of work in African American and Diaspora Studies which includes a statement of the student's interdisciplinary research interests, a program plan, and samples of writing that indicate the student's interest in questions taken up by scholars of African American and Diaspora Studies.

**dissertation Committee Composition**

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gsad/cac/gcac-600/phd-dissertation-committee-formation), at least one member of the dissertation committee must be a member of the African American and Diaspora Studies Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. If the chair is not faculty in African American and Diaspora Studies, then the committee member representing African American and Diaspora Studies must be appointed as co-chair.

**Comprehensive Exams**

The African American and Diaspora Studies Graduate Faculty member on the student's committee is responsible for developing and administering the African American and Diaspora Studies portion of the student's comprehensive exams. The exam must incorporate written and oral components in African American and Diaspora Studies based on the student's thematic or regional area of interest and specialization in African American and Diaspora Studies. The African American and Diaspora Studies portion of the exam will include the following components: broad history of the field, contemporary theory and debates, and either sexual and gender politics or a topic related to the student's specific area of interest.

**Dissertation**

The candidate must complete a dissertation and pass a final oral examination (the dissertation defense) on a topic that reflects their original research and education in both the primary discipline and African American and Diaspora Studies in order to earn the dual-title Ph.D. degree.

**Student Aid**

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School’s website. Students on graduate assistantships must adhere to the course credit loads (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

**Courses**

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**Contact**

**Graduate Program Head:** Cynthia Young

**Director of Graduate Studies/Professor-in-Charge:** Raymond Gilyard

**Primary Program Contact:** Jamie Whitehead

**Email:** jle1@psu.edu

**Mailing Address:** 133 Willard Building, Pennsylvania State University, University Park, PA 16802

**Telephone:** (814)867-3549

**Program Website:** African American and Diaspora Studies (http://afam.la.psu.edu)

**African Studies**

**Graduate Program Head:** William J. Dewey

**Program Code:** AFRST

**Campus(es):** University Park

**Degrees Conferred:** Dual-Title

**The Graduate Faculty**

View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=AFRST)

Students electing this program through participating departments will earn a degree with a dual-title at the Ph.D. level, i.e., Ph.D. in (graduate program name) and African American and Diaspora Studies.
The following graduate programs offer dual-title Ph.D. degrees in African Studies: Comparative Literature, French, Geography, and Political Science.

The primary objective of the dual-title degree program in African Studies is to expand teaching, research, and scholarship on Africa and African societies at Penn State. This is accomplished by providing multidisciplinary training for Penn State doctoral students, who are undertaking graduate studies in Africa-related topics in a number of allied disciplines, such as geography, history, political science, sociology, comparative literature, public health, forestry, agricultural sciences, and international studies. The program complements training on Africa for graduate students in other areas such as business, law, and engineering. The program provides these various disciplines with an intellectual and physical location at which their African scholarship can be put to the most effective use for graduate students. The program uses the research projects and institutional networks of core and affiliate African Studies Graduate Faculty to provide research opportunities and linkages in Africa for Penn State doctoral students. The program aims to produce Penn State doctoral graduates, who have a comparative advantage for African Studies-related employment in academia, bilateral and multilateral agencies and international think-tanks.

Admission Requirements

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

Students must apply and be admitted to the primary graduate program and the Graduate School before they can apply for admission to the dual-title degree program. Applicants interested in the dual-title degree program may make their interest in the program known clearly on their applications to the major program and include remarks in their statement of purpose that address the ways in which their research and professional goals reflect an interest in African Studies-related research.

To be enrolled in the Dual Title Doctoral Degree Program in African Studies, a student must submit a letter of application and transcript, which will be reviewed by an African Studies Admissions Committee. An applicant must have a minimum grade point average of 3.0 (on a 4 point scale) to be considered for enrollment in the dual-title degree program. Students must apply for enrollment into the dual-title degree program in African Studies prior to taking the qualifying examination in their primary program.

Degree Requirements

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

The Dual-Title Doctoral Degree in African Studies is awarded to students who are admitted to a Ph.D. program that has adopted the dual-title degree program in African Studies. The minimum course requirements for the dual-title Ph.D. degree in African Studies are as follows.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AFR 501</td>
<td>Key Issues in African Studies</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>18 credits of Africa-related coursework at the 400 or 500-level</td>
<td>18</td>
</tr>
</tbody>
</table>

- a minimum of 6 of these credits must be taken from a list of courses maintained by the African Studies program chair
- as many as 6 of the 18 credits may come from the primary program as approved by the student’s academic advisers in the primary program and the African Studies Program
- no more than 6 credits may be taken at the 400-level and no more than 6 combined credits may come from individual studies courses and/or foreign studies courses

Communication and foreign language requirements will be determined by the student and the academic advisers from the primary program and the African Studies Program

| Total Credits | 21 |

The choice of electives in African Studies is to be proposed by the student subject to approval by the academic advisers from the primary program and the African Studies Program, in accordance with the existing language requirements of the primary program.

qualifying Examination

The dual-title degree is guided by the Qualifying Exam procedure of the primary program. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable. There will be a single qualifying examination, containing elements of both the major discipline and African Studies.

dissertation Committee Composition

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the committee must include at least one member of the African Studies Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. The chair of the committee is typically from the primary program. If the chair is not also a member of the Graduate Faculty in African Studies, the member of the committee representing African Studies must be appointed as co-chair.

Comprehensive Examination

After completing all course work, doctoral students must pass a comprehensive examination that includes written and oral components. Written components are administered on a student’s primary discipline and in African Studies. The African Studies representative on the student’s dissertation committee develops questions for and participates in the evaluation of the comprehensive examination. The African Studies component of the exam is based on the student’s thematic, national or regional area of interest and specialization in African Studies.

Dissertation and Dissertation Defense

Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree.
Students enrolled in the dual-title program are required to write and orally defend a dissertation on a topic that reflects their original research and education in both the primary discipline and African Studies.

**Student Aid**

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

**Courses**

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**Learning Outcomes**

1. Graduates will demonstrate command of historical and current socioeconomic developments of Africa.
2. Graduates will demonstrate command of applying social science and humanities methodologies in the advancement of knowledge about Africa’s broad socioeconomic developments.
3. Graduates will demonstrate the ability to effectively communicate major issues in the study of Africa.
4. Graduates will have command of critical thinking and interdisciplinary analysis of developments in Africa.
5. Graduates will master the highest ethical standards required in conducting research and in applying their discipline.

**Contact**

Graduate Program Head: William J. Dewey

Primary Program Contact: Jamie Whitehead

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Mailing Address: 133 Willard Building, University Park, PA 16802

Telephone: (814)867-3549

Program Website: African Studies (http://afr.la.psu.edu)

Agricultural and Biological Engineering offers students the opportunity to gain expertise in areas of engineering for biological/agricultural systems corresponding to their professional interests. Graduate students select research projects (and supporting course work) from a wide range of interest areas that match faculty research expertise. Research projects are available in:

- physical properties of biological materials
- plant and animal production systems
- food engineering
- wood engineering
- agricultural structures
- agricultural safety
- food safety
- bulk solids handling and storage
- agricultural systems engineering
- agricultural by-product utilization
- forage processing and handling systems
- electronics instrumentation
- online computer control systems
- erosion and sedimentation control
- waste management
- water quality
- natural resources management and conservation

Excellent facilities, including equipment and instrumentation, are available for research in the designated areas. Among the special facilities are:

- field plot areas
- a full-scale sedimentation basin test facility
- hydraulic flumes
- sedigraph
- gas and ion chromatography units
- atomic absorption unit
- rainfall simulators
• food properties lab
• food equipment and processing lab
• microbiological engineering lab
• fermentation lab
• computer vision systems
• hydraulic and pneumatic test stands
• fabrication shop
• electronics instrumentation
• microcomputer laboratory
• controlled environment chambers
• composite characterization labs
• wood structures lab
• wood mechanics lab

Collaborative arrangements allow access to a large variety of other resources:

• Penn State Institutes of the Environment and Energy
• Huck Institutes of the Life Sciences
• Materials Research Institute
• Materials Characterization Laboratory
• Nanofabrication Facility
• Penn State Institute for CyberScience
• PA Housing Research Center
• Center for Food Manufacturing
• USDA Pasture Systems and Watershed Management Research Lab
• a mushroom research and demonstration facility
• a 1,500-acre agricultural research center for cooperative work with agronomic and horticultural production systems as well as animal production systems

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

An undergraduate major in engineering is normally a prerequisite to work in the major. Students without an undergraduate engineering degree will be considered for admission on a provisional basis (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/provisional-admission) pending the completion of a number of additional credits to be specified on an individual basis. These additional credits will not count towards the program degree requirements.

All students must submit scores from the General Aptitude Test of the Graduate Record Examinations (GRE) prior to admission (except those who have an ABET-accredited engineering degree). There is no minimum GRE score required for admission, as this is only one of several qualifications considered in the admission review process. However, financial assistance is often influenced by the degree of success exhibited by GRE scores and grade-point averages (GPAs) from previous engineering programs.

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. See GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

All applicants must provide the department with official transcripts from all post-secondary institutions attended (http://gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission), as well as a statement of purpose written by the applicant, and at least three letters of recommendation. Admission into the Agricultural and Biological Engineering Graduate Program is based upon a thorough review of all applicant qualifications, and the best-qualified applicants will be accepted up to the number of students for which department resources are available.

Master of Science (M.S.)

Completion of an undergraduate degree in agricultural or biological engineering or in another related engineering discipline is required for direct admission to the Agricultural and Biological Engineering Graduate Program. Students need at least a 3.0 (4.0 base) junior/senior grade-point average to be considered for admission.

A student with an undergraduate degree in a non-engineering field can be admitted to the M.S. program on a provisional basis (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/provisional-admission), pending the completion of a number of additional credits to be specified on an individual basis. These additional credits will not count towards the M.S. degree requirements.

The provision status continues until completion of the engineering undergraduate requirements in mathematics, physics, engineering sciences (thermodynamics, statics, dynamics, strength of materials, fluid-mechanics and electrical circuitry), and 6 credits of 400-level Biological Engineering courses. Upon completion of these preparatory courses with a minimum grade-point average of 3.0, the student will be admitted to the graduate program.

Doctor of Philosophy (Ph.D.)

The program requirement for acceptance to graduate study toward a Ph.D. degree in Agricultural and Biological Engineering is an M.S. degree with research thesis in an engineering or science discipline with a B.S. degree from an engineering program. Outstanding students interested in direct admission from a B.S. engineering program to the Ph.D. Program should contact the Graduate Program Coordinator. Direct admission will be based on critical evaluation of the student’s potential to conduct publishable research, academic record, results of standardized tests, statement of purpose, and reference letters. Students who apply directly to the Ph.D. program but are not qualified will be considered for admission into the M.S. program.

A student with an undergraduate degree in a non-engineering field can be admitted to the Ph.D. program on a provisional basis (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/provisional-admission), pending the completion of a number of additional credits to be specified on an individual basis. These additional credits will not count towards the Ph.D. degree requirements.

Degree Requirements

Master of Science (M.S.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

All candidates for the M.S. degree must complete a minimum of 30 credits at the 400, 500, 600, or 800 level, with at least 6 credits in thesis...
research (600 or 610). All candidates for the M.S. must write a thesis. The thesis must be accepted by the advisers and/or committee members, the head of the graduate program, and the Graduate School, and the students must pass a thesis defense.

**Doctor of Philosophy (Ph.D.)**

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

Official entrance into a Ph.D. program occurs upon successful completion of the Ph.D. Qualifying Exam. Ph.D. degree requirements include successful completion of the following: approved graduate course work, Ph.D. English competency requirements, a comprehensive examination, and final oral examination (the dissertation defense). To earn the Ph.D. degree, doctoral candidates must write a dissertation that is accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

No specified number of courses completed or credits earned are required by the department. However, the candidate must complete at least 9 credits of Agricultural and Biological Engineering (ABE) course work beyond the baccalaureate degree. Six credits must be 500-level ABE courses (excluding ABE 500, ABE 590, ABE 594, ABE 595, ABE 596); the remaining 3 credits must be in any ABE course 460 or higher. Unless previously taken, all Ph.D. students must complete ABE 500. The student’s dissertation committee will recommend the minimum requirements in such supporting areas as mathematics, engineering, agricultural/biological sciences, and physical sciences. The candidate is expected to develop a program of study and submit it to the appointed dissertation committee for consideration and approval. All Ph.D. students are required to participate in resident education or extension teaching activities for the equivalent of at least one semester during their graduate program. A typical plan of study consists of about 90 credits beyond the baccalaureate degree with about 30 of the total credits for research. All requirements for a Ph.D. degree, whether satisfied on this campus or elsewhere, must be completed within eight years after passing the qualifying examination.

**Ph.D. Language and Communication Requirement**
The purpose of the communication requirement is to strengthen the student’s professional communication skills. The candidate must take a minimum of two courses (a minimum total of 5 credits) and receive a grade of B or better in each course taken. Course selections must be approved by the academic adviser prior to registration. Courses used to satisfy this requirement must include the substantial practice of writing and/or speaking.

**Dual-titles**

**Dual-Title M.S. and Ph.D. in Agricultural and Biological Engineering and International Agriculture and Development**

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

Graduate students with research and educational interests in international education may apply to the dual-title program in Agricultural and Biological Engineering and International Agriculture and Development. The goal of the dual-title program in ABENG and INTAD is to enable graduate students from ABENG to acquire the knowledge and skills of their primary area of specialization in ABENG, while at the same time gaining the perspective and methods needed for work in the international agriculture. Graduate study in this program seeks to prepare students to assume leadership roles in science, engineering, outreach, and project management anywhere in the world. Students acquire a broad perspective on how to apply their research findings in the context of the broader international community. Thus, the dual-title will allow students to master their field of specialization from an international perspective so that they can effectively engage in agricultural development activities within various countries and regions.

**Admission Requirements**

Students must apply and be admitted to the graduate program in ABENG and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the INTAD dual-title program. Refer to the Admission Requirements section of the INTAD Bulletin page (http://bulletins.psu.edu/graduateprograms/majors/international-agriculture-development). Doctoral students must be admitted into the dual-title degree program in INTAD prior to taking the qualifying examination in their primary graduate program.

**Degree Requirements for the Dual-Title M.S.**

To qualify for the dual-title degree, students must satisfy the degree requirements for the M.S. degree, listed on the Degree Requirements tab. In addition, students must complete the degree requirements for the dual-title M.S. in INTAD, listed on the INTAD Bulletin page (http://bulletins.psu.edu/graduateprograms/majors/international-agriculture-development). Up to 6 credits of INTAD approved courses can be applied to fulfilling ABENG program requirements. Final course selection must be approved by the student’s advisory committee.

**Degree Requirements for the Dual-Title Ph.D.**

To qualify for the dual-title degree, students must satisfy the degree requirements for the Ph.D. degree, listed on the Degree Requirements tab. In addition, students must complete the degree requirements for the dual-title Ph.D. in INTAD, listed on the INTAD Bulletin page (http://bulletins.psu.edu/graduateprograms/majors/international-agriculture-development). Some courses may satisfy both ABENG program requirements and those of the INTAD program. Up to 6 credits of INTAD approved courses can be applied to fulfilling ABENG program requirements. Final course selection must be approved by the student’s dissertation committee.

The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from ABENG and must include at least one Graduate Faculty member from the INTAD program. Faculty members who hold appointments in both programs’ Graduate Faculty may service in a combined role. There will be a single qualifying examination, containing elements of both ABENG and INTAD. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the candidacy examination may be delayed on semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of an ABENG and INTAD dual-title Ph.D. student must include at least one member of the INTAD Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may service
in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in INTAD, the member of the committee representing INTAD must be appointed as co-chair. The INTAD representative on the student’s dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their dissertation committee and reflects their original research and education in ABENG and INTAD. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

**Dual-Title M.S. and Ph.D. in Agricultural and Biological Engineering and Operations Research**

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-208/dual-title-graduate-degree-programs).

Graduate students with interests in operations research may apply to the dual-title program in Agricultural and Biological Engineering and Operations Research. The goal of the dual-title program in ABENG and Operations Research is to enable graduate students from ABENG to acquire the knowledge and skills of their primary area of specialization in ABENG, while at the same time gaining the perspective and methods needed for work systems analysis and modeling. Graduate study in this program seeks to prepare students to utilize the tools, techniques, and methodology of operations research, while maintaining a close association with areas of application. Operations research is the analysis—usually involving mathematical treatment—of a process, problem, or operation to determine its purpose and effectiveness and to gain maximum efficiency.

**Admission Requirements**

Students must apply and be admitted to the graduate program in ABENG and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the OR dual-title program. Refer to the Admission Requirements section of the OR Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/operations-research). Doctoral students must be admitted into the dual-title degree program in OR prior to taking the qualifying examination in their primary graduate program.

**Degree Requirements for the Dual-Title M.S.**

To qualify for the dual-title degree, students must satisfy the degree requirements for the M.S. degree, listed on the Degree Requirements tab. In addition, students must complete the degree requirements for the dual-title M.S. in OR, listed on the OR Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/operations-research). Up to 6 credits of OR approved courses can be applied to fulfilling ABENG program requirements. Final course selection must be approved by the student’s advisory committee.

**Degree Requirements for the Dual-Title Ph.D.**

To qualify for the dual-title degree, students must satisfy the degree requirements for the Ph.D. degree, listed on the Degree Requirements tab. In addition, students must complete the degree requirements for the dual-title Ph.D. in OR, listed on the OR Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/operations-research). Some courses may satisfy both ABENG program requirements and those of the OR program. Up to 6 credits of OR approved courses can be applied to fulfilling ABENG program requirements. Final course selection must be approved by the student’s dissertation committee.

The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from ABENG and must include at least one Graduate Faculty member from the OR program. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. There will be a single qualifying examination, containing elements of both ABENG and OR. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the candidacy examination may be delayed on semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of an ABENG and OR dual-title Ph.D. student must include at least one member of the OR Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in OR, the member of the committee representing OR must be appointed as co-chair. The OR representative on the student’s dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their dissertation committee and reflects their original research and education in ABENG and OR. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

**Student Aid**

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

**Courses**

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**Learning Outcomes**

**Master of Science (M.S.)**

1. Knowledge: Graduates will be able to demonstrate mastery of core principles and methods of agricultural and biological engineering professional practice and in-depth mastery of a subfield.

2. Critical and analytical thinking: Graduates will be able to critically and creatively conceptualize and evaluate engineering problem formulations, analyses, and solutions.
Agricultural and Extension Education

Doctor of Philosophy (Ph.D.)

1. Know: Graduates will demonstrate a deep knowledge of principles and methodologies of agricultural and biological engineering which may include the foundational mathematics, physics, chemistry, biology, engineering or communications.

2. Create: Graduates will be able to create new knowledge and develop new solutions to agricultural and biological engineering problems by developing an understanding of the scientific and engineering literature and engaging in scientific research.

3. Apply: Graduates will be able to apply knowledge of the principles and methodologies of agricultural and biological engineering to the process of creating new knowledge and conducting original scientific research in the field of agricultural and biological engineering.

4. Critical and analytical thinking: Graduates will be able to independently analyze and critique motivations for conducting research, the research process, research results, and the implications of research and its results to our world.

5. Communicate: Graduates will be able to actively listen, convey accurately and clearly ideas and results both orally and in writing, and engage in positive, effective deliberation.

6. Professional practice: Graduates will be prepared to become leaders in our society by being able to apply technical skills for effective decision making in agricultural and biological engineering fields.

Contact

Graduate Program Head: Paul Heinemann, Department Head

Director of Graduate Studies/Professor-in-Charge: Jeffrey Catchmark

Primary Program Contact: Wendy Thomas

Email: wjt11@psu.edu

Mailing Address: 249 Agricultural Engineering Building, University Park, PA 16802

Telephone: (814) 863-1524

Program Website: Agricultural and Biological Engineering (http://abe.psu.edu/graduateprograms)

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Master of education (M.Ed.)

All applicants must submit a letter of application, two or three pages in length, describing their professional experience, education, career goals, and reasons for pursuing the degree. Applicants must ensure that three recommendation and evaluation forms from individuals knowledgeable about the applicant are forwarded to the department. Only the most qualified applicants will be admitted to the graduate program. The graduate program may provisionally admit (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/provisional-admission) selected applicants pending resolution of the requirements listed here. Exceptions to the admission criteria listed below may be made at the discretion of the program for students with special backgrounds, abilities, and interests.

Prerequisite for admission to a master's degree program is a demonstrated professional interest in agricultural and extension education and/or applied youth and family education. Graduate Record Examination (GRE) scores are required for application. The GRE score is one of several variables taken into consideration for offers of admission to the AEE graduate program.

The purpose of the AEE M.Ed. degree program is to prepare students through experience and course work in teaching, learning, and educational planning and assessment to enhance their professional qualifications and career advancement. Prerequisite for admission to this
program is a minimum of 18 credits in professional education courses (including educational psychology and teaching and/or professional internship), or certification as a teacher of agriculture, or equivalent professional experience, including extension. Credits obtained to fulfill this admission prerequisite requirement cannot be applied towards requirements for the degree. The program is designed for individuals who are primarily interested in teaching. Graduates can go on to become: agricultural educators at the secondary or post-secondary level; Cooperative Extension educators or related professionals; and professionals in the public, private, or non-profit sectors focused on education, training, or human capacity development.

Students considering graduate education beyond the Master’s level are encouraged to pursue the M.S. degree, which prepares students for advanced study and research activity.

Master of Science (M.S.)
All applicants must submit a letter of application, two or three pages in length, describing their professional experience, education, career goals, and reasons for pursuing the degree. Applicants must ensure that three recommendation and evaluation forms from individuals knowledgeable about the applicant are forwarded to the department. Only the most qualified applicants will be admitted to the graduate program. The graduate program may provisionally admit (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/provisional-admission) selected applicants pending resolution of the requirements listed here. Exceptions to the admission criteria listed below may be made at the discretion of the program for students with special backgrounds, abilities, and interests.

Prerequisite for admission to a master’s degree program is a demonstrated professional interest in agricultural and extension education and/or applied youth and family education. Graduate Record Examination (GRE) scores are required for application. The GRE score is one of several variables taken into consideration for offers of admission to the AEE graduate program.

The purpose of the AEE M.S. degree program is to prepare students through experience and course work in research methods, data analysis, and research reporting to enhance their professional qualifications and career advancement. The program is designed for individuals who are primarily interested in conducting, interpreting, or communicating research for educational work or advanced graduate (i.e. doctoral) study. Graduates can go on to become: agricultural educators at the post-secondary level; Cooperative Extension educators or related professionals; and professionals in the public, private, or non-profit sectors focused on education, training, or human capacity development.

Doctor of Philosophy (Ph.D.)
Letter of Introduction and Résumé. Applicants must submit a two-to three-page letter of introduction in which they describe their professional experience and education and delineate their career goals. A current résumé is also required.

Graduate Record Examination. Graduate Record Examination (GRE) scores are required for application. The GRE score is one of several variables taken into consideration for offers of admission to the AEE graduate program.

Official Transcripts. Official transcripts from all post-secondary institutions attended (http://www.gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission) must be submitted. Applicants must provide evidence of either a baccalaureate or a master’s degree in the agricultural sciences, human sciences, or related area.

Three Letters of Reference.

Professional Experience. A minimum of two years of appropriate professional experience is required either prior to admission or before the degree is awarded. An interview with the graduate faculty is recommended of all applicants prior to admission into a doctoral program.

Degree Requirements
Master of Education (M.Ed.)
Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

A program of study agreement between adviser and student, including planned course work (approved by the student’s graduate committee) and time frame, should be completed before beginning the second semester of study.

The Master of Education degree requires a minimum of 31 credits at the 400, 500, or 800 level, with a minimum of 18 credits at the 500 or 800 level, and at least 6 credits at the 500 level. The 31 credits include:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AEE 501</td>
<td>Foundations of Agricultural and Extension Education</td>
<td>3</td>
</tr>
<tr>
<td>AEE 509</td>
<td>Contemporary Research in Agricultural and Extension Education</td>
<td>3</td>
</tr>
<tr>
<td>AEE 590</td>
<td>Colloquium</td>
<td>1</td>
</tr>
<tr>
<td>AEE 520</td>
<td>Scientific Method in the Study of Agricultural and Extension Education</td>
<td>3</td>
</tr>
<tr>
<td>AEE 521</td>
<td>Basic Applied Data Analysis in Agricultural and Extension Education</td>
<td>3</td>
</tr>
<tr>
<td>AEE 596</td>
<td>Individual Studies (3 credits for the Capstone Project, AEE 596 (3). A minimum of 3 credits of AEE 596 is required, but the student’s committee may require 3 additional credits be completed based on the project’s complexity. No more than 3 credits of AEE 596 will count towards the minimum credit requirement for the degree; if students are required to complete 6 credits of AEE 596, then they must complete a minimum of 34 credits for the degree.)</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits 31

In addition to completing a minimum of 31 credits of required course work, M.Ed. candidates are required to:
• Conduct a Capstone Project, typically involving the development and/or evaluation of an educational curriculum, project, or program;
• Write a professional paper supporting and reflecting upon the Capstone Project;
• Conduct an oral defense of the Capstone Project and professional paper; and
• Submit at least one article to an appropriate forum (e.g. extension- or education-related journal, trade publication, editor-only reviewed publication, or conference proceedings).

Master of Science (M.S.)
Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

A program of study agreement between adviser and student, including planned course work (approved by the student’s graduate committee) and time frame, should be completed before beginning the second semester of study.

The Master of Science degree requires a minimum of 34 credits at the 400, 500, 600, or 800 level, with least 18 credits at the 500 and 600 level, combined. The 34 credits include:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AEE 501</td>
<td>Foundations of Agricultural and Extension Education</td>
<td>3</td>
</tr>
<tr>
<td>AEE 590</td>
<td>Colloquium</td>
<td>1</td>
</tr>
<tr>
<td>AEE 520</td>
<td>Scientific Method in the Study of Agricultural and Extension Education</td>
<td>3</td>
</tr>
<tr>
<td>AEE 521</td>
<td>Basic Applied Data Analysis in Agricultural and Extension Education</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>a 3-credit course on Research Methods and Data Analysis from a list maintained by the graduate program office</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>a 3-credit course focused on writing, public speaking, or communicating scientific information to an audience from a list maintained by the graduate program office</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>9 credits in either the base program or one of two options defined in the Options section below</td>
<td>9</td>
</tr>
<tr>
<td>Electives</td>
<td>3 elective credits from a list maintained by the graduate program office</td>
<td>3</td>
</tr>
<tr>
<td>Culminating Experience</td>
<td>AEE 600</td>
<td>Thesis Research (up to a maximum of 12 credits)</td>
</tr>
<tr>
<td>or AEE 610</td>
<td>Thesis Research Off-Campus</td>
<td>6</td>
</tr>
<tr>
<td>Total Credits</td>
<td></td>
<td>34</td>
</tr>
</tbody>
</table>

In addition to completing a minimum of 34 credits of required course work, M.S. candidates are required to:
• Conduct an empirical research study involving the collection of primary and/or secondary data;
• Write a thesis on their empirical research study;
• Conduct an oral defense of the research study and thesis; and
• Submit at least one article to a relevant peer-reviewed journal.

The thesis must be accepted by the committee members, the head of the graduate program, and the Graduate School, and the student must pass the thesis defense.

Doctor of Philosophy (Ph.D.)
Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

Approximately 75 credits of graduate work beyond the baccalaureate degree are required. Approximately two-thirds of the total program must be in the major field. Courses in education or statistics may be counted in the major with prior approval of the dissertation committee. A minimum of 30 credits must be earned in residence.

Courses completed in the doctoral program in AEE should give students competence in at least one core area of expertise: educational processes; leadership development and communications; program development, and research. Students must complete the following course requirements, for a minimum of 26 credits:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AEE 501</td>
<td>Foundations of Agricultural and Extension Education</td>
<td>3</td>
</tr>
<tr>
<td>AEE 590</td>
<td>Colloquium (2 credits over two semesters)</td>
<td>2</td>
</tr>
<tr>
<td>AEE 520, AEE 521, or AEE 522</td>
<td>15 total 500-level credits with at least one, three-credit 500-level course being completed from each of the four core areas: Educational Processes; Leadership Development and Communications; Program Development; and Research, from a list maintained by the graduate program office</td>
<td>15</td>
</tr>
<tr>
<td>ENGL 418</td>
<td>Advanced Technical Writing and Editing</td>
<td>3</td>
</tr>
<tr>
<td>Culminating Experience</td>
<td>AEE 600</td>
<td>Thesis Research (up to a maximum of 12 credits)</td>
</tr>
<tr>
<td>or AEE 601</td>
<td>Ph.D. Dissertation Full-Time</td>
<td>6</td>
</tr>
<tr>
<td>or AEE 610</td>
<td>Thesis Research Off-Campus</td>
<td>6</td>
</tr>
<tr>
<td>or AEE 611</td>
<td>Ph.D. Dissertation Part-Time</td>
<td>6</td>
</tr>
</tbody>
</table>

In addition to completing a minimum of 34 credits of required course work, Doctoral candidates are required to:
• Conduct an empirical research study involving the collection of primary and/or secondary data;
• Write a thesis on their empirical research study;
• Conduct an oral defense of the research study and thesis; and
• Submit at least one article to a relevant peer-reviewed journal.

Official entrance into the Ph.D. program occurs upon successful completion of the qualifying examination. Ph.D. degree requirements include successful completion of the following: approved graduate course work, English Competence requirements, a comprehensive examination, and a final oral examination (the dissertation defense).

To earn the Ph.D. degree, doctoral candidates must write a dissertation that is accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

All doctoral students in AEE are required to write an article or a paper for publication or presentation based upon (1) their dissertation or (2) their assistantship responsibilities as determined by the academic adviser and
assistantship supervisor prior to the granting of a degree. The article or paper will be reviewed and approved by the student’s graduate adviser. The article or paper will be submitted to a refereed or professional journal, a professional or research conference, and/or a popular magazine. If co-authored with a faculty member, the student’s name will appear as the lead author.

**Options**

Students may elect to pursue either AEE master’s degree (M.S. or M.Ed.) as a generalist following a base curriculum or with one of two graduate options. Options involve more tailored course work and are included on the student’s transcript and diploma after the primary degree title.

The generalist (base) curriculum educates students in core areas of AEE, including leadership, formal education, non-formal program development, and evaluation. The base curriculum requires 9 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AEE 450</td>
<td>Program Design and Delivery</td>
<td>3</td>
</tr>
<tr>
<td>AEE 505</td>
<td>Leadership Development</td>
<td>3</td>
</tr>
<tr>
<td>AEE 530</td>
<td>Teaching and Learning in Agricultural Science</td>
<td>3</td>
</tr>
</tbody>
</table>

The Agricultural Education (AE) Option allows students to select course work related to their specific interests including: educational program planning and instructional development; leadership within and administration of agricultural education programs; and change in agricultural education. The Agricultural Education option requires 9 credits, chosen from the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AEE 413</td>
<td>Program Planning and Instructional Development</td>
<td>3</td>
</tr>
<tr>
<td>AEE 508</td>
<td>Administration and Supervision of Agricultural and Extension Education</td>
<td>3</td>
</tr>
<tr>
<td>AEE 524</td>
<td>Change in Education</td>
<td>3</td>
</tr>
<tr>
<td>WFED 413</td>
<td>Vocational Education for Special-Needs Learners</td>
<td>3</td>
</tr>
</tbody>
</table>

The Youth, Family, and Community (YFC) Option allows students to select course work related to their specific interests including: program design, implementation, and evaluation; leadership development and civic engagement within communities; intergenerational programs; and volunteer program management. The Youth, Family, and Community option requires 9 credits, chosen from the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AYFCE 535</td>
<td>Youth Civic Development</td>
<td>3</td>
</tr>
<tr>
<td>AYFCE 550</td>
<td>Program Development and Evaluation in Youth, Families and Communities</td>
<td>3</td>
</tr>
<tr>
<td>AYFCE 555</td>
<td>Volunteer Program Management</td>
<td>3</td>
</tr>
<tr>
<td>AYFCE 845</td>
<td>Intergenerational Programs and Practices</td>
<td>3</td>
</tr>
</tbody>
</table>

**Dual-Titles**

Dual-Title M.Ed., M.S., and Ph.D. in Agricultural and Extension Education and Comparative and International Education

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

M.Ed., M.S., and Ph.D. students with research and educational interests in schooling and education around the globe may apply to the dual-title program in Agricultural and Extension Education (AEE) and Comparative and International Education (CIED). Comparative and international education is a field devoted to the systematic analysis of the operation and effects of the world’s education systems. The goal of the dual-title graduate program is to enable graduate students from AEE to acquire the knowledge and skills of their primary area of specialization in AEE, while at the same time gain the perspectives, techniques, and methodologies of comparative and international education. Graduate study in this program seeks to create opportunities for a range of people—administrators and policy makers in social welfare, health education, and development; school leaders; and scholars of education. Graduates of the dual-title program in AEE and CIED will be able to compare, analyze, and make policy recommendations for agricultural and extension education at both national and international levels.

**Admission Requirements**

Students must apply and be admitted to the graduate program in AEE and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the CIED dual-title program. Refer to the Admission Requirements tab on the CIED Bulletin page (http://bulletins.psu.edu/graduate/programs/compare-international-education). Students must be admitted into the dual-title degree program in CIED prior to taking the qualifying examination in their primary graduate program.

**Degree Requirements for the Dual-Title M.Ed. and M.S.**

To qualify for this dual-title degree, students must satisfy the requirements of the AEE Master of Science or Master of Education degree program, listed on the Degree Requirements tab. In addition, they must satisfy the CIED program requirements for the dual-title master’s degree. Refer to the Degree Requirements tab on the CIED Bulletin page. Some courses may satisfy both the graduate primary program requirements and those of the CIED program. Final course selection is determined by the student after consulting, in advance, with their AEE and CIED advisers.

For the dual-title M.S. degree in AEE and CIED, the thesis must reflect the student’s education and interest in both AEE and CIED. The student’s capstone experience and professional paper must reflect the student’s education and interest in both AEE and CIED. All members of the student’s committee for both the M.S. and the M.Ed. must be members of the Graduate Faculty. The master’s committee must include at least one Graduate Faculty member from CIED. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. A Degree Committee form should be filed upon selection of the committee members.

**Degree Requirements for the Dual-Title Ph.D.**

To qualify for the dual-title degree, students must satisfy the degree requirements for the degree they are enrolled in AEE, listed on the Degree Requirements tab. In addition, students must complete the degree requirements for the dual-title Ph.D. in CIED, listed on the CIED Bulletin page. The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from AEE and must include at least one Graduate Faculty member from the CIED program. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in
a combined role. There will be a single qualifying examination, containing elements of both AEE and CIED. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of an AEE and CIED dual-title Ph.D. student must include at least one member of the CIED Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in CIED, the member of the committee representing CIED must be appointed as co-chair. The CIED representative on the student’s dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their dissertation committee and reflects their original research and education in AEE and CIED. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

**Dual-Title M.S. and Ph.D. in Agricultural and Extension Education and International Agriculture and Development**

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

M.S. and Ph.D. students with research and educational interests in international agriculture extension and education may apply to the dual-title program in Agricultural and Extension Education and International Agriculture and Development. The goal of the dual-title graduate program is to enable graduate students from AEE to acquire the knowledge and skills of their primary area of specialization in AEE, while at the same time gaining the perspective and methods needed to work internationally. Graduate study in this program seeks to prepare students to assume leadership roles in developing contemporary curricula and programs, conducting high-quality research and development activities, and disseminating new knowledge in these areas in both national and international settings. Students are required to write research proposals and expected to write grants to support their research activities reflecting both research areas of the dual-title degree. As part of their professional development presentations, publication of research articles and active participation in professional societies is expected. Emphasis is placed upon the professional development of the student.

**Admission Requirements**

Students must apply and be admitted to the graduate program in AEE and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the INTAD dual-title program. Refer to the Admission Requirements tab on the INTAD Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/international-agriculture-development). Doctoral students must be admitted into the dual-title degree program in INTAD prior to taking the qualifying examination in their primary graduate program.

**Degree Requirements for the Dual-Title M.S.**

To qualify for this dual-title degree, students must satisfy the requirements of the AEE Master of Science degree program, listed on the Degree Requirements tab. In addition, they must satisfy the INTAD program requirements for the dual-title master's degree. Refer to the Degree Requirements tab on the INTAD Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/international-agriculture-development). Some courses may satisfy both the graduate primary program requirements and those of the INTAD program. Final course selection is determined by the student after consulting, in advance, with their AEE and INTAD advisers.

For the dual-title M.S. degree in AEE and INTAD, the thesis must reflect the student’s education and interest in both AEE and INTAD. All members of the student’s committee must be members of the Graduate Faculty. The master’s committee must include at least one Graduate Faculty member from INTAD. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. A Degree Committee form should be filed upon selection of the committee members and must be approved by the INTAD Academic Program Committee Co-chair.

**Degree Requirements for the Dual-Title Ph.D.**

To qualify for the dual-title degree, students must satisfy the degree requirements for the Ph.D. in AEE, listed on the Degree Requirements tab. In addition, students must complete the degree requirements for the dual-title in INTAD, listed on the INTAD Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/international-agriculture-development).

The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from AEE and must include at least one Graduate Faculty member from the INTAD program. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. There will be a single qualifying examination, containing elements of both AEE and INTAD. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of an AEE and INTAD dual-title Ph.D. student must include at least one member of the INTAD Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in INTAD, the member of the committee representing INTAD must be appointed as co-chair. The INTAD representative on the student’s dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their dissertation committee and reflects their original research and education in AEE and INTAD. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

**Student Aid**

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://
Coursescarrynumbersfrom500to699and800to899.
Advancedundergraduatecoursenumberedbetween400and499may
beusedtometsomegraduatedegreerequirementswhentakenby
graduatestudents.Coursesbelowthe400levelmaynot.Agraduate
studentmayregisterfororauditthesescoursesinordertomakeup
deficienciesortofillin-gapsinpreviouseducationbutnottomettwo
requirementsforanadvanceddegree.

Admission Requirements

ApplicantsapplyforadmissiontotheprogramviatheGraduateSchool
applicationforadmission(http://gradschool.psu.edu/prospective-
students/how-to-apply).Requirementslistedhereareinadditionto
GraduateCouncilpolicieslistedunderGCAC-300GeneralAdmissions
Standards(http://gradschool.psu.edu/graduate-education-policies).
ScoresfromtheGraduateRecordExaminations(GRE),orfromacomparable
substitutetest,arerequiredforadmission.Atthe
discretionofthegraduatestandardscommittee,astudentmaybe
admittedforgraduatestudyintheprogramwithoutthesescores.

PrerequisitesformajorworkinAgronomyvarywiththearea
of specializationandthedegree sought, but courses in chemistry,
mathematics, physics, geology, basic and applied biological sciences,
andEnglishcommunicationskillsarerequired.Abaccalaureatedegree
in basic or applied natural sciences is preferred for M.S. degree applicants.

A minimum junior/senior grade-point average 3.00 (on a 4.00 scale) is
required in all courses in the biological and physical sciences regardless
ofwhentaken.Exceptionstotheserequirementsmaybeforned
students with special backgrounds, abilities, and interests.

Degree Requirements

Master of science (M.S.)

Requirements listed here are in addition to Graduate Council policies
listed under GCAC-600 Research Degree Requirements. (http://
gradschool.psu.edu/graduate-education-policies)

A minimum of 31 credits at the 400, 500, 600, or 800 level is required, with
least 18 credits at the 500 and 600 level, combined, including:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGRO</td>
<td>Required Courses</td>
<td>12</td>
</tr>
<tr>
<td>AGRO</td>
<td>12 credits of 400- or 500-level formal courses in the major field (with at least 6 credits at the 500-level)</td>
<td>12</td>
</tr>
<tr>
<td>AGRO</td>
<td>6 credits of 400- or 500-level formal courses in a minor or general studies area</td>
<td>6</td>
</tr>
<tr>
<td>AGRO</td>
<td>3 credits in statistical methods at the 500-level</td>
<td>3</td>
</tr>
<tr>
<td>AGRO</td>
<td>AGRO 501 Graduate Student Dialogue</td>
<td>1</td>
</tr>
<tr>
<td>AGRO</td>
<td>AGRO 555 Effective Scientific Communications</td>
<td>2</td>
</tr>
<tr>
<td>AGRO</td>
<td>AGRO 590 Colloquium 1</td>
<td>1</td>
</tr>
<tr>
<td>AGRO</td>
<td>Culminating Experience</td>
<td></td>
</tr>
<tr>
<td>AGRO</td>
<td>AGRO 600 Thesis Research Off Campus</td>
<td>6</td>
</tr>
<tr>
<td>AGRO</td>
<td>or AGRO 610 Thesis Research Off Campus</td>
<td></td>
</tr>
<tr>
<td>Total Credits</td>
<td></td>
<td>31</td>
</tr>
</tbody>
</table>

1 Students are required to participate in AGRO 590 each semester they are registered, but can only count a maximum of 1 credit of AGRO 590 towards the degree.

In addition, M.S. students are required to complete 1 credit of AGRO 602; however, this 1 credit cannot be counted towards the degree requirements. The remaining elective credits may be chosen from a list of approved electives maintained by the program office.
The thesis must be accepted by the advisory committee members, the head of the graduate program, and the Graduate School, and the student must pass a thesis defense.

**Doctor of philosophy (Ph.D.)**

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

While a minimum number of courses for the degree is not specified, the dissertation committee has the responsibility of specifying courses and credits essential for the education and development of the candidate. Students are expected to be educated in depth in a specific subfield of agronomy and to have a perspective of the general field. Normally, 55 to 60 credits in formal course work beyond the B.S. degree are required including:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>12 credits of 500-level formal courses beyond the B.S. degree</td>
<td>12</td>
</tr>
<tr>
<td>A</td>
<td>A minor or general studies course work</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>6 credits in statistical methods beyond the B.S. degree (with at least 3 credits at the 500 level)</td>
<td>6</td>
</tr>
<tr>
<td>AGRO 501</td>
<td>Graduate Student Dialogue</td>
<td>1</td>
</tr>
<tr>
<td>AGRO 590</td>
<td>Colloquium 1</td>
<td>1</td>
</tr>
</tbody>
</table>

**Culminating Experience**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGRO 600</td>
<td>Thesis Research</td>
<td>12</td>
</tr>
<tr>
<td>or AGRO 610</td>
<td>Thesis Research Off Campus</td>
<td></td>
</tr>
</tbody>
</table>

1 Doctoral candidates are required to participate regularly in a departmental seminar and to register for at least 2 credits of the seminar during the Ph.D. program. However, only 1 credit of AGRO 590 can be counted towards the degree.

In addition, Ph.D. students are required to complete 2 credits of AGRO 600; however, these 2 credits cannot be counted towards the degree requirements.

The communication requirement for the Ph.D. degree may be met by completing at least 6 credits of course work in an area of English communications approved by the student's dissertation committee.

Every student has a close professional relationship with his or her faculty adviser. While research that is done for the dissertation will be on subjects that fall within the ongoing research program of the adviser, students are encouraged to propose research projects that are of interest to them. The department encourages professional development of students through participation in meetings of relevant professional societies and organizations.

**Dual-Titles**

**Dual-Title M.S. and Ph.D. in Agronomy and International Agriculture and Development**

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

Graduate students with research and educational interests in international agriculture may apply to the dual-title degree program in Agronomy and International Agriculture and Development. The goal of the dual-title degree in AGRO and INTAD is to enable graduate students from AGRO to acquire the knowledge and skills of their primary area of specialization in AGRO, while at the same time gaining the perspective and methods needed for work in the international agriculture. Graduate study in this program seeks to prepare students to assume leadership roles in science, engineering, outreach, and project management anywhere in the world. Students acquire a broad perspective on how to apply their research findings in the context of the broader international community. Thus, the dual-title will allow students to master their field of specialization from an international perspective so that they can effectively engage in agricultural development activities within various countries and regions.

**Admission Requirements**

Students must apply and be admitted to the graduate program in AGRO and the Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the INTAD dual-title program. Refer to the Admission Requirements tab on the INTAD Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/international-agriculture-development). Doctoral students must be admitted into the dual-title degree program in INTAD prior to taking the qualifying examination in their primary graduate program.

**Degree Requirements for the Dual-Title M.S.**

To qualify for the dual-title degree, students must satisfy the degree requirements for the M.S. degree, listed on the Degree Requirements tab. In addition, students must complete the degree requirements for the dual-title M.S. in INTAD, listed on the INTAD Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/international-agriculture-development). Up to 6 credits of INTAD approved courses can be applied to fulfilling AGRO program requirements. Final course selection must be approved by the student's advisory committee.

**Degree Requirements for the Dual-Title Ph.D.**

To qualify for the dual-title degree, students must satisfy the degree requirements for the Ph.D. degree, listed on the Degree Requirements tab. In addition, students must complete the degree requirements for the dual-title Ph.D. in INTAD, listed on the INTAD Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/international-agriculture-development). Some courses may satisfy both AGRO program requirements and those of the INTAD program. Up to 6 credits of INTAD approved courses can be applied to fulfilling AGRO program requirements. Final course selection must be approved by the student's committee.

The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from AGRO and must include at least one Graduate Faculty member from the INTAD program. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. There will be a single qualifying examination, containing elements of both AGRO and INTAD. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed on semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of an AGRO and INTAD dual-title Ph.D. student must include at least one member of the INTAD Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve...
in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in INTAD, the member of the committee representing INTAD must be appointed as co-chair. The INTAD representative on the student’s dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their dissertation committee and reflects their original research and education in AGRO and INTAD. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

**Student Aid**

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

**Courses**

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**Learning Outcomes**

**Master of science (M.S.)**

1. **Know:** Graduates of the Agronomy or Horticulture M.S. degree programs will demonstrate mastery of the principles and common research methods within the field of agronomy or horticulture. The demonstration will cover mastery of biotechnology, sustainability, profitability, weed mgmt. and herbicide resistance, nutrient mgmt., food safety, and/or turfgrass science.

2. **Create/Apply:** Graduates of the Agronomy or Horticulture M.S. degree programs will be able to assimilate essential concepts and literature in agronomy and horticulture, create hypotheses, develop tests of hypotheses, and develop solutions to agronomic and horticultural problems. M.S. graduates will also be able to carry out applied research projects that address problems in the field of agronomy or horticulture.

3. **Communicate:** Graduates of the Agronomy or Horticulture M.S. degree programs will be able to effectively communicate technical knowledge, research findings, and current topics in agronomy or horticulture verbally and in writing to scientists and lay people.

4. **Critical thinking:** Graduates of the Agronomy or Horticulture M.S. degree programs will be able to critically analyze research performed by others and evaluate agronomic or horticultural problems and formulate solutions to problems.

**Doctor of Philosophy (Ph.D.)**

1. **Know:** Graduates of the Agronomy/Horticulture Ph.D. Programs will demonstrate in-depth knowledge of essential theories and research methods within the fields of agronomy or horticulture. The demonstration areas will cover the application of biotechnology, sustainability, profitability, weed mgmt. and herbicide resistance, nutrient mgmt., food safety, and/or turfgrass science.

2. **Create/Apply:** Graduates of the Agronomy/Horticulture Ph.D. Programs will be able to assimilate essential theory and literature in agronomy to generate new ideas and develop creative solutions to agronomic and horticultural problems. Graduates of the program will also be able to conduct original research in an independent manner that addresses problems in the fields of agronomy or horticulture.

3. **Communicate:** Graduates of the Agronomy/Horticulture Ph.D. Programs will be able to convey ideas, arguments, and current topics in agronomy or horticulture verbally and in writing to scientists and lay people.

4. **Critical thinking:** Graduates of the Agronomy/Horticulture Ph.D. Programs will be able to critically analyze research performed by others in the fields of agronomy or horticulture.

5. **Professional practice:** M.S. graduates of the Agronomy or Horticulture Graduate Programs will demonstrate ability to collaborate in a collegial manner and demonstrate high ethical standards, values, and best practices.

**Contact**

**Graduate Program Head:** Erin Connolly
**Director of Graduate Studies/Professor-in-Charge:** Peter Landschoot
**Primary Program Contact:** Stacy Smith
**Email:** sls60@psu.edu
**Mailing Address:** Dept. Plant Science, 101 Tyson Building, University Park, PA 16802
**Telephone:** (814) 863-7724
**Program Website:** Agronomy (http://plantscience.psu.edu/graduateprograms)
American Studies

Graduate Program Head
John R. Haddad

Program Code
AMSTD

Campus(es)
Harrisburg (Ph.D., M.A.)

Degrees Conferred
Doctor of Philosophy (Ph.D.)
Master of Arts (M.A.)
Integrated B.A. in American Studies and M.A. in American Studies

The Graduate Faculty
View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=AMSTD)

Master of Arts (M.A.)
The M.A. degree program, offered at Penn State Harrisburg, emphasizes the study of American society and culture. It serves students who want to investigate the American experience and apply their studies in a variety of professions, including education, government, communications, and museums. It is the distinguishing characteristic of the program that the large majority of its course offerings are taught by faculty trained in the discipline of American Studies and these courses have the AMST prefix for “American Studies.” The program offers a number of concentrations including folklore, cultural history (politics, popular culture, media studies), international American Studies, material and visual culture (art, architecture, craft, landscape, food, clothing, medicine), public heritage (museums, historic preservation, archiving, cultural resource management), race and ethnicity, and regional studies.

The campus is located in a rich cultural region, which includes Amish Farmlands, Gettysburg, Hershey, Steelton, Ephrata, Carlisle, York, and Harrisburg. Additionally, proximity to the major cities of Philadelphia, Pittsburgh, Baltimore, Washington, D.C., and New York offer a host of research options for students. Strong ties with local educational and cultural institutions, including the Pennsylvania Historical and Museum Commission, State Museum of Pennsylvania, Landis Valley Museum, Hershey Museum, National Civil War Museum, and the Dauphin County Historical Society, Cumberland County Historical Society, and other public heritage resources provide excellent learning opportunities for students.

The M.A. degree can be earned by full- or part-time study. Most 500-level courses are offered in the evening as the program strives to meet students’ needs.

Doctor of Philosophy (Ph.D.)
The Doctor of Philosophy program in American Studies represents the study of the United States as an academic field with its own developed theories, methods, and applications. Taking advantage of its location in a capital region with internationally known heritage sites and American Studies resources such as the Gettysburg Battlefield, Three-Mile Island, Hershey, Steelton, Anthracite Coal Region, and Amish Country, it emphasizes critical cultural inquiry and the application of American Studies to public heritage, public policy, and cultural resource management, including governmental work, museums, cultural agencies, education, archives and records management, public policy, and communications. A foundation for this application is an understanding of the American experience developed within the intellectual legacy of American Studies.

Graduates of the program are typically oriented toward public practice as well as scholarship in American Studies, integrating perspectives on United States history, culture, and society. Students have opportunities for internships and field experiences outside the classroom. In addition to preparation for academic teaching and writing, the program is distinctively concerned among other doctoral departments of American Studies with the production of public scholars and leadership careers outside of academia. The program strives to cover America broadly in its national and international contexts, work with local resources and institutions, and to develop a focus on cultural expression and identity, including areas of:

- material and visual culture
- folk and popular culture
- race, ethnicity, and gender
- literature, performance, and media

Admission Requirements
Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Master of Arts (M.A.)
The M.A. degree program in American Studies accepts students from a wide array of disciplines—particularly art, history, English, sociology, and anthropology—but recommends educational preparation related to the interdisciplinary study of American culture. An applicant must hold either (1) a baccalaureate degree from a regionally accredited U.S. institution or (2) a tertiary (postsecondary) degree that is deemed comparable to a four-year bachelor’s degree from a regionally accredited U.S. institution. This degree must be from an officially recognized degree-granting institution in the country in which it operates. All applicants must submit:

- a completed Graduate School online application form (http://gradschool.psu.edu/prospective-students/how-to-apply) with the application fee
- official transcripts from all post-secondary institutions attended (http://gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission) (minimum of 2.75 junior/senior grade-point average on a 4.00 scale)
- two letters of recommendation from individuals who can attest to the student’s ability to handle graduate study
- a statement of intent (approximately 500 to 1,000 words outlining their preparation for study, proposed fields of study, and career goals)
- and a sample of written work (seminar paper or equivalent research paper) as evidence of their American research and writing skills.

Students applying for scholarships and assistantships are requested to submit general examination scores of the Graduate Record Examination (GRE) taken within five years previous to the date of application. The GRE is recommended, but not required, for admission.

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. See GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-305/admission-requirements-international-students) for more information.
### Doctor of Philosophy (Ph.D.)

Applicants for the Doctor of Philosophy in American Studies must hold a master's degree in American Studies, or a related field emphasizing American cultural scholarship and public heritage work such as:

- History
- English
- Sociology
- Political Science
- Folklore
- Cultural Studies
- Performance Studies
- Ethnic Studies
- Gender Studies
- Communications
- Art History
- Museum and Library Studies
- Education
- Cultural Resource Management

Students are required to submit the following:

- a completed Graduate School online application (http://gradschool.psu.edu/prospective-students/how-to-apply) with the application fee;
- official transcripts from all post-secondary institutions attended (http://gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission);
- scores from the Graduate Record Examination (GRE);
- three letters of reference attesting to both academic and professional capabilities. (At least two of these letters should be from academic sources, such as professors or academic advisers);
- a letter of 500 to 1000 words outlining significant scholarly and applied experience, career goals, commitment to American Studies as a field, and academic objectives;
- a recent personal curriculum vitae;
- a paper from a graduate course taken previously or publication demonstrating research and composition skills.

Admission is highly competitive and the best-qualified students will be admitted subject to space availability and compatibility of the student with the program's research mission. Successful applicants with an M.A. typically have a GPA of 3.5 or above (on a 4.0 scale) in their graduate work.

International applicants must hold the equivalent of an American master's degree. They must submit official or attested university records, with certified translations if the records are not in English. Notarized copies are not sufficient.

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. See GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

### Degree Requirements

#### Master of ARts (M.A.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

The student is required to take a minimum of 30 (non-thesis) - 33 (thesis) credits in American Studies, including at least 18 credits in the 500 series.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMST 500</td>
<td>Theory and Methods</td>
<td>3</td>
</tr>
<tr>
<td>AMST 591</td>
<td>Seminar in American Studies</td>
<td>3</td>
</tr>
</tbody>
</table>

#### Culminating Experience

| AMST 580 | Projects in American Studies               | 1-6     |
| AMST 600 | Thesis in American Studies                 |         |

1 AMST 500 should be taken within the first two semesters of study.
2 AMST 591 should be taken in the last two semesters of study.
3 Usually in the last semester of study, students are required to complete their program with a major paper by taking AMST 580 or thesis, in which case AMST 600 is taken. The choice of AMST 580 to fulfill graduation requirements is for an original scholarly master's paper or project. One to 6 credits in AMST 580 can be earned; the typical number of credits for the culminating project is 3. The choice of AMST 600 is for a thesis and is taken for 6 credits. The thesis must follow the Submission Requirements (http://gradschool.psu.edu/current-students/etd) of the Office of Theses and Dissertations in the Graduate School.

Advanced undergraduate courses (400-level) that have not counted toward a student's undergraduate degree may be considered for transfer into the graduate student's requirement of 30 credits of American Studies with permission of the program, subject to restrictions outlined in GCAC-309 Transfer Credit (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-309/transfer-credit). At least 20 of the 30 credits must be earned at the Harrisburg location where the program is offered. Courses not having an American Studies designation but which are relevant to American Studies may be considered for inclusion in the student's requirement of 30 credits of American Studies with permission of the program.

#### Doctor of Philosophy (Ph.D.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

Over some twelve-month period during the interval between admission to the Ph.D. program and completion of the Ph.D. program, the student must spend at least two semesters (summer sessions are not included) as a registered full-time student (9 credits per semester) engaged in academic work at Penn State Harrisburg. A doctoral student is required to complete the program, including defense and acceptance of the doctoral dissertation, within eight years after successful completion of the qualifying examination.

Students progress through the following phases and take courses designated by their dissertation committee as part of their study for the Ph.D.
In the initial phase, the student must:

1. make up any deficiencies in graduate courses in American Studies noted in the letter of acceptance
2. complete with a grade of B or better the following courses:
   AMST 500, two sections of AMST 502 on different topics, and AMST 591
3. pass a qualifying examination

Admitted students who have met all course prerequisites begin the core courses with AMST 500. Students who have already taken AMST 500 within three years of admission may begin their program of study with AMST 502.

The qualifying examination is administered by a special committee appointed by the director of the doctoral program.

The comprehensive examination is taken after course work in subfields is completed. The written examination consists of three parts and is administered by the student’s dissertation committee. One is in the area of Theory and Method and an additional two subfields of study from a list of five areas covered in the program. The five subfields of specialization are:

2. Folk and Popular Culture (material and visual culture, literature and media, language, performance, media, and music);
3. Interdisciplinary History and Politics (history of ideas, philosophy, and politics; biography and oral history; everyday life and socioeconomic studies; government, public policy, and diplomacy);
4. Society and Ethnography (race, ethnicity, class, gender, age, religion and belief; comparative culture and transnationalism);
5. Regional, Environmental, Urban, and Local Studies.

Additional subfields of study within American Studies may be selected with the approval of the student’s dissertation committee. An oral defense of the comprehensive examination is scheduled after the written examination, at which time it is customary for the candidate to present the dissertation proposal.

Although the exact number of courses required in each subfield may vary among students, typically four per subfield are required. Dissertation committees meet with students at least once each academic year. Written and oral comprehensive examinations in the three areas are given at the end of the study period.

Under guidance from the dissertation committee, the candidate prepares a detailed research proposal that serves as the basis for the written dissertation covering an aspect of American Studies. The dissertation should represent a significant contribution to knowledge, show familiarity with the intellectual heritage of American Studies, be presented in a scholarly manner, reveal an ability on the part of the candidate to work independently, and indicate considerable experience in using a variety of research techniques and forms of primary evidence. The contents and conclusions of the dissertation must be defended at the time of the final oral examination. The dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School, and the student must pass the final oral examination (the dissertation defense).

### Integrated Undergrad-Grad Programs

#### Integrated B.A. in American Studies and M.A. in American Studies

Requirements listed here are in addition to requirements listed in GCAC-210 Integrated Undergraduate-Graduate (IUG) Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/integrated-undergraduate-graduate-degree-programs).

The American Studies program offers an integrated B.A./M.A. program that is designed to allow academically superior baccalaureate students enrolled in the American Studies major to obtain both the B.A. and the M.A. degrees in American Studies within five years of study. The first two years of undergraduate coursework typically include the University General Education requirements and lower-level courses. In the third year, students typically take upper-division coursework in American Studies and define areas of interest. The fourth year involves graduate-level American Studies coursework including required courses in AMST 500. The fifth and final year of the program typically consists of graduate coursework in American Studies including AMST 591 and identification of a research project that will culminate in the completion of a M.A. project (AMST 580) or thesis (AMST 600).

By encouraging greater depth and focus in the course of study beginning in the third undergraduate year, this program will help the student more clearly define his/her area of interest and expertise in the broad field of American Studies. As a result, long-range academic planning for exceptional students pursuing doctoral degrees or other professional goals after leaving Penn State will be greatly enhanced. For most students, the total time required to reach completion of the higher degree will be shortened by about a year. The student will have earlier contact with the rigors of graduate study and with Graduate Faculty. The resources of the Graduate School are accessible to students accepted into the IUG program. Students in their third and fourth year of study with IUG status benefit from their association with graduate students whose level of work parallel their own.

If for any reason a student admitted to the B.A./M.A. program is unable to complete the requirements for the Master of Arts degree program in American Studies, the student will be permitted to receive the B.A. degree assuming all degree requirements have been satisfactorily completed.

#### Admission Requirements

The number of openings in the integrated B.A./M.A. program is limited. Admission will be selective based on specific criteria and the unqualified recommendation of faculty. Applicants to the integrated program:

1. Must be enrolled in the American Studies B.A. program and meet the admission requirements of the American Studies M.A. program.
2. Must apply and be admitted to the Graduate School.
3. Shall be admitted no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree, as specified in the proposed IUG plan of study.
4. Must have completed at least one 400-level American Studies course (AMST prefix) with a grade of A.
5. Must submit transcript(s) of previous undergraduate work, recommendations from two faculty members, writing sample, and statement of goals.
6. Must have an overall GPA at or above 3.3 (on a 4.0 scale) in undergraduate coursework and a GPA at or above 3.5 in all coursework completed for the American Studies major.

7. Must present a plan of study approved by the student’s adviser in the application process.

Degree Requirements
Up to 12 credits may be double-counted towards the degree requirements for both the graduate and undergraduate degrees; a minimum of 50% of the double-counted courses must be at the 500 or 800 level. Credits associated with the culminating experience for the graduate degree cannot be double-counted.

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<tr>
<td>AMST 491W</td>
<td>American Studies Perspectives (two seminars on different topics taken during the student’s fourth (senior) year)</td>
<td>6</td>
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<tr>
<td>AMST 500</td>
<td>Theory and Methods (taken during the student’s fourth (senior) year)</td>
<td>3</td>
</tr>
<tr>
<td>AMST 591</td>
<td>Seminar in American Studies (taken during the student’s fifth year)</td>
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With the approval of the student’s adviser, students may take American Studies courses from the 100 to 400 levels at Penn State campuses other than Harrisburg, but 500-level courses must be taken at the Harrisburg campus.

Student Aid
Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Learning Outcomes
Master of Arts (M.A.)
1. Graduates will demonstrate knowledge of the history, society, culture, and arts of the United States by conducting research in accordance with the highest ethical and professional standards and, with a variety of evidence, including objects, still and moving images, practices and performances, and oral and written texts.
2. Graduates will demonstrate knowledge of American Studies historiography by identifying major movements and approaches in the study of the American experience and providing major scholarly bibliographic and cultural sources for those movements and approaches.
3. Graduates will apply presentational and communicative skills used in American Studies scholarship, including oral presentation, writing, and exhibition, to produce material that can be used in educational institutions, heritage and museum organizations, and governmental and cultural agencies.
4. Graduates will demonstrate analytical skills such as symbolic analysis, cross-cultural comparison, and ethnographic fieldwork, to interpret meaning in historical, social, cultural, and artistic trends and movements in the United States.

Doctor of Philosophy (Ph.D.)
1. Graduates will demonstrate knowledge of the history, society, culture, and arts of the United States by conducting research in accordance with the highest ethical and professional standards and, with a variety of evidence, including objects, still and moving images, practices and performances, and oral and written texts.
2. Graduates will demonstrate knowledge of American Studies historiography by identifying major movements and approaches in the study of the American experience and providing major scholarly bibliographic and cultural sources for those movements and approaches.
3. Graduates will apply presentational and communicative skills used in American Studies scholarship, including oral presentation, writing, and exhibition, to produce material that can be used in educational institutions, heritage and museum organizations, and governmental and cultural agencies.
4. Graduates will demonstrate analytical skills such as symbolic analysis, cross-cultural comparison, and ethnographic fieldwork, to interpret meaning in historical, social, cultural, and artistic trends and movements in the United States.

Contact
Graduate Program Head: John R. Haddad
Primary Program Contact: Hannah Murray (hbm5103@psu.edu)
Program Email: amstd@psu.edu
Mailing Address: Penn State Harrisburg, 777 W. Harrisburg Pike, Middletown, PA 17057
Telephone: (717) 948-6201
Program Website: American Studies (https://harrisburg.psu.edu/humanities/american-studies)

Anatomy
Graduate Program Head: Patricia J. McLaughlin
Program Code: ANAT
Campus(es): Hershey (Ph.D., M.S.)
Degrees Conferred:
- Doctor of Philosophy (Ph.D.)
- Master of Science (M.S.)
- Dual-Title Ph.D. in Anatomy and Clinical and Translational Sciences
The Graduate Faculty:
View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=ANAT)
The Anatomy graduate program provides students curricular training with a unique focus on human anatomy, health and disease, and the opportunity for concentrated research in a related discipline such as:

- biochemistry
- cell biology
- embryology
- genetics
- immunology
- neuroscience
- pharmacology
- physiology
- structural biology
- virology

Students receive rigorous training that provides the skills necessary to be leaders in biomedical research and other endeavors that benefit from a rigorous scientific background, including education, law, journalism, and public policy. A dual-title degree in Anatomy and Clinical and Translational Sciences expands the educational experience of students training in anatomical science to include training, via a unique curriculum and research focus, for career paths that involve clinical trials or clinical research programs.

The Anatomy graduate program is an interdepartmental program that engages faculty from 4 basic science and 9 clinical science departments. This broad-reaching program provides students a wide ranging understanding of multiple disciplines with specific expertise in a chosen area, and encourages interdisciplinary research that is the hallmark of biomedical sciences in the 21st century.

**Admission Requirements**

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

1. Completed official Penn State Graduate School Application for Admission (http://gradschool.psu.edu/prospective-students/how-to-apply); Master’s or Doctoral Degree
2. Graduate Record Examinations (GRE) general test
3. Three letters of recommendation
4. Statement of goals including
   a. your reasons for applying to the Anatomy graduate program
   b. particular areas of research interests if known, and
   c. long-term career goals
5. Post-secondary course work must include biochemistry and molecular biology or genetics.

**Degree Requirements**

**Master of science (M.S.)**

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

The Anatomy program actively recruits students to earn an M.S. degree. To receive an M.S. degree in Anatomy, at least 30 credits are required (400-, 500-, 600-, or 700-level) with a minimum of 18 credits from courses at the 500 and 600 level courses combined. The first-year Fall curriculum includes a one-credit colloquium which introduces the student to professionalism, scientific communication, and addresses manuscript evaluation and writing, as well as scientific methodology and techniques that will be discussed in subsequent coursework. The professionalism elements reinforce ethics courses but focus on regulatory issues of animal or patient use and research.

### Code | Title | Credits
--- | --- | ---
ANAT 503 | Gross Anatomy | 6
ANAT 512 | Human Embryology and Teratology | 2
ANAT 505 | Histology and Embryology I | 2
ANAT 506 | Histology and Embryology II | 2
ANAT 590 | Colloquium (1 credit assigned an “R” grade) | 1
1 semester of a Biomedical Ethics course | 1

**Electives**

1. Elective Course Work | 10

**Culminating Experience**

ANAT 600 | Thesis Research | 6

Total Credits | 30

1. NEURO 511 is highly recommended as an elective, but is optional.

Students must complete original laboratory research that culminates in a thesis. The thesis must be accepted by the advisers and/or committee members, the head of the graduate program, and the Graduate School, and the student must pass a thesis defense.

**Doctor of philosophy (Ph.D.)**

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

The first-year Fall curriculum includes a one-credit colloquium which introduces the student to professionalism, scientific communication, and addresses manuscript evaluation and writing, as well as scientific methodology and techniques that will be discussed in subsequent coursework. The professionalism elements reinforce ethics courses but focus on regulatory issues of animal or patient use and research. The first-year Spring curriculum includes one 3-credit course focusing on neuroanatomical studies.

In addition, during the first year, students complete three research rotations that expose them to the wide range of research interests of The Pennsylvania State University Graduate Faculty from both basic and clinical science departments at the College of Medicine in Hershey. These rotations serve to inform the students with regard to choosing a thesis or dissertation adviser and forming a master's or doctoral committee. In addition students are advised to take ethics, statistics and electives. The doctoral students also complete their qualifying examination which entails an oral presentation and a written examination on anatomical coursework. In the Fall of the second year, the students are engaged in 2 credits of Supervised Teaching that allows them to have a full
complement of experiences in lecturing, dissecting, preparation of exams, and tutoring students. In addition, the requirements involve a 6-credit BMS course on Biomedical Sciences that encompasses 6 modules providing underlying principles of basic cellular processes of medical sciences.

In addition, each student must complete research rotations, as well as elective courses that may include statistics or other electives. Each student for the Ph.D. degree must fulfill written and spoken English communication requirements that are satisfied by preparing written and oral reports describing the laboratory rotations during the first year.

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<td>PHS 500</td>
<td>Research Ethics for Clinical Investigators</td>
<td>1</td>
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<tr>
<td>ANAT 596</td>
<td>Individual Studies</td>
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<td>Regulation of Cellular &amp; Systemic Energy Metabolism</td>
<td>3</td>
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<tr>
<td>BMS 502</td>
<td>Cell and Systems Biology</td>
<td>3</td>
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<tr>
<td>ANAT 602</td>
<td>Supervised Experience in College Teaching</td>
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**Dual-Titles**

**Dual-Title Ph.D. in Anatomy and Clinical and Translational Sciences**

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

**Admission Requirements**

Potential dual-title trainees will express an interest in the dual-title degree as early as during the recruitment process for the Anatomy Graduate Program, and may apply for the dual-title Ph.D. in Anatomy and Clinical and Translational Sciences following admission to the Graduate School and to the Anatomy program and prior to taking the qualifying examination in Anatomy, no later than the end of the third semester of graduate study in Anatomy. Students interested in the dual-title degree will be considered for admission to the Clinical and Translational Sciences program by a committee consisting of the Clinical and Translational Sciences program co-directors and faculty affiliated with the Clinical and Translational Sciences dual-title program. Refer to the Admission Requirements section of the CTS Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/clinical-translational-sciences).

**Degree Requirements**

To qualify for the dual-title degree, students must satisfy the degree requirements for the Ph.D. degree, listed on the Degree Requirements tab. In addition, students must complete the degree requirements for the dual-title Ph.D. in CTS, listed on the CTS Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/clinical-translational-sciences). Reciprocity between the CTS dual-title program and the Anatomy graduate program allows for up to 7 of the elective credits required for the Clinical and Translational Sciences degree to be met simultaneously (ethics, statistics, and 1 elective).

Anatomy graduate students accepted to the Clinical and Translational Sciences dual-Title program will take the qualifying examination at the end of the third semester of graduate training:

1. to allow exposure to the Clinical and Translational Sciences curriculum in the Spring semester of the first year and Fall semester of the second year, which will prepare the students for the integrated content of the dual-title qualifying exam, and

2. to allow sufficient time to identify and assure commitment of an appropriate dissertation adviser who embraces the dual-title program of the student.

During the qualifying examination, the student will also be assessed for the dual-title program, and at least one member of the qualifying examination committee must come from the dual-title program. Faculty members who hold appointments in both programs may serve in a combined role.

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of an Anatomy and Clinical and Translational Sciences dual-title doctoral degree student must include at least one member of the Clinical and Translational Sciences Graduate Faculty. Faculty members who hold appointments in both programs’ graduate faculty may serve in a combined role.
The committee chair will be a member of the Graduate Faculty in the primary graduate program. Faculty members who hold appointments in both the primary graduate program and the CTS program may serve in a combined role. If the committee chair does not serve in this combined role, the faculty member representing the CTS program must be designated co-chair of the committee. The CTS representative(s) will be expected to assist in constructing and evaluating comprehensive examination questions that cover the secondary area of study.

Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. Students enrolled in the dual-title program are required to write and orally defend a dissertation on a topic that reflects their original research and expertise in both Anatomy and Clinical and Translational Sciences. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

Student Aid
Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding [gradschool.psu.edu/graduate-funding](http://gradschool.psu.edu/graduate-funding) section of The Graduate School's website. Students on graduate assistantships must adhere to the course load limits [gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants](http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Learning Outcomes
Master of Science (M.S.)
1. **KNOW:** Anatomy master's degree graduates will demonstrate a) a broad base of knowledge in the anatomical sciences including human gross anatomy, human microscopic anatomy (histology), and human development, b) a broad base of biological knowledge required to understand the molecular, cellular, and organismal processes related to biomedical sciences; c) a broad understanding of experimental approaches used to investigate biomedical problems; d) in-depth knowledge within their specific areas of research interests, and e) the highest standards of research ethics.
2. **CREATE:** Anatomy master's degree graduates will creatively synthesize theory and literature to generate questions, ideas, or hypotheses addressing current problems in human health and disease, and will devise critical experimental approaches to test these ideas and hypotheses.
3. **APPLY:** Anatomy master's degree graduates will perform hypothesis-driven, original research that addresses current problems in biomedical sciences - often related to their mentor's primary research.
4. **COMMUNICATE:** Anatomy master's degree graduates will perform independent and original research studies that address current problems in biomedical sciences leading to rigorous and reproducible experimental outcomes.

5. **CRITICAL THINKING:** Anatomy master's degree graduates will critically evaluate experimental approaches and results of their own research and the research of others.
6. **PRACTICE:** Anatomy master's degree graduates will conduct all activities in research practices and interactions with medical professionals with the highest level of ethics and integrity.
7. **APPLY:** Anatomy master's degree graduates will capitalize on their knowledge and research skills to obtain placement in professional schools, to continue their education in alternative careers, and/or to obtain careers in biomedical research or anatomical teaching.

Doctor of Philosophy (Ph.D.)
1. **Know:** Anatomy graduates will demonstrate a) a broad base of knowledge in the anatomical sciences including human gross anatomy, human microscopic anatomy (histology), and human development, b) a broad base of biological knowledge required to understand the molecular, cellular, and organismal processes related to biomedical sciences; c) a broad understanding of experimental approaches used to investigate biomedical problems; d) in-depth knowledge within their specific areas of research interests, and e) the highest standards of research ethics.
2. **Create:** Anatomy graduates will synthesize material in the anatomical sciences to formulate didactic lectures, flipped-classrooms, problem-based learning modules, and team-based learning. Students will creatively organize material for classroom and laboratory (cadaver dissection) presentations. Graduates will creatively synthesize theory and literature to generate questions, ideas, or hypotheses addressing current problems in human health and disease, and will devise critical experimental approaches to test these ideas and hypotheses.
3. **Apply:** Anatomy graduates will demonstrate their anatomical knowledge by providing lectures to first and second year medical students and physician assistant students, as well as upper-class medical students and residents. Graduates will be involved in hands-on training of medical and PA students in cadaver-based laboratory settings including (i) assisting in preparation of laboratory and written examinations, (ii) identification of structures for laboratory practical exams, and (iii) preparing and grading written exams. Graduates will perform independent and original research studies that address current problems in biomedical sciences leading to rigorous and reproducible experimental outcomes.
4. **Critical thinking:** Anatomy graduates will be required to interpret a large body of knowledge and condense material to provide important components to medical and physician assistant students. In terms of research, graduates will critically evaluate experimental approaches and results of their own research and the research of others.
5. **Communicate:** Anatomy graduates will convey knowledge on the subjects of human gross anatomy, embryology and microscopic anatomy (histology) and neuroanatomy to a variety of audiences including undergraduate students (Brain Bee), medical students, physician assistant students, as well as to graduate medical students in residency programs at Penn State Hershey. In terms of research activities, graduates will convey ideas, experimental approaches, and results in clear, concise, well-organized papers, posters, proposals, oral presentations, and discussions.
6. **Professional practice:** Anatomy graduates will begin interactions with other professionals within 2 years of matriculation, as they are included in teams of faculty involved in medical education oversight and curriculum design and review. In terms of research,
graduates will collaborate in a collegial and ethical manner with other professionals within their field or with diverse scientific backgrounds.

7. Career development: Anatomy graduates will pursue academic teaching positions at undergraduate school, graduate schools with allied health science centers, and professional medical universities with programs in a variety of medical health fields. Graduates will participate in, and attend, professional career seminars at the College of Medicine, Career Day activities, and maintain a yearly IDP (individual development plan). In many cases for university employment, both teaching and research expertise are required.

Contact

Graduate Program Head: Patricia McLaughlin

Primary Program Contact: Kristin Smith

Email: kec17@psu.edu

Mailing Address: College of Medicine H181, P.O. Box 850, Hershey, PA 17033

Telephone: (717) 531-1045

Program Website: Anatomy (http://med.psu.edu/anatomy-phd)

Animal Science

Graduate Program Head: Terry D. Etherton

Program Code: ANSC

Campus(es): University Park (Ph.D., M.S., M.P.S.)

Degrees Conferred: Doctor of Philosophy (Ph.D.)

Master of Science (M.S.)

Master of Professional Studies (M.P.S.)

Dual-Title Ph.D. and M.S. in Animal Science and Operations Research

The Graduate Faculty

View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=ANSC)

Students may specialize in animal care and management, breeding and genetics, growth and development, lactational biology, nutrition, or reproductive biology. Well-equipped research laboratories and various agricultural animals, as well as small-animal models and wildlife species, are available.

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Prerequisite to graduate work is the completion of an undergraduate major in animal science, dairy science, poultry science, or a related biological science.

Scores from the Graduate Record Examinations (GRE) are required for admission (average percentile at least 50 percent in verbal, quantitative, and analytical components). The quantitative reasoning component is recommended, but the program will accept scores from the mathematical reasoning component. Students with a 3.00 junior/senior grade-point average (on a 4.00 scale) and with appropriate course backgrounds will be considered for admission on a competitive basis.

Exceptions to admission requirements may be made for students with special backgrounds, abilities, and interests.

Degree Requirements

Master of Professional Studies (M.P.S.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

The M.P.S. is a professional program designed to prepare individuals for specialist and management positions in county agricultural extension, government, or industry and does not require a thesis.

Master of Science (M.S.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

The academic M.S. program requires a thesis and is designed for those primarily interested in education and research.

Doctor of Philosophy (Ph.D.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

The academic Ph.D. program requires a thesis and is designed for those primarily interested in education and research. The communication or foreign language requirement for the Ph.D. degree may be satisfied by competence in either one foreign language or communication skills.

Dual-Titles

Dual title M.S. and Ph.D. in Animal Science and Operations research

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-208/dual-title-graduate-degree-programs).

Admission Requirements

Students must apply and be admitted to the graduate program in Animal Science and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the OR dual-title program. Refer to the Admission Requirements section of the OR Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/operations-research). Doctoral students must be admitted into the dual-title degree program in OR prior to taking the qualifying examination in their primary graduate program.

Degree Requirements for the Dual-Title M.S.

To qualify for the dual-title degree, students must satisfy the degree requirements for the M.S. degree, listed on the Degree Requirements tab. In addition, students must complete the degree requirements for the dual-title M.S. in OR, listed on the OR Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/operations-research). Final course selection must be approved by the student’s advisory committee.
Degree Requirements for the Dual-Title Ph.D.
To qualify for the dual-title degree, students must satisfy the degree requirements for the Ph.D. degree, listed on the Degree Requirements tab. In addition, students must complete the degree requirements for the dual-title Ph.D. in OR, listed on the OR Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/operations-research). Some courses may satisfy both Animal Science program requirements and those of the OR program. Final course selection must be approved by the student’s dissertation committee.

The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Animal Science and must include at least one Graduate Faculty member from the OR program. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. There will be a single qualifying examination, containing elements of both Animal Science and OR. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the candidacy examination may be delayed on semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of an Animal Science and OR dual-title Ph.D. student must include at least one member of the OR Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in OR, the member of the committee representing OR must be appointed as co-chair. The OR representative on the student’s dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their dissertation committee and reflects their original research and education in Animal Science and OR. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

Student Aid
Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Learning outcomes
Master of Science (M.S.)
1. KNOW. Students will demonstrate appropriate breadth and depth of disciplinary knowledge (e.g., nutrition, physiology, statistics, etc.), a command of the current literature relating to their thesis project, and a thorough understanding of the problems that their research addresses.
2. APPLY/CREATE. Students will apply current knowledge in their field to design animal studies and/or perform laboratory methods or other techniques to address their research problems, while generating and testing new ideas or hypotheses that provide solutions to those problems.
3. COMMUNICATE. Students will effectively communicate their research findings, both in writing, via abstracts and manuscripts, and orally, via seminars and oral or poster presentations, to peers, advisors/mentors, and other scholars and/or stakeholders in their specialty field or beyond their discipline.
4. THINK. Students will be able to conceptualize and critically evaluate the work of others in their field.
5. PROFESSIONAL PRACTICE. Students will be able to identify ethical issues in research, will become familiar with University policies involving the use of animals and human subjects in research, will act ethically and exhibit collegiality with other professionals within or outside of their field, and will engage in service to the profession and to society.

Doctor of Philosophy (Ph.D.)
1. KNOW. Students will demonstrate appropriate breadth and depth of disciplinary knowledge (e.g., nutrition, physiology, statistics, etc.), a command of the current literature relating to their thesis project, and a thorough understanding of the problems that their research addresses.
2. APPLY/CREATE. Students will apply current knowledge in their field to design animal studies and/or perform laboratory methods or other techniques to address their research problems, while generating and testing new ideas or hypotheses that provide solutions to those problems.
3. COMMUNICATE. Students will effectively communicate their research findings, both in writing, via abstracts and manuscripts, and orally, via seminars and oral or poster presentations, to peers, advisors/mentors, and other scholars and/or stakeholders in their specialty field or beyond their discipline.
4. THINK. Students will be able to conceptualize and critically evaluate the work of others in their field.
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Contact
Graduate Program Head: Terry D. Etherton
Director of Graduate Studies/Professor-in-Charge: Robert G. Elkin
Primary Program Contact: Molly Martin
Email: mjf217@psu.edu
Anthropology

Graduate Program Head
Douglas J. Kennett

Program Code
ANTH

Campus(es)
University Park (Ph.D., M.A.)

Degrees Conferred
Doctor of Philosophy (Ph.D.)
Master of Arts (M.A.)

Dual-Title Ph.D. in Anthropology and Bioethics
Dual-Title M.A. and Ph.D. in Anthropology and Demography
Dual-Title M.A. and Ph.D. in Anthropology and Human Dimensions of Natural Resources and the Environment
Integrated B.S. in Anthropological Science and B.A. in Classics and Ancient Mediterranean Studies and M.A. in Anthropology
Integrated B.A. in Anthropology and B.A. in Classics and Ancient Mediterranean Studies and M.A. in Anthropology
Joint M.D. / Ph.D. with the College of Medicine

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Entrance to the Anthropology graduate program occurs in the fall semester. Applications must be received by the department no later than December 1 for fall admission. The Department of Anthropology requires Ph.D. program applicants to submit:

- official transcripts from all post-secondary institutions attended (http://www.gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission)
- Graduate Record Examinations (GRE) scores (verbal, quantitative, and analytical)
- a statement of purpose
- a CV
- at least three letters of recommendation from persons familiar with the applicant's academic performance

A Master's degree is not required to apply to the Ph.D. Program. The department does not admit students to the terminal Master's degree, but does allow students to apply for a Master's degree through admission to the IUG (Integrated Undergraduate and Graduate) program and Ph.D. degree program.

Degree Requirements

Master of arts (M.A.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

A minimum of 30 credits at the 400, 500, 600, or 800 level is required, with at least 18 credits at the 500 and 600 level, combined. All Master's students are required to take the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANTH</td>
<td>Required Courses</td>
<td></td>
</tr>
<tr>
<td>560</td>
<td>Ecology, Evolution, and Human Behavior</td>
<td>3</td>
</tr>
<tr>
<td>571</td>
<td>Principles of Human Evolutionary Biology</td>
<td>3</td>
</tr>
<tr>
<td>588</td>
<td>Method and Theory in Archaeology</td>
<td>3</td>
</tr>
<tr>
<td>541</td>
<td>Current Literature in Integrative Anthropology</td>
<td>2</td>
</tr>
</tbody>
</table>

Students also have the option of enrolling in dual-title Ph.D. graduate programs in Demography, Human Dimensions of Natural Resources and the Environment (HNDRE), and Bioethics, and dual-title M.A. programs in Demography and HDNRE. The Department also offers two Integrated Undergraduate/Graduate (IUG) programs (B.A./M.A. and B.S./B.A./M.A.): with the Department of Classics (CAMS). In addition, the Department of Anthropology also offers a joint M.D./Ph.D. degree program with the College of Medicine.
500 level, and must write a satisfactory scholarly paper, while enrolled in ANTH 596.

All entering graduate students are expected to complete online training in Scholarship and Research Integrity (SARI), also referred to as Responsible Conduct of Research (RCR), by no later than October 1 of their first semester in residence. Additional course work is tailored to the student's research interests after advance consultation with their adviser, and specific courses may be required by the adviser depending on the student's background and research plans.

**Doctor of Philosophy (Ph.D.)**

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

The doctoral degree in Anthropology requires a minimum of 30 credits, 27 of which are required coursework and 3 credits of which are electives. All first-year Ph.D. students are required to register for 9-12 credits per semester and complete 15 credits of course work, including the three core theory seminars (ANTH 560, ANTH 571, ANTH 588) and two research method seminars (ANTH 572, and ANTH 573). The core method and theory courses will serve as the basis for the Ph.D. qualifying exam, which will take place at the end of the first year.

In the fall of the second year, all students in the Ph.D. program should enroll for a total of 9-12 credits per semester, including ANTH 509. ANTH 508, Visualizing Anthropological Data, is required for all Ph.D. students and may be taken at any point in the first two years. Students without suitable preparation in statistics may also be required to take a course at the 400 or 500 level at the adviser's discretion. A student's dissertation committee can require additional course work depending on the student's background and research plans.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANTH 508</td>
<td>Visualizing Anthropological Data</td>
<td>3</td>
</tr>
<tr>
<td>ANTH 509</td>
<td>Proposal Writing</td>
<td>3</td>
</tr>
<tr>
<td>ANTH 541</td>
<td>Current Literature in Integrative Anthropology</td>
<td>2</td>
</tr>
<tr>
<td>ANTH 560</td>
<td>Ecology, Evolution, and Human Behavior</td>
<td>6</td>
</tr>
<tr>
<td>ANTH 571</td>
<td>Principles of Human Evolutionary Biology</td>
<td>3</td>
</tr>
<tr>
<td>ANTH 572</td>
<td>Advances in Anthropological Methods</td>
<td>3</td>
</tr>
<tr>
<td>ANTH 573</td>
<td>Anthropology Research Practicum</td>
<td>3</td>
</tr>
<tr>
<td>ANTH 588</td>
<td>Method and Theory in Archaeology</td>
<td>3</td>
</tr>
</tbody>
</table>

1 ANTH 508 is required for all Ph.D. students and may be taken at any point in the first two years.
2 All Ph.D. students are required to enroll in a one-unit literature review seminar (ANTH 541), for one credit each semester during the first six semesters of study.

All entering graduate students are expected to complete online training in Scholarship and Research Integrity (SARI), also referred to as Responsible Conduct of Research (RCR), by no later than October 1 of their first semester in residence. A student's dissertation committee can require reading knowledge and/or demonstrated working knowledge of a foreign language, specialized training in linguistics, or training in computer programming languages, depending on the student's research interests. This will be determined shortly after the committee is formed.

For the Ph.D. degree, students must conduct significant original research that demonstrates the student's mastery of the field. The Ph.D. requirements include successful completion of course work as stipulated by the department and dissertation committee, passing the qualifying exam, preparing a dissertation proposal, successfully passing the comprehensive exam/dissertation proposal defense, and writing and defending the subsequent dissertation. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School, and the student must pass a final oral examination (the dissertation defense).

**Dual-Titles**

**Dual-Title Ph.D. in Anthropology and Bioethics**

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

The Bioethics program (http://bulletins.psu.edu/graduate/programs/majors/bioethics) provides anthropology students with an opportunity to develop their knowledge of the social and ethical implications of their research. This combination – solid research experience with an intimate knowledge of the ethical dimensions of that work – is increasingly important in the workplace, and broadens the possibilities of employment beyond traditional anthropology positions.

**Admissions Requirements**

Students must apply and be admitted to the graduate program in Anthropology and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Bioethics dual-title program. Refer to the Admission Requirements section of the Bioethics Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/bioethics). Doctoral students must be admitted into the dual-title degree program in Bioethics prior to taking the qualifying examination in their primary graduate program.

**Degree Requirements**

To qualify for the dual-title degree, students must satisfy the degree requirements for the degree they are enrolled in Anthropology, listed above. In addition, students must complete the degree requirements for the dual-title in Bioethics, listed on the Bioethics Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/bioethics).

The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Anthropology and must include at least one Graduate Faculty member from the Bioethics program. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. There will be a single qualifying examination, containing elements of both Anthropology and Bioethics. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of an Anthropology and Bioethics dual-title Ph.D. student must include at least one member of the Bioethics Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty
may serve in a combined role. If the chair of the doctoral committee is not also a member of the Graduate Faculty in Bioethics, the member of the committee representing Bioethics must be appointed as co-chair. The Bioethics representative on the student’s doctoral committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their dissertation committee and reflects their original research and education in Anthropology and Bioethics. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

**Dual-Title M.A. and Ph.D. in Anthropology and Demography**

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

The Demography interdisciplinary program (http://bulletins.psu.edu/graduate/programs/majors/demography) is designed to give students in-depth knowledge of the demographic dimensions of anthropological research, including studies of present populations as well as those of the past.

**Admissions Requirements**

Students must apply and be admitted to the graduate program in Anthropology and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Demography dual-title program. Refer to the Admission Requirements section of the Demography Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/demography). Doctoral students must be admitted into the dual-title degree program in Demography prior to taking the qualifying examination in their primary graduate program.

**Degree Requirements**

To qualify for the dual-title degree, students must satisfy the degree requirements for the degree they are enrolled in Anthropology, listed on the Degree Requirements tab. In addition, students must complete the degree requirements for the dual-title in Demography, listed on the Demography Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/demography).

The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Anthropology and must include at least one Graduate Faculty member from the Demography program. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. There will be a single qualifying examination, containing elements of both Anthropology and Demography. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of an Anthropology and Demography dual-title Ph.D. student must include at least one member of the Demography Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in Demography, the member of the committee representing Demography must be appointed as co-chair. The Demography representative on the student’s dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their dissertation committee and reflects their original research and education in Anthropology and Demography. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

**Dual-Title M.A. and Ph.D. in Anthropology and Human Dimensions of Natural Resources and the Environment**

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

The HDNRE program (http://bulletins.psu.edu/graduate/programs/majors/human-dimensions-natural-resources-environment) involves four colleges including the College of the Liberal Arts, is oriented toward research that furthers our understanding of the human use of natural resources, a pressing concern for all of us in the twenty-first century. Topics of special concern for anthropologists are the (very) long-term impact of humans on natural settings, and the ways people have adapted to those changes in their surroundings.

**Admissions Requirements**

Students must apply and be admitted to the graduate program in Anthropology and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the HDNRE dual-title program. Refer to the Admission Requirements section of the HDNRE Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/human-dimensions-natural-resources-environment). Doctoral students must be admitted into the dual-title degree program in HDNRE prior to taking the qualifying examination in their primary graduate program.

**Degree Requirements**

To qualify for the dual-title degree, students must satisfy the degree requirements for the degree they are enrolled in Anthropology, listed on the Degree Requirements tab. In addition, students must complete the degree requirements for the dual-title in HDNRE, listed on the HDNRE Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/human-dimensions-natural-resources-environment).

The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Anthropology and must include at least one Graduate Faculty member from the HDNRE program. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. There will be a single qualifying examination, containing elements from both Anthropology and HDNRE. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying
examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of an Anthropology and HDNRE dual-title Ph.D. student must include at least one member of the HDNRE Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in HDNRE, the member of the committee representing HDNRE must be appointed as co-chair. The HDNRE representative on the student’s dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their dissertation committee and reflects their original research and education in Anthropology and HDNRE. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

**Integrated Undergrad-Grad Programs**

**Integrated B.A. degree in Anthropology or B.S. degree in Anthropological Science, B.A. degree in Classics and Ancient Mediterranean Studies (CAMS), and M.A. degree in Anthropology**

Requirements listed here are in addition to requirements listed in GCAC-210 Integrated Undergraduate-Graduate (IUG) Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/integrated-undergraduate-graduate-degree-programs).

The Department of Anthropology offers two integrated undergraduate-graduate (IUG) degree programs (B.A./B.A./M.A. or B.A./B.S./M.A.) designed to allow academically superior students to obtain either a B.A. degree in Anthropology or a B.S. degree in Anthropological Science, a B.A. degree in Classics and Ancient Mediterranean Studies (CAMS), and an M.A. degree in Anthropology in five years of study.

**Admission Requirements**

Students who are applying to the Integrated Undergraduate and Graduate (IUG) program must complete the Graduate School application for admission (http://www.gradschool.psu.edu/prospective-students/how-to-apply), and must meet all the admission requirements of the Graduate School and the Anthropology IUG graduate program, listed on the Admission Requirements tab. Students shall be admitted to an IUG program no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree, as specified in the proposed IUG plan of study. Criteria for admission include a minimum GPA of 3.4 in their majors, strong recommendation letters from faculty, and an excellent proposal for a research project with a specific adviser who has agreed to guide the student through to the completion of the M.A. thesis or scholarly paper. In consultation with this adviser, students must prepare a plan of study appropriate to this integrated program, and must present their plan of study in person to the head of the graduate program or the appropriate committee overseeing the integrated program prior to being admitted to the program. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser as the student advances through the program.

**Degree Requirements**

Students must fulfill all requirements for each degree in order to be awarded that degree, subject to the double-counting of credits as outlined below. Degree requirements for the B.A. in Anthropology, B.A. in Classics and Ancient Mediterranean Studies, and B.S. in Anthropological Science are listed in the Undergraduate Bulletin (http://bulletins.psu.edu/undergrad). Degree requirements for the M.A. degree are listed below. Up to 12 credits may be double-counted towards the degree requirements for both the graduate and undergraduate degrees; a minimum of 50% of the double-counted courses must be at the 500 or 800 level. Credits associated with the culminating experience for the graduate degree cannot be double-counted.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANTH 541</td>
<td>Current Literature in Integrative Anthropology</td>
<td>1</td>
</tr>
<tr>
<td>ANTH 560</td>
<td>Ecology, Evolution, and Human Behavior</td>
<td>3</td>
</tr>
<tr>
<td>ANTH 571</td>
<td>Principles of Human Evolutionary Biology</td>
<td>3</td>
</tr>
<tr>
<td>ANTH 588</td>
<td>Method and Theory in Archaeology</td>
<td>3</td>
</tr>
</tbody>
</table>

Students must sequence their courses so all undergraduate degree requirements are fulfilled before taking courses to count towards the graduate degree. If students accepted into the IUG program are unable to complete the M.A. degree, they are still eligible to receive their undergraduate degree if all the undergraduate degree requirements have been satisfied.

**Joint Degrees**

**Joint M.D. / Ph.D. with the College of Medicine**

Requirements listed here are in addition to requirements listed in GCAC-211 Joint Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/joint-degree-programs).

**Admission Requirements**

Prospective students interested in simultaneously pursuing a M.D. and Ph.D. degree must apply to the College of Medicine M.D. program using the national American Medical College Application Service (AMCAS) application system and indicate their intent to pursue the joint-degree program. Admissions requirements and applications for admission for Penn State College of Medicine are available at the M.D. Program (http://med.psu.edu/md) section of the Penn State College of Medicine website. Applicants must also meet the admission requirements of the Graduate School and the Ph.D. admission requirements listed on the Admission Requirements tab, however, the requirement for GRE scores is waived for students applying to the joint degree program. The M.D./Ph.D. Admissions Committee reviews applications and evaluates candidates for acceptance into both the M.D. and Ph.D. programs. After the review committee has accepted an applicant to the joint degree program, s/he must apply to the Graduate School (http://www.gradschool.psu.edu/prospective-students/how-to-apply) for admission to the graduate program. Applicants not accepted into the joint-degree program may be referred to either the M.D. or Ph.D. program, depending on their qualifications.

Applicants to this program generally have very strong grades and MCAT scores, as well as a strong and sustained background in research.
Applicants must be able to clearly articulate reasons for pursuing the joint degree. Letters of recommendation from faculty who have advised the applicant in research and who can comment on the applicant’s passion and potential for research are strongly encouraged.

**Degree Requirements**

Students must fulfill all requirements for each degree in order to be awarded that degree, subject to the double-counting of credits outlined below. Degree requirements for the M.D. program are listed on the Penn State College of Medicine website (http://www.med.psu.edu/web/md/home). For students enrolled in the joint degree program, the requirement for ANTH 572 and ANTH 573 will be waived, and students will be required to complete 2 credits of ANTH 541 instead of 6. The College of Medicine will accept 8 credits of ANTH 600 in lieu of two months of elective rotations (MED 797). In addition, the College of Medicine waives the requirement for a Medical Student Research project for students in the M.D./Ph.D. program.

If students accepted into the joint degree program are unable to complete the M.D. degree, they are still eligible to receive the Ph.D. degree if all the Ph.D. degree requirements have been satisfied.

In addition to the requirements for the doctoral committee (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation) for a Ph.D. student in the ANTH Graduate Program, at least one member of the dissertation committee must be on the M.D./Ph.D. Steering Committee. This member may serve other roles on the doctoral committee.

M.D./Ph.D. students must complete 25 credits. Candidates for the M.D./Ph.D. in ANTH will take all of the core courses for the ANTH Ph.D., as well as electives chosen by the ANTH M.D./Ph.D. student in consultation with their primary mentor. In the first semester of the second year at UP all students in the ANTH Ph.D. program are required to take ANTH 509, the research methods seminar. ANTH 508, Anthropological Data Analysis and Visualization, is also required for all ANTH Ph.D. students and may be taken at any point in the first two years. Students without suitable preparation in statistics may also be required to take a course at the 400 or 500 level at the advisor's discretion. At any point during the first two years, M.D./Ph.D. students may be required to take up to 6 additional credits of advanced seminars, as directed by their advisor. The M.D./Ph.D. students pursuing the ANTH Ph.D. are also required to enroll in a one-unit literature review seminar (ANTH 541) for one credit each semester during the first two semesters of study. All entering graduate students are expected to complete online training in Scholarship and Research Integrity (SARI), also referred to as Responsible Conduct of Research (RCR), by no later than October 1 of their first semester in residence at University Park. In addition to taking the required core courses and the literature review course, six credits of elective courses may be required in consultation with the student's dissertation adviser and doctoral committee. Eight credits of ANTH 600/ANTH 601 Thesis Research/Ph.D. Dissertation conducted over the four years of the graduate portion of the training program will be counted by the College of Medicine in lieu of two months of elective rotations (MED 797). The College of Medicine's requirement for a Medical Student Research project is also waived for all M.D./Ph.D. in ANTH candidates.

The doctoral committee of an M.D./Ph.D. student in ANTH will be formed upon successful passing of the ANTH qualifying examination and commencement of work under a primary mentor, no later than the end of the first semester of the second year of graduate study at UP. The doctoral committee must include a minimum of four faculty members, i.e., the chair and at least three additional members, all of whom must be members of the Graduate Faculty. The committee must include at least two members of the ANTH graduate faculty and one member of the M.D./Ph.D. steering committee. One member of the doctoral committee must represent a field outside the candidate's major field of study in order to provide a broader range of disciplinary perspectives and expertise. This person is the "outside field member." Additionally, one member of the committee must be "outside unit member," a member of the graduate faculty outside the adviser's administrative home (for a tenure-line faculty member this is the department that serves as their tenure home). The same person can be the outside field member and outside unit member.

The comprehensive examination for ANTH M.D./Ph.D. students will follow the same guidelines as for Ph.D. students in ANTH, except that the comprehensive examination must be held before the end of the second academic year at UP. The M.D./Ph.D. student must write a dissertation proposal in preparation for the comprehensive exam, and a final version of the dissertation proposal must be circulate by the student to all committee members at least four weeks in advance of the comprehensive exam. The comprehensive examination for M.D./Ph.D. students will be an oral examination, scheduled with the Graduate School at least two weeks ahead of time, which may be open to the public. The examination will consist of student presentation of their dissertation proposal, followed by questions and discussion. The student and the chair (or one of the co-chairs) is physically present at the exam, which is given and evaluated by the entire doctoral committee. A favorable vote of at least two-thirds of the members of the committee is required for passing. In case of failure, it is the responsibility of the doctoral committee to determine whether the candidate may take another examination. The results are reported to the Office of Graduate Enrollment Services and are entered on the candidate's official record.

The dissertation requirements for ANTH Ph.D. and ANTH M.D./Ph.D. students are the same: All Ph.D. candidates must conduct original research and prepare a dissertation that makes a significant contribution to existing knowledge. The content and conclusions of the dissertation must be defended at the time of the final oral examination.

Students must present their dissertation in accordance with Graduate Council and Graduate School guidelines as described in the Thesis and Dissertation Guide (http://gradschool.psu.edu/current-students/etd).

**Student Aid**

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School's website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

**Courses**

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.
Learning Outcomes

1. Graduates will demonstrate comprehensive understanding of the history and current knowledge and theory in the field of Anthropology through written works, oral presentations and teaching endeavors.
2. Graduates will be able to identify research questions in anthropology, develop a research design to examine questions using appropriate data collection methods, analyze the data using appropriate statistical methodology, and interpret the results of data analysis.
3. Demonstrate effective communication of research ideas in written works and oral presentations. Demonstrate effective communication of current topics in Anthropology through development of clear and engaging lectures and assignments for undergraduate courses.
4. Graduates will be able to develop an effective, original research proposal that is framed by current anthropological theory and methods.
5. Graduates will demonstrate knowledge of the professional standards of scholarly and professional work in their field of anthropology through their written and oral works and interactions with colleagues.

Contact

Graduate Program Head: Douglas Kennett
Director of Graduate Studies/Professor-in-Charge: Mary Shenk
Primary Program Contact: Audrey Chambers
Email: amv14@psu.edu
Mailing Address: 414 Carpenter Building, University Park, PA 16802
Telephone: (814) 865-2509
Program Website: Anthropology (http://anth.la.psu.edu)

Applied Behavior Analysis

Graduate Program Head: Holly Angelique
Program Code: ABA
Campus(es): Harrisburg (M.A.)
Degrees Conferred: Master of Arts (M.A.)
The Graduate Faculty

The program, offered at Penn State Harrisburg, helps master's level graduates prepare to function in community settings as applied behavior analysts, and to provide the academic training necessary for graduates to apply for national board certification in behavior analysis. The overall model emphasizes the core areas of the discipline including the scientific basis of behavior analysis, as well as how biological, social, and individual differences affect human behavior. Training will emphasize the development of both assessment and intervention skills.

The program helps prepare graduates to work in hospitals, medical schools, mental health centers, health maintenance organizations, a wide variety of educational settings, forensic settings, research facilities, and in center- and home-based programs for individuals with autism and developmental disabilities.

The program is intended for both part- and full-time students. Courses will be scheduled for fall and spring semesters. Admission is in the fall and spring semesters only.

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Students will be admitted on a competitive basis and must submit the following:

- a completed Graduate School online application (http://gradschool.psu.edu/prospective-students/how-to-apply) and payment of the application fee
- official transcripts from all post-secondary institutions attended (http://www.gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission)
- three letters of recommendation
- a brief (two-page) interest statement

Applicants must have at least 18 credits in education, psychology, or related disciplines with a cumulative grade-point average of 3.0 or above in the last 60 credits. Scores from the Graduate Record Examinations are required in the verbal, quantitative, and analytic portions. A personal interview may be required.

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. See GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

Degree Requirements

Master of Arts (M.A.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

Requirements for the M.A. in Applied Behavior Analysis include 30 credits in required course work, including the master’s project paper, supervised internship experience, and 6 elective credits for a total of 36 credits.

ABA Core Courses (to be offered annually) are required for all students in the program.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABA 500</td>
<td>Science and Foundations of Behavior</td>
<td>3</td>
</tr>
<tr>
<td>ABA 511</td>
<td>Behavioral Assessment and Treatment</td>
<td>3</td>
</tr>
<tr>
<td>ABA 522</td>
<td>Behavioral Research Methods</td>
<td>3</td>
</tr>
<tr>
<td>ABA 533</td>
<td>Applied Analysis of Behavior</td>
<td>3</td>
</tr>
<tr>
<td>ABA 577</td>
<td>Case Conceptualization and Development</td>
<td>3</td>
</tr>
<tr>
<td>ABA 588</td>
<td>Ethics and Legal Issues in Applied Behavior Analysis</td>
<td>3</td>
</tr>
</tbody>
</table>

Select six credits of the following:

Electives |
Select six credits of the following: 6
Applied Clinical Psychology

Graduate Program Head: Holly Angelique
Program Code: ACPSY
Campus(es): Erie (M.A.)
Harrisburg (M.A.)

Degrees Conferred:
- Master of Arts (M.A.)

The Graduate Faculty:
View https://secure.gradsch.psu.edu/gmps/index.cfm?
searchType=fac&prog=ACPSY

The Master of Arts in Applied Clinical Psychology program helps students prepare to work as mental health professionals in a variety of settings and is intended to provide a broad training program in empirically validated clinical psychology which, when accompanied by an additional 12 credits in advanced graduate studies in psychology and/or counseling, can provide the academic training necessary for graduates to apply for master's level licensing as a professional counselor in the Commonwealth of Pennsylvania. The M.A. program requires 48 credits of course work. An optional 12-credit certificate program is available for students seeking licensure.

The overall model emphasizes the scientific bases of behavior, including biological, social, and individual difference factors. The training model is health-oriented rather than pathology-oriented and emphasizes the development of helping skills, including both assessment and intervention.

The degree program is intended for both part- and full-time students. Students are admitted fall semester only. The deadline for admission is May 1.

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Students will be admitted on a competitive basis and must submit the following:

- completed Graduate School application form (http://gradschool.psu.edu/prospective-students/how-to-apply) with the application fee
- official transcripts from all post-secondary institutions attended (http://gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission)
- three professional letters of recommendation
- a brief (two-page) interest statement
- verbal, quantitative, and analytical scores on the Graduate Record Examinations

The applicant must have a bachelor's degree from a regionally accredited academic institution or the equivalent, must have completed at least 18 credits in psychology, and must have a cumulative grade-point average of 3.0 or above in the last 60 credits of undergraduate course work. The undergraduate work must include a statistics course and a psychology

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-education-policies/gsad/) section of The Graduate School's website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact

Graduate Program Head: Holly Angelique

Director of Graduate Studies/Professor-in-Charge: Jonathan Ivy

Primary Program Contact: Mary Ann Sim

Email: mus19@psu.edu

Mailing Address: Penn State Harrisburg, 777 W. Harrisburg Pike, Middletown, PA 17057-489

Telephone: (717) 948-6034

research methods course with grades of B or higher. A personal interview is required.

**Degree Requirements**

**Master of Arts (M.A.)**

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

The M.A. in Applied Clinical Psychology requires 48 credits of coursework. At least 20 must be earned at the established graduate campus where the program is offered. Included in the core courses are 100 hours of clinical practicum, 600 hours of supervised internship experience, and a master's research paper completed in association with PSYC 500.

Psychology Core Courses (23 credits) provide a foundation in professional ethics, individual differences and cultural diversity, the scientific bases of behavior, and scientific research skills. These courses are intended to facilitate the development of an awareness of the context in which clients live and in which interventions must work.

Clinical Core Courses (25 credits) provide a general background in clinical diagnosis, assessment, and interventions with appropriate supervised experience to allow students to develop the clinical skills appropriate for master's level practitioners.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYC 500</td>
<td>Ethics and Professional Practice in Psychology and Counseling</td>
<td>3</td>
</tr>
<tr>
<td>PSYC 501</td>
<td>Cultural Competency in Psychology</td>
<td>3</td>
</tr>
<tr>
<td>PSYC 502</td>
<td>Applied Social Psychology</td>
<td>3</td>
</tr>
<tr>
<td>PSYC 520</td>
<td>Research Methods</td>
<td>4</td>
</tr>
<tr>
<td>PSYC 521</td>
<td>Statistics</td>
<td>4</td>
</tr>
<tr>
<td>PSYC 524</td>
<td>Biological Basis of Behavior</td>
<td>3</td>
</tr>
<tr>
<td>PSYC 510</td>
<td>Human Development and Growth</td>
<td>3</td>
</tr>
<tr>
<td>PSYC 517</td>
<td>Psychopathology</td>
<td>3</td>
</tr>
<tr>
<td>PSYC 518</td>
<td>Interviewing and Counseling</td>
<td>3</td>
</tr>
<tr>
<td>PSYC 519</td>
<td>Theories and Models of Psychotherapy</td>
<td>3</td>
</tr>
<tr>
<td>PSY 540</td>
<td>Seminar in Clinical Problems</td>
<td>3</td>
</tr>
<tr>
<td>PSYC 571</td>
<td>Tests and Measurements</td>
<td>3</td>
</tr>
<tr>
<td>PSYC 595A</td>
<td>Clinical Practicum</td>
<td>1</td>
</tr>
<tr>
<td>PSYC 595B</td>
<td>Clinical Internship</td>
<td>6</td>
</tr>
<tr>
<td>PSYC 530</td>
<td>Research Paper</td>
<td>3</td>
</tr>
</tbody>
</table>

**Learning Outcomes**

1. **KNOW.** Graduates will be able to demonstrate conceptual understanding and proficiency in clinical psychology and counseling at the level required to contribute to the discipline.

2. **RESEARCH/THINK.** Graduates will be able to develop and use appropriate research methods and techniques to apply knowledge or create new knowledge aimed at significant questions in clinical psychology and counseling.

3. **COMMUNICATE.** Graduates will be able to effectively communicate research and practice applicable to the field in formal presentations and in written works.

4. **CRITICAL THINKING.** Graduates will be able to conceptualize therapeutic cases in a theoretical framework.

5. **PROFESSIONAL PRACTICE.** Graduates will demonstrate the ability to work effectively and ethically in a clinical/counseling setting with actual clients.

**Student Aid**

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School's website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

There are a limited number of scholarships and research grants available, as well as graduate assistantships.

Many students work full-time and take classes part-time. In many cases, employers have a tuition-reimbursement plan which reimburses employees for partial or full tuition. To find other options available to you, contact the Financial Aid Office at 717-948-6307 (Harrisburg) or 814-898-6162 (Erie).

**Courses**

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**Contact**

**Graduate Program Head:** Holly Angelique

**Harrisburg Campus**

**Director of Graduate Studies/Professor-in-Charge:** Gina Brelsford

**Primary Program Contact:** Mary Ann Sim

**Email:** mus19@psu.edu

**Mailing Address:** W311 Olmsted Bldg, Middletown, PA 17057
The M.P.S. degree in Applied Demography is a 30-credit program of study for working professionals interested in understanding the concepts, measures, data, software, and analytical skills that can be utilized in both the public and private sectors. The content of the program will include readings, materials, and exercises that draw on demographic research from both the U.S. and the international context.

The M.P.S. in Applied Demography provides professionals with the skills necessary to perform applied demographic analysis to aid in decision-making processes. The program content exposes the student to a broad range of methods and problems in the public and private sectors, aiming to provide students with practical experiences. The program will also familiarize students with the methods, techniques, and projects used in the applied demography setting in their line of work.

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Applicants are expected to have one undergraduate course in Statistics or work experience where statistics are used.

Students who do not have an undergraduate GPA of at least 3.0 will be considered on a case-by-case basis depending on the quality of their overall application. Work experiences will be considered for applicants who have more than two years of experiences in a related field. Applicants who are still completing their baccalaureate requirements at the time of application may be admitted to the Graduate School provisionally (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/provisional-admission), pending the award of the degree. Completion of admission in such cases is dependent upon receipt of the missing credentials.

Core Application Packet

- Completed official online Graduate School application (http://gradschool.psu.edu/prospective-students/how-to-apply) and payment of a nonrefundable application fee.
- Statement of purpose: a 2-3 page essay articulating career and educational goals that demonstrate the student’s written communication skills and basic statistical knowledge
- A current curriculum vitae (vita) or résumé.
- Three letters of recommendation that attest to the student’s readiness for graduate study and document the requisite of minimum of two years of work experience. Letters must be submitted through the online application system. Within the online application you will be asked to enter the names and email addresses of three individuals who will be providing your recommendation. Those individuals will receive a note via email asking them to complete a brief form that will serve as your recommendation. Applicants must inform all recommenders that recommenders must submit the form in order for the application to be complete.
- Official transcripts from all post-secondary institutions attended (http://www.gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission).

Degree Requirements

Master of Professional Studies (M.P.S.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

Total required credits for the M.P.S.: 30 credits. At least 18 credits at the 500 or 800 level, with at least 6 credits at the 500 level.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>APDEM 801</td>
<td>Principles of Demography</td>
<td>3</td>
</tr>
<tr>
<td>SOC 573</td>
<td>Demographic Techniques</td>
<td>3</td>
</tr>
<tr>
<td>APDEM 802</td>
<td>Data, GIS, and Applied Demography</td>
<td>3</td>
</tr>
<tr>
<td>APDEM 803</td>
<td>Applications in Applied Demography</td>
<td>3</td>
</tr>
<tr>
<td>HPA 850</td>
<td>Health Care Marketing</td>
<td></td>
</tr>
<tr>
<td>CEDEV 500</td>
<td>Community and Economic Development: Theory and Practice</td>
<td></td>
</tr>
<tr>
<td>CEDEV 509</td>
<td>Population, Land Use, and Municipal Finance</td>
<td></td>
</tr>
<tr>
<td>GEOG 588</td>
<td>Planning GIS for Emergency Management</td>
<td></td>
</tr>
</tbody>
</table>

Electives:

Select up to 6 credits of the following:

- APDEM 804 Business Demography
- APDEM 805 Public Sector Demography
- APDEM 806 Applied Demography and Health
- SOC 579 Spatial Demography
- CEDEV 500 Community and Economic Development: Theory and Practice
- CEDEV 509 Population, Land Use, and Municipal Finance
- GEOG 588 Planning GIS for Emergency Management
- HPA 850 Health Care Marketing
M.P.S. in Applied Demography students will have the opportunity to design their program of study by choosing from a list of elective courses, based in their area of interest. The elective courses will be chosen in consultation with the student’s adviser. The elective courses counting towards the M.P.S. will be reviewed on an annual basis by an advisory board to ensure that we are matching the listed electives with M.P.S. student interests and needs, and that the identified courses outside of the M.P.S. are offered frequently enough.

The culminating experience provides students with an opportunity to apply their knowledge of applied demography to a research project. The choice of research project topic and exact form will be mutually determined by the faculty mentor and the student. The student will work with a faculty mentor/adviser on a capstone project that will be written up as a capstone report. Students are expected to utilize methods acquired during other courses in the M.P.S. in Applied Demography and apply them to a topic of interest. The report will be formally presented to peers in the M.P.S. and faculty members at the end of the semester (i.e. final presentation via videoconference). The capstone report must be approved by the faculty mentor/adviser to meet course requirements.

Substitutions for the above prescribed courses, either with resident-education courses, alternate online courses, or courses from other institutions, will be considered on a case-by-case basis consistent with Graduate Council policy (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/transfer-credit), and must be petitioned and approved in advance by the program administrator, with input from the student’s adviser.

Student Aid
World Campus students in graduate degree programs may be eligible for financial aid. Refer to the Tuition and Financial Aid section (http://www.worldcampus.psu.edu/tuition-and-financial-aid) of the World Campus website for more information.

Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact
Graduate Program Head: Eric Baumer
Director of Graduate Studies/Professor-in-Charge: Stephen Matthews

Program Website: Applied Demography (http://sites.psu.edu/applieddemography)

Applied Linguistics
Graduate Program Head: Robert Schrauf
Program Code: APLNG
Campus(es): University Park (Ph.D.)
Degrees Conferred: Doctor of Philosophy (Ph.D.)
Dual-Title Ph.D. in Applied Linguistics and Asian Studies

The Graduate Faculty

The Ph.D. in Applied Linguistics helps prepare scholars who will conduct systematic examinations of individual and societal multilingualism in order to build and test theories of how linguistic systems develop, are acquired, used, and taught in global contexts. The Ph.D. degree program includes the foundational theory and research of linguistics, applied linguistics, second language acquisition, psycholinguistics, and sociolinguistics. It will prepare doctoral students to utilize a range of research perspectives, both qualitative and quantitative, e.g., sociocultural, historical, linguistic, stylistic, discourse analytical. Overall, the purpose of the research undertaken in graduate study in Applied Linguistics will be to illuminate, in all its complexity, the multiple dimensions of the study of language as a mode of social existence, communication, and cognition.

Admission Requirements
Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Applicants are required to submit official transcripts from all post-secondary institutions attended (http://www.gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission). In addition, scores from the Graduate Record Examinations (GRE) are required for applicants who have received a degree from an institution of higher education in the United States or abroad in which the medium of instruction is English. GRE scores are optional for applicants who have received a degree from an institution of higher education in which the medium of instruction is a language other than English. All applicants are required to submit:

- three letters of reference (at least two from faculty with whom the applicant has studied) evaluating aptitude for doctoral study
- at least one sample of scholarly writing (published or unpublished research paper, thesis, etc.)
- an academic statement describing their teaching and research experience and their specific professional goals and interests

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. See GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.
Applicants to the Applied Linguistics program must have a score of 600 or higher on the TOEFL paper-based test. In addition, international applicants are encouraged to submit a cassette tape recording on which they describe their career goals and the reasons for wanting to pursue doctoral studies at Penn State.

Degree Requirements
Doctor of Philosophy (Ph.D.)
Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

qualifying examination
In the third semester (a minimum of 18 credits) of graduate study, all students must satisfactorily complete a qualifying evaluation in which they are required to present a portfolio of work completed in their program of study. The portfolio will include a transcript of the student's academic record, a program plan, samples of scholarly work in Applied Linguistics and related areas, and a brief description of the proposed dissertation research, showing relevant course work completed and projected. Following submission of this portfolio, the student will meet with the members of his/her dissertation committee for an oral qualifying evaluation. The purpose of this evaluation is threefold:

1. to determine whether the student has achieved a level of learning and understanding sufficient to justify continuing in the program,
2. to discover what further study is required to bring the student to the competence required for the research being proposed, and
3. to secure approval of a program of course work and independent study to achieve the requisite competence. The particulars of each student's program of study and research are defined on the basis of the qualifying evaluation.

English Language Competence
During course work prior to the qualifying examination, students will be assessed for communicative competence in reading, writing, and speaking English. Should a higher level of competence be required, the student will be directed to the appropriate resources. International candidates will be advised that the passage of the minimal TOEFL requirement does not demonstrate the level of competence required for completion of the Ph.D. program.

Additional Language Competence
All students must demonstrate competence in reading relevant research literature in one language other than English and intermediate speaking competence in an additional language. The additional language competence requirements may be demonstrated in a variety of ways.

dissertation Committee Composition
The dissertation committee must meet all Graduate Council requirements (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation). Members of the Graduate Faculty with courtesy appointments in LALS who are members of the Applied Linguistics Graduate Faculty may serve as the chair of the dissertation committee with approval of the Director of LALS.

Comprehensive Examination
All doctoral students must pass a comprehensive examination designed to assess mastery of and ability to synthesize and integrate theoretical issues in Applied Linguistics. This examination is taken upon completion of all course work. The content and format of the comprehensive exam will be established by the members of the candidate's dissertation committee in accordance with degree requirements of LALS and consist of two course papers that are of publishable quality and two or three research papers based on questions developed by members of the dissertation committee. The original papers must be submitted by end of semester prior to that in which the student plans to take the comprehensive exam. The student will be given two months' time in which to complete and submit these exam papers. Within three weeks of submission of the exam papers, the student will take an oral exam based on the original research papers and the exam papers. Students who fail the examination on the first attempt may repeat it once. Students who fail the examination the second time will not be permitted to continue in the program.

Dissertation
Each doctoral candidate is required to conduct an original and independent research project representing a significant contribution to knowledge in the field of study. The project should be presented in a scholarly manner, show an ability on the part of the candidate to do independent research of high quality, and demonstrate considerable experience in using appropriate research techniques. The content and conclusions of the dissertation will be defended at the time of the final oral examination. A written dissertation proposal is required and must be approved at a proposal hearing by a majority vote of the candidate's dissertation committee. A majority vote is also required for approval of the completed written dissertation at the final oral defense. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

Dual-Titles
Dual-Title Ph.D. in Applied Linguistics and Asian Studies
Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

Graduate students with research and educational interests in Asian Studies may apply to the Applied Linguistics/Asian Studies Degree Program. The goal of the dual-title degree Applied Linguistics and Asian Studies is to enable graduate students from Applied Linguistics to acquire the knowledge and skills of their major area of specialization in Applied Linguistics while at the same time gaining the perspective of Asian Studies.

In order to prepare graduate students for the competitive job market, this program provides them with a solid disciplinary foundation that will allow them to compete for the best jobs in their field. For such students the dual-title Ph.D. in Asian Studies will add value to their degree and their status as candidates. It will produce excellent linguists who are experts in Asian Studies as well. The dual-title degree in Applied Linguistics and Asian Studies will build curricular bridges beyond the student's major field so as to provide a unique training regime for the global scholar.

Admission Requirements
For admission to the dual-title Ph.D. degree under this program, a student must first apply and be admitted to the Applied Linguistics graduate program. Once accepted into the Applied Linguistics program, the student can apply to the Admissions Committee of the Asian Studies. The Asian Studies Admissions Committee reviews applications and recommends students for admission to the Asian Studies program to the Graduate School. Refer to the Admission Requirements section of the Asian Studies Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/asian-studies). Doctoral students must be admitted
into the dual-title degree program in Asian Studies prior to taking the qualifying examination in their primary graduate program. Applicants interested in the program should also make their interest in the dual-title degree program known clearly on their applications and include remarks in their essays that explain their training, interests, and career goals in an area of Asian Studies.

**Degree Requirements**

To qualify for an Asian Studies degree, students must satisfy the requirements of the Applied Linguistics program in which they are primarily enrolled. In addition, they must satisfy the requirements described below, as established by the Asian Studies committee. Within this framework, final course selection is determined by the student, their Asian Studies adviser, and their Applied Linguistics program adviser.

Upon a student’s acceptance by the Asian Studies Admissions Committee, the student will be assigned an Asian Studies academic adviser in consultation with the Asian Studies chair. As students develop specific scholarly interests, they may request that a different Asian Studies faculty member serve as their adviser. The student and adviser will discuss a program of study that is appropriate for the student’s professional objectives and that is in accord with the policies of The Graduate School, the Applied Linguistics department and the Asian Studies program.

The doctoral degree in Applied Linguistics and Asian Studies is awarded to students who are admitted to the Applied Linguistics doctoral program and admitted to the dual-title degree in Asian Studies. The minimum course requirements for the dual-title Ph.D. degree in Applied Linguistics and Asian Studies are as follows:

60 credits beyond the master’s degree, including:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Required Courses</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>APLNG 580</td>
<td>Proseminar in Applied Linguistics</td>
<td>1</td>
</tr>
<tr>
<td><strong>Foundations Courses</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Select 6 credits, which may include but need not be limited to the following:</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>APLNG 591</td>
<td>Seminar in Second Language Acquisition</td>
<td></td>
</tr>
<tr>
<td>APLNG 597</td>
<td>Special Topics</td>
<td></td>
</tr>
<tr>
<td><strong>Research Methods</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Select 6 credits, which may include but need not be limited to the following:</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>APLNG 593</td>
<td>Experimental Research on Language</td>
<td></td>
</tr>
<tr>
<td>APLNG 597</td>
<td>Special Topics</td>
<td></td>
</tr>
<tr>
<td>APLNG 581</td>
<td>Discourse Analysis</td>
<td></td>
</tr>
<tr>
<td>APLNG 586</td>
<td>Analyzing Classroom Discourse</td>
<td></td>
</tr>
<tr>
<td><strong>Asia-related Coursework</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ASIA 501</td>
<td>Proseminar in Asian Studies I</td>
<td>3</td>
</tr>
<tr>
<td>ASIA 502</td>
<td>Proseminar in Asian Studies II</td>
<td>3</td>
</tr>
<tr>
<td>Select 9 credits at the 400 or 500 level</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td><strong>Electives</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Select 6 credits in Applied Linguistics electives, in consultation with the applied linguistics adviser</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td><strong>Language Requirement</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

All-skills proficiency in one Asian language AND intermediate speaking competence in an additional language other than English

| Total Credits | 34 |

1 As many as 6 may come from Applied Linguistics, as approved by the student’s doctoral adviser and the Asian Studies Program director of graduate studies. The remaining credits can be taken in ASIA or in any department other than Applied Linguistics.

Particular courses may satisfy both the Applied Linguistics requirements and those of the Asian Studies program. Final course selection is determined by the student in consultation with their dual-title program advisers and their major program advisers.

**Student Aid**

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

**Courses**

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**Learning Outcomes**

1. Graduates will demonstrate command of historical and current developments in applied linguistics theory and the current literature relevant to a particular theoretical topic and research area in applied linguistics.
2. Graduates will demonstrate command of current developments in research methods in applied linguistics and ability to collect and adequately analyze data appropriate for addressing specific research questions.
3. Graduates will demonstrate ability to design and execute original, independent research projects to significantly advance theory and knowledge in applied linguistics.
4. Graduates will demonstrate ability to clearly and effectively report their research in both oral presentations and written formats using appropriate conventions of the discipline.
5. Graduates will demonstrate knowledge of and commitment to the professional and ethical standards of scholarly and professional work in applied linguistics.

**Contact**

**Graduate Program Head:** Robert Schrauf

**Director of Graduate Studies:** Xiaofei Lu

**Primary Program Contact:** Sally Arnold

**Email:** sah4@psu.edu
Mailing Address: 234 Sparks Building, University Park, PA 16802
Telephone: (814) 867-4284

Program Website: Applied Linguistics (http://aplng.la.psu.edu/programs/ph-d-degree-in-applied-linguistics)

Applied Psychological Research

Graduate Program Head
Holly Angelique

Program Code
APSYR

Campus(es)
Harrisburg (M.A.)

Degrees Conferred
Master of Arts (M.A.)
Integrated B.S. in Psychology and M.A. in Applied Psychological Research

The Graduate Faculty
View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=APSYR)

The Master of Arts program in Applied Psychological Research focuses on the development of research skills within the context of scientific training in psychology.

The program is designed to meet the needs of students who plan careers in research or administration within human service or similar organizations, who plan to conduct research in other settings, or who plan to pursue doctoral study. Students can select electives and research experiences to reflect their individual interests in consultation with their adviser.

The program is intended for both part- and full-time students. Students are admitted for fall semester only. The deadline for admission is May 1.

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Students will be admitted on a competitive basis and must submit the following:

- a completed online Graduate School application form (http://gradschool.psu.edu/prospective-students/how-to-apply) with the application fee
- official transcripts from all post-secondary institutions attended (http://www.gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission)
- three professional letters of recommendation
- a brief (two-page) interest statement
- verbal, quantitative, and analytical scores on the Graduate Record Examinations

The applicant must have completed at least 18 credits in psychology, and must have a cumulative grade-point average of 3.0 or above in the last 60 credits of coursework. The undergraduate work must include a statistics course and a psychology research methods course with grades of B or higher. A personal interview is required.

Degree Requirements

Master of Arts (M.A.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

The M.A. in Applied Psychological Research requires 35 credits of course work, including 6 credits of supervised research experience and a master's research paper.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYC 500</td>
<td>Ethics and Professional Practice in Psychology and Counseling</td>
<td>3</td>
</tr>
<tr>
<td>PSYC 501</td>
<td>Cultural Competency in Psychology</td>
<td>3</td>
</tr>
<tr>
<td>PSYC 502</td>
<td>Applied Social Psychology</td>
<td>3</td>
</tr>
<tr>
<td>PSYC 520</td>
<td>Research Methods</td>
<td>4</td>
</tr>
<tr>
<td>PSYC 521</td>
<td>Statistics</td>
<td>4</td>
</tr>
<tr>
<td>PSYC 524</td>
<td>Biological Basis of Behavior</td>
<td>3</td>
</tr>
<tr>
<td>PSYC 594</td>
<td>Research Topics</td>
<td>6</td>
</tr>
</tbody>
</table>

Electives

Select 6 of the following credits:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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<tbody>
<tr>
<td>PSYC 514</td>
<td>Preventive Psychology</td>
</tr>
<tr>
<td>PSYC 515</td>
<td>Clinical Health Psychology</td>
</tr>
<tr>
<td>PSYC 516</td>
<td>Child Health Psychology</td>
</tr>
<tr>
<td>PSYC 525</td>
<td>Forensic Psychology</td>
</tr>
<tr>
<td>PSYC 535</td>
<td>Behavioral Management</td>
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Culminating Experience

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSYC 530</td>
<td>Research Paper</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits 35

1 Psychology Core Courses provide a foundation in professional ethics, individual differences and cultural diversity, the scientific bases of behavior, and scientific research skills.

2 Should be selected in consultation with the student’s adviser in support of the student’s research focus. Applied Psychological Research students may take elective graduate-level (500 or above) courses in areas such as human factors or similar areas, with the guidance and approval, in advance, of their adviser, and subject to the permission of the degree program areas.

The following courses are offered through other Penn State Harrisburg graduate programs as electives for APSYR students.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABA 522</td>
<td>Behavioral Research Methods</td>
<td>3</td>
</tr>
<tr>
<td>ADTED 550</td>
<td>Qualitative Research in Adult Education</td>
<td>3</td>
</tr>
<tr>
<td>CMPSY 520</td>
<td>Research Methods II</td>
<td>3</td>
</tr>
</tbody>
</table>

APSYR students can take courses that are offered through the College of Medicine in Hershey (approximately 8 miles from Penn State Harrisburg) for elective credit, with the permission of their adviser and the College of Medicine.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHS 500</td>
<td>Research Ethics for Clinical Investigators</td>
<td>1</td>
</tr>
<tr>
<td>PHS 510</td>
<td>Grant Writing for Clinical Research</td>
<td>3</td>
</tr>
</tbody>
</table>
Credits earned at other institutions but not used to earn a degree may be applied toward the requirements for a graduate degree, subject to restrictions outlined in GCAC-309 Transfer Credit (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/transfer-credit).

## Integrated Undergrad-Grad Programs
### Integrated B.S. in Psychology and M.A. in Applied Psychological Research
Requirements listed here are in addition to requirements listed in GCAC-210 Integrated Undergraduate-Graduate (IUG) Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/integrated-undergraduate-graduate-degree-programs).

### Admission Requirements
Psychology undergraduates may apply for admission to the Integrated Undergraduate-Graduate (IUG) degree program by no later than February 15th the spring of their junior year after completing a minimum of 60 credits, if they meet the following admission requirements:

1. Grade point average of 3.5 or above cumulative.
2. Completion of undergraduate statistics and an undergraduate research course with an A- or above in both.
3. Completing 18 credits or more in psychology with a psychology GPA of 3.67 or above.
4. Typical successful candidates will obtain GRE scores of 146 or above on both verbal and quantitative sections, with an analytical score of 3.5 or above.
5. Complete interviews with graduate faculty members.
6. Provide three professional letters of recommendation with at least two from academic references.

Students must apply to the program via the Graduate School application for admission (http://www.gradschool.psu.edu/prospective-students/how-to-apply), and must meet all the admission requirements of the Graduate School and the Applied Psychological Research graduate program for the Master of Arts degree, listed on the Degree Requirements tab. Students shall be admitted to an IUG program no earlier than the 15th semester of their junior year after completing a minimum of 60 credits, if they meet the following admission requirements:

1. Grade point average of 3.5 or above cumulative.
2. Completion of undergraduate statistics and an undergraduate research course with an A- or above in both.
3. Completing 18 credits or more in psychology with a psychology GPA of 3.67 or above.
4. Typical successful candidates will obtain GRE scores of 146 or above on both verbal and quantitative sections, with an analytical score of 3.5 or above.
5. Complete interviews with graduate faculty members.
6. Provide three professional letters of recommendation with at least two from academic references.

In consultation with an adviser, students must prepare a plan of study appropriate to this integrated program, and must present their plan of study in person to the head of the graduate program or the appropriate committee overseeing the integrated program prior to being admitted to the program. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser as the student advances through the program.

### Degree Requirements
Students must fulfill all degree requirements for each degree in order to be awarded that degree, subject to the double-counting of credits as outlined below. Degree requirements for the Bachelor of Science in Psychology are listed in the Undergraduate Bulletin (http://bulletins.psu.edu/undergraduate). Degree requirements for the Master of Arts in Applied Psychological Research degree are listed on the Degree Requirements tab. Students must sequence their courses so all undergraduate degree requirements are fulfilled before taking courses to count solely towards the graduate degree. If students accepted into the IUG program are unable to complete the M.A. degree, they are still eligible to receive their undergraduate degree if all the undergraduate degree requirements have been satisfied.

Up to 12 credits may be double-counted towards the degree requirements for both the graduate and undergraduate degrees; a minimum of 50% of the double-counted courses must be at the 500 or 800 level. Credits associated with the culminating experience for the graduate degree cannot be double-counted.

### Student Aid
Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School's website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

### Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

### Learning Outcomes
1. **Know:** Graduates will be able to state and distinguish among ethical principles, biological, social and cultural basis, and methodological strategies for applied psychological research.
2. **Think:** Graduates will develop and construct solid background knowledge about a research topic and conceptualize and define research questions within the topic.
3. **Apply:** Graduates will design and execute a research study, as well as analyze and interpret data in order to address a properly defined research question.
4. **Communicate:** Graduates will be able to produce formal presentations and APA style written reports that effectively communicate the background, objective, method, and findings of a research project.
5. **Professional Practice:** Graduates will demonstrate a commitment to active citizenship in the discipline by applying research knowledge...
and skills in order to address questions and solve problems in the field of applied psychology.

Contact
Graduate Program Head: Holly Angelique
Primary Program Contact: Mary Ann Sim
Email: mus19@psu.edu
Mailing Address: Penn State Harrisburg, 777 W. Harrisburg Pike, Middletown, PA 17057
Telephone: (717) 948-6034

Architectural Engineering
Graduate Program Head: M. Kevin Parfit
Program Code: AE
Campus(es): University Park (Ph.D., M.S., M.A.E., M.Eng.)
Degrees Conferred:
- Doctor of Philosophy (Ph.D.)
- Master of Science (M.S.)
- Master of Architectural Engineering (M.A.E.)
- Master of Engineering (M.Eng.)
- Integrated Bachelor of Architectural Engineering (B.A.E.) and Master of Science (M.S.) in Architectural Engineering
- Integrated Bachelor of Architectural Engineering (B.A.E.) and Master of Architectural Engineering (M.A.E.)

The Graduate Faculty
View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=AE)

Students may specialize in building construction, building illumination systems, building mechanical and energy systems, or building structural systems.

Admission Requirements
Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Scores from the Graduate Record Examinations (GRE) are required for admission to the Ph.D., M.S., and M. Eng. programs. For the M. Eng. degree, the GRE requirement will be waived for students who have graduated with a degree from the College of Engineering at The Pennsylvania State University with a cumulative grade-point average greater than 3.00.

Students with a 3.00 junior/senior grade-point average (on a 4.00 scale) and with appropriate course backgrounds will be considered for admission to the AE graduate programs. Students accepted into the Architectural Engineering program generally have an undergraduate degree in:
- mechanical engineering
- electrical engineering
- civil engineering
- architectural engineering
- science
- or architecture

All degree candidates are required to provide a letter of intent outlining the student’s intended area of study as well as three letters of recommendation. The best-qualified applicants will be accepted up to the number of spaces that are available for new students.

Degree Requirements
All students in the M.Eng., M.S., and Ph.D. programs must also attend a minimum of 10 approved lectures during their degree program.

M.Eng. in Architectural Engineering
Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

The M.Eng. in Architectural Engineering degree is a non-thesis professional master’s degree. Candidates for the M.Eng. degree are required to complete 30 credits of course work. A minimum of 18 credits must be at the 500 level. Students must follow the approved program of courses for one of the four available specialty areas. Minor modifications to these programs are permitted, with approval of the Graduate Program Officer. Each student must also complete a capstone project supervised by a member of the Graduate Faculty, completed while enrolled in AE 596. The capstone project requires students to work individually or within a group on an aspect of architectural engineering of their choosing. The project should demonstrate the ability of the student to integrate and apply concepts and techniques learned in the program courses.

M.S. in Architectural Engineering
Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

A thesis is required for the M.S. degree, which consists of a minimum of 30 credits: 24 credits of course work and a 6-credits of thesis research, either AE 600 or AE 610. A minimum of 12 of the course credits must be completed at the 500 level. A student’s program of courses in the M.S. program is developed in cooperation with the student’s academic adviser.

Ph.D. in Architectural Engineering
Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

For the Ph.D. degree, a dissertation that displays a student’s ability to conduct high-quality original scholarly work is required of all Ph.D. students. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School. Each student accepted into the Ph.D. degree program must pass the Ph.D. Qualifying Examination, which requires students to display an understanding of basic material in all AE option areas, along with an
Integrated Undergrad-Grad Programs

Integrated Bachelor of Architectural Engineering (B.A.E.) and Master of Architectural Engineering (M.A.E.) or Master of Science (M.S.) in Architectural Engineering

Requirements listed here are in addition to requirements listed in GCAC-210 Integrated Undergraduate-Graduate (IUG) Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/integrated-undergraduate-graduate-degree-programs).

Admission Requirements
A limited number of undergraduate students in the B.A.E. program will be considered for admission to one of two integrated undergraduate-graduate degree programs. The first leads to the student earning both the B.A.E. and M.A.E. degrees and involves a graduate-level component in the capstone senior project. The second provides the student with the opportunity to earn both the B.A.E. and M.S. degrees and involves a research-oriented thesis in addition to the capstone undergraduate senior project.

Students shall be admitted to an IUG program in the 6th semester of the program (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree, as specified in the proposed IUG plan of study. Students must apply to and meet the admission requirements of the Graduate School, as well as the graduate program in which they intend to receive their master’s degree. Students must be admitted to the program prior to taking the first course they intend to count towards the graduate degree.

Application materials for both programs are available on the AE Department website. To be considered for admission to either program, students must have attained a GPA of at least 3.0 and a grade of C or better in all classes listed as AE. A commitment from an AE Graduate Faculty member to serve as the student’s M.S. thesis adviser is necessary for admission to the B.A.E./M.S. program. In consultation with an adviser, students must prepare a plan of study appropriate to this integrated program. Students must present their plan of study to the head of the graduate program or the appropriate committee overseeing the integrated program prior to being admitted to the program. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser as the student advances through the program.

Degree Requirements
Students admitted to an integrated program (B.A.E./M.A.E. or B.A.E./M.S.) must maintain a GPA in all classes used toward the M.A.E. or M.S. degree of at least 3.0. For both the integrated B.A.E./M.A.E. and B.A.E./M.S. degree programs, 30 credits of the 172 total credits required to receive both degrees are applied toward the master’s degree (up to 12 credits count toward both degrees). For the B.A.E./M.S. a minimum of 18 credits is required at the 500 and 600 level combined. For the B.A.E./M.A.E., a minimum of 18 credits is required at the 500 or 800 levels, with at least 6 credits at the 500 level. For the B.A.E./M.A.E. degree program, all of graduate credits are course credits. For the B.A.E./M.S. degree program, a thesis is required and six credits of thesis research (AE 600 or AE 610) must be included in the candidate’s academic course plan. Approved integrated program course sequences are available for each of the four undergraduate option areas. These sequences specifically identify the 12 credits of courses that count toward both degrees. The courses that can double-count for the B.A.E./M.A.E. are as follows:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AE 430</td>
<td>Indeterminate Structures</td>
<td>3</td>
</tr>
<tr>
<td>AE 457</td>
<td>HVAC Control Systems</td>
<td>3</td>
</tr>
<tr>
<td>AE 461</td>
<td>Architectural Illumination Systems &amp; Design</td>
<td>3</td>
</tr>
<tr>
<td>AE 467</td>
<td>Advanced Building Electrical System Design</td>
<td>3</td>
</tr>
<tr>
<td>AE 475</td>
<td>Building Construction Engineering I</td>
<td>3</td>
</tr>
<tr>
<td>AE 476</td>
<td>Building Construction Engineering II</td>
<td>3</td>
</tr>
<tr>
<td>AE 570</td>
<td>Production Management in Construction</td>
<td>3</td>
</tr>
<tr>
<td>AE 557</td>
<td>Centralized Cooling Production and Distribution Systems</td>
<td>3</td>
</tr>
<tr>
<td>AE 565</td>
<td>Daylighting</td>
<td>3</td>
</tr>
</tbody>
</table>

The courses that can be double-counted for the B.A.E./M.S. are as follows:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AE 430</td>
<td>Indeterminate Structures</td>
<td>3</td>
</tr>
<tr>
<td>AE 457</td>
<td>HVAC Control Systems</td>
<td>3</td>
</tr>
<tr>
<td>AE 461</td>
<td>Architectural Illumination Systems &amp; Design</td>
<td>3</td>
</tr>
<tr>
<td>AE 467</td>
<td>Advanced Building Electrical System Design</td>
<td>3</td>
</tr>
<tr>
<td>AE 475</td>
<td>Building Construction Engineering I</td>
<td>3</td>
</tr>
<tr>
<td>AE 476</td>
<td>Building Construction Engineering II</td>
<td>3</td>
</tr>
<tr>
<td>AE 530</td>
<td>Computer Modeling of Building Structures</td>
<td>3</td>
</tr>
<tr>
<td>AE 557</td>
<td>Centralized Cooling Production and Distribution Systems</td>
<td>3</td>
</tr>
<tr>
<td>AE 558</td>
<td>Centralized Heating Production and Distribution Systems</td>
<td>3</td>
</tr>
<tr>
<td>AE 562</td>
<td>Luminous Flux Transfer</td>
<td>3</td>
</tr>
<tr>
<td>AE 565</td>
<td>Daylighting</td>
<td>3</td>
</tr>
<tr>
<td>AE 570</td>
<td>Production Management in Construction</td>
<td>3</td>
</tr>
</tbody>
</table>

At least 6 of the double-counted credits must be at the 500- or 800-level. The graduate thesis or other graduate culminating/capstone experience (including any associated credits and/or deliverables) may not be double counted towards any other degree.
Each student must submit a course plan detailing the graduate component for approval when applying to this program and must request approval from the Graduate Program Officer for any proposed modifications to this plan following admission to the program. If students accepted into the IUG program are unable to complete the M.A.E. or the M.S. degree, they are still eligible to receive their undergraduate degree if all the undergraduate degree requirements have been satisfied.

### Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

A limited number of research and teaching assistantships, scholarships, and fellowships are available to M.S. and Ph.D. students in the Department of Architectural Engineering. The intent of these assistantships and awards is to support students conducting research under faculty supervision. For this reason, students in the M.S. and Ph.D. programs who receive these types of financial support are expected to complete their degree program, including the thesis or dissertation, and may not transfer to the Master of Engineering degree program.

### Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

### Contact

**Graduate Program Head:** M. Kevin Parfitt

**Director of Graduate Studies/Professor-in-Charge:** Richard Mistrick

**Primary Program Contact:** Richelle Weiger (rbw11@psu.edu)

**Program Email:** gpoarc@engr.psu.edu

**Mailing Address:** 104 Engr Unit A, University Park, PA 16802

**Telephone:** (814) 865-6664

**Program Website:** Architectural Engineering (http://www.engr.psu.edu/ae/degree_programs/graduate.asp)

### Architecture

**Graduate Program Head:** Ute Poerschke

**Program Code:** ARCH

**Campus(es):** University Park (M.Arch., M.S., Ph.D.)

**Degrees Conferred:**
- Doctor of Philosophy (Ph.D.)
- Master of Science (M.S.)
- Master of Architecture (M.Arch.)
- Dual-Title M.S. and Ph.D. in Architecture and Human Dimensions of Natural Resources and the Environment
- Integrated B.Arch. in Architecture and M.S. in Architecture

**The Graduate Faculty View** (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=ARCH)

The M.Arch. program is a professional degree program focused on preparation to practice architecture for students who hold a bachelor's degree.

The M.S. in Architecture program is a research-focused degree program designed to offer students graduate level research inquiry into architecture for students who hold a professional baccalaureate or graduate degree in architecture.

The Ph.D. in Architecture program is a research-focused degree program for students with a research-focused master's degree who have previously studied the technical and professional aspects of architectural or landscape architectural practice and are primarily interested in strengthening the intellectual underpinnings of their work through significant and original theoretical inquiry.

### Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

**Master of architecture (M.Arch.)**

The applicant's baccalaureate degree may be in a field other than architecture or be a non-professional baccalaureate degree in architecture. This M.Arch. program culminates in a professional degree, currently in candidacy status for National Architectural Accrediting Board (NAAB) accreditation.

A minimum grade-point average [GPA] of 3.0 on a 4.0 scale is required.

All applicants for admission to the M.Arch. degree program must submit the following:

- a completed Graduate School application (http://www.gradschool.psu.edu/prospective-students/how-to-apply), and payment of the non-refundable application fee
- official transcripts from all post-secondary institutions attended (http://www.gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission)
All applicants for admission to the M.S. in Architecture degree program must hold either (1) a professionally accredited baccalaureate degree in architecture or related field from a regionally accredited U.S. institution and a master's degree in architecture or landscape architecture or related field; both degrees must be from an officially recognized degree-granting institution in the country in which they operate. Alternatively, the applicant can hold (3) a baccalaureate degree from a regionally accredited U.S. institution plus a professionally accredited master's degree in architecture or landscape architecture or (4) a tertiary (postsecondary) degree that is deemed comparable to a professionally accredited bachelor's degree in architecture or landscape architecture from a regionally accredited U.S. institution and a master's degree in architecture or landscape architecture or related field; both degrees must be from an officially recognized degree-granting institution in the country in which they operate. Outstanding candidates who do not hold a professional architecture or landscape architecture degree but who satisfy all other entrance requirements may be admitted at the discretion of the program.

A minimum grade-point average (GPA) of 3.0 on a 4.0 scale is required.

All applicants for admission to the M.S. in Architecture degree program must submit the following:

- a completed Graduate School application (http://www.gradschool.psu.edu/prospective-students/how-to-apply), and payment of the non-refundable application fee
- official transcripts from all post-secondary institutions attended (http://www.gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission)
- Graduate Record Exam [GRE] scores
- names of three faculty members or professionals acquainted with the applicant's academic history who can be contacted and invited to provide reference letters
- a statement of intent, which should be primarily a description of the applicant's professional goals, subjects of study, and the area(s) of anticipated architectural inquiry
- a portfolio of creative and design work executed at the undergraduate level, under professional guidance or independently, provided that such work can be evidenced as executed by the applicant, is an important part of the graduate application. A minimum portfolio representation of one project for each year of academic undergraduate study, or its equivalent, is required
- other evidence of academic excellence, such as awards, design and scholarly achievements, and other recognitions that the applicant wishes to have considered by the admissions committee

Doctor of Philosophy (Ph.D.)

All applicants must hold either (1) a professionally accredited baccalaureate degree in architecture or related field from a regionally accredited U.S. institution and a master's degree in architecture or landscape architecture or related field or (2) a tertiary (postsecondary) degree that is deemed comparable to a professionally accredited bachelor's degree in architecture or landscape architecture from a regionally accredited U.S. institution and a master's degree in architecture or landscape architecture or related field; both degrees must be from an officially recognized degree-granting institution in the country in which they operate. Alternatively, the applicant can hold (3) a baccalaureate degree from a regionally accredited U.S. institution plus a professionally accredited master's degree in architecture or landscape architecture or (4) a tertiary (postsecondary) degree that is deemed comparable to a bachelor's degree from a regionally accredited U.S. institution plus a professionally accredited master's degree in architecture or landscape architecture; these degrees must be from officially recognized degree-granting institutions in the country in which they operate. Outstanding candidates who do not hold a professional architecture or landscape architecture degree but who satisfy all other entrance requirements may be admitted at the discretion of the program.

Scores from the Graduate Record Examination (GRE) will be required for admission. An overall minimum grade-point average of 3.20 for graduate and undergraduate degrees is required for admission. Exceptions to the minimum 3.20 grade-point average may be made for students with special backgrounds, abilities, and interests at the discretion of the program.

All applicants for admission to the Ph.D. degree program must submit the following:

- a completed Graduate School application (http://www.gradschool.psu.edu/prospective-students/how-to-apply) and payment of the application fee
- official transcripts from all post-secondary institutions attended (http://www.gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission)
- Graduate Record Exam [GRE] scores
- names of three faculty members or professionals acquainted with the applicant's academic history who can be contacted and invited to provide reference letters
- a Ph.D. Essay that (1) articulates the reasons for pursuing graduate training; (2) demonstrates that the Ph.D. program has been carefully considered and a relevant faculty member has been identified; (3) presents a clear research focus; and (4) highlights how previous education, academic background, and/or professional experience provide a foundation for pursuing graduate training in this research field
- a Curriculum Vitae

Degree Requirements

Master of Architecture (M.Arch.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).
The professional M.Arch. may be completed in three years (seven semesters, with the fifth semester being a summer semester) of course work. The M.Arch. degree requires 40 credits of preparatory course work, plus 57 credits of core graduate course work for a total of 97 credits. Some or all of the preparatory course work may have been completed previously, in which case the total credits required for the degree may be reduced in an equivalent manner to a minimum of 57 credits of core courses. At least 36 credits must be at the 500 level, and at least 57 credits must be taken in residence at University Park. There will be a review of transcripts to assess the completion of materials covered in preparatory course work. Faculty will assess each accepted applicant’s transcripts for possible course equivalents. If courses have been fulfilled with equivalent undergraduate or graduate course work, students will be eligible for advancement. Accordingly, time to complete degree requirements may be reduced.

The culminating experience of the M.Arch. degree is a master’s design project, requiring the student to identify and formulate an area of inquiry and then to complete a research-intensive design project, documented in a volume that includes the design and the research. The capstone course ARCH 536 Design Inquiry is associated with this culminating experience, and students are required to complete two semesters of ARCH 536 for six credits each, for a total of 12 credits.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AE 211</td>
<td>Introduction to Environmental Control Systems</td>
<td>3</td>
</tr>
<tr>
<td>AE 421</td>
<td>Architectural Structural Systems I</td>
<td>3</td>
</tr>
<tr>
<td>AE 422</td>
<td>Architectural Structural Systems II</td>
<td>3</td>
</tr>
<tr>
<td>AE 424</td>
<td>Environmental Control Systems I</td>
<td>3</td>
</tr>
<tr>
<td>ARCH 501</td>
<td>Analysis of Architectural Precedents: Ancient Industrial Revolution</td>
<td>3</td>
</tr>
<tr>
<td>ARCH 502</td>
<td>Analysis of Architectural Precedents: Modernism</td>
<td>3</td>
</tr>
<tr>
<td>ARCH 503</td>
<td>Materials and Building Construction I</td>
<td>3</td>
</tr>
<tr>
<td>ARCH 504</td>
<td>Materials and Building Construction II</td>
<td>3</td>
</tr>
<tr>
<td>ARCH 521</td>
<td>Visual Communications I</td>
<td>2</td>
</tr>
<tr>
<td>ARCH 522</td>
<td>Visual Communications II</td>
<td>2</td>
</tr>
<tr>
<td>ARCH 531</td>
<td>Architectural Design I</td>
<td>6</td>
</tr>
<tr>
<td>ARCH 532</td>
<td>Architecture Design II</td>
<td>6</td>
</tr>
</tbody>
</table>

**Required Courses**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARCH 451</td>
<td>Architectural Professional Practice</td>
<td>3</td>
</tr>
<tr>
<td>ARCH 480</td>
<td>Technical Systems Integration</td>
<td>3</td>
</tr>
<tr>
<td>Select 6 credits from the following:</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>ARCH 495</td>
<td>Advanced Architectural and Related Design/ Construction Work Experience II</td>
<td></td>
</tr>
<tr>
<td>ARCH 496</td>
<td>Independent Studies</td>
<td></td>
</tr>
<tr>
<td>ARCH 499</td>
<td>Foreign Studies</td>
<td></td>
</tr>
<tr>
<td>ARCH 510</td>
<td>Contemporary Architecture and Planning Theories</td>
<td>3</td>
</tr>
<tr>
<td>ARCH 511</td>
<td>Theoretical Perspectives in Architecture</td>
<td>3</td>
</tr>
<tr>
<td>ARCH 520</td>
<td>Methods of Inquiry in Architecture and Urban Design</td>
<td>3</td>
</tr>
<tr>
<td>ARCH 533</td>
<td>Architectural Design III</td>
<td>6</td>
</tr>
<tr>
<td>ARCH 534</td>
<td>Architectural Design IV</td>
<td>6</td>
</tr>
<tr>
<td>ARCH 550</td>
<td>Ethics in the Built Environment</td>
<td>3</td>
</tr>
</tbody>
</table>

**Electives**

Select 9 credits

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARCH 600</td>
<td>Thesis Research</td>
<td>6</td>
</tr>
</tbody>
</table>

**Total Credits**

| Total Credits | 97 |

**Master of Science (M.S.)**

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

The culminating experience of the post-professional M.S. in Architecture program is a Master’s Thesis, which requires the student to identify and formulate an area of inquiry within which he or she will be expected to do original research that tests a hypothesis, and to complete a written thesis that presents that research. The master’s thesis committee must be composed of a minimum of three Graduate Faculty members, not less than two of whom shall be members of the Architecture Graduate Faculty. One of these two Graduate Faculty members shall serve as the chair of the committee and thesis adviser. One or more members of the committee may be members from another department.

At the master’s thesis defense, the student presents a summary of his/her thesis. This presentation and part of the following discussion are open to the public. The thesis may only pass with a unanimous affirmative decision of the thesis committee. The graduate officer or department head must attend the thesis defense and sign off on the thesis; if the graduate officer is the adviser or a committee member then the department head must attend the defense and sign off on the thesis, and vice versa.

The M.S. in Architecture is a 30-credit program that requires 24 credits of course work and 6 credits of thesis. At least 18 credits must be at the 500 or 600 levels, and at least 20 credits must be taken in residence at University Park.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARCH 511</td>
<td>Theoretical Perspectives in Architecture</td>
<td>3</td>
</tr>
<tr>
<td>ARCH 520</td>
<td>Methods of Inquiry in Architecture and Urban Design</td>
<td>3</td>
</tr>
<tr>
<td>ARCH 536</td>
<td>Design-Inquiry</td>
<td>6</td>
</tr>
<tr>
<td>ARCH 550</td>
<td>Ethics in the Built Environment</td>
<td>3</td>
</tr>
</tbody>
</table>

**Electives**

Select 9 credits

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARCH 600</td>
<td>Thesis Research</td>
<td>6</td>
</tr>
</tbody>
</table>

**Total Credits**

| Total Credits | 99 |

**Doctor of Philosophy (Ph.D.)**

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

For the Ph.D. degree, students must conduct significant original research that demonstrates mastery of the field. The student’s program of courses is developed in cooperation with the student’s dissertation committee. It is recommended that it consist of approximately 30 credits of course work. This includes 12 credits of course work for students without a research-focused master’s degree in architecture or landscape architecture or related field (a research-focused master’s degree is typically an M.S. in Architecture or Landscape Architecture degree, but can also be a post-professional M.Arch. or M.L.A. degree). There will be a
review of transcripts to assess completion of materials covered in course work. A faculty review committee will assess each accepted applicant’s transcripts for possible course equivalents.

At the conclusion of the student’s course work, the Ph.D. student must pass a comprehensive examination that is developed and administered by the student’s dissertation committee. To earn the Ph.D. degree, doctoral students must also write a dissertation that is accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

**Dual-Titles**

**Dual-Title M.S. and Ph.D. in Architecture and Human Dimensions of Natural Resources and the Environment**

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

The dual-title M.S. and Ph.D. in Architecture and Human Dimensions of Natural Resources and the Environment is a research-focused degree program that enables students from Architecture to acquire the knowledge and skills of their major area of specialization in Architecture, while at the same time gaining the perspective and methods of Human Dimensions of Natural Resources and the Environment.

**Admission Requirements**

For admission to the dual-title degree under this program, a student must first apply and be admitted to Penn State’s Graduate School as well as to the Architecture graduate program. Once accepted into the Architecture program, the student can apply to the Admissions Committee of HDNRE. The HDNRE admissions committee reviews applications and recommends students for admission to the dual-title degree program to The Graduate School. In addition to the admission requirements for the in Architecture degree program, the HDNRE program also requires a minimum baccalaureate Jr/Sr grade-point average of 3.0 on a 4.0 scale. Refer to the Admission Requirements section of the HDNRE Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/human-dimensions-natural-resources-environment). Doctoral students must be admitted into the dual-title degree program in HDNRE prior to taking the qualifying examination in their primary graduate program.

**Degree Requirements for the Dual-title M.S.**

To qualify for a dual-title degree, students must satisfy the requirements of the Architecture program in which they are primarily enrolled. In addition, they must satisfy the the degree requirements for the dual-title M.S. in HDNRE, listed on the HDNRE Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/human-dimensions-natural-resources-environment). Within this framework, final course selection is determined by the student, the HDNRE adviser, and the Architecture program adviser.

Upon a student’s acceptance by the HDNRE admissions committee, the student will be assigned an HDNRE academic adviser in consultation with the HDNRE chair. As students develop specific scholarly interests, they may request that a different HDNRE faculty member serve as their adviser. The student and adviser will discuss a program of study that is appropriate for the student’s professional objectives and that is in accord with the policies of Graduate Council, the Architecture program and the HDNRE Program.

Some courses may satisfy both the graduate major program requirements and those of the dual-title program. Final course selection is determined by the students in consultation with their dual-title program advisers and their major program advisers.

A thesis committee for the dual-title M.S. degree will consist of two Graduate Faculty members from Architecture and one Graduate Faculty member from the HDNRE Program. The thesis topic itself will be an integration of both Architecture and HDNRE.

Candidates for the dual-title Master of Science degree in Architecture and HDNRE will also be required to pass a final defense covering the general field of Architecture and HDNRE Program, with emphasis on the student’s area of specialization. The defense is to be administered by the student’s thesis committee. The thesis may only pass with an unanimous affirmative decision of the thesis committee.

**Degree Requirements for the Dual-title Ph.D.**

To qualify for a dual-title degree, students must satisfy the requirements of the Architecture program in which they are primarily enrolled. In addition, they must satisfy the degree requirements for the dual-title Ph.D. in HDNRE, listed on the HDNRE Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/human-dimensions-natural-resources-environment). Within this framework, final course selection is determined by the student, the HDNRE adviser, and the Architecture program adviser.

Upon a student’s acceptance by the HDNRE admissions committee, the student will be assigned an HDNRE academic adviser in consultation with the HDNRE chair. As students develop specific scholarly interests, they may request that a different HDNRE faculty member serve as their adviser. The student and adviser will discuss a program of study that is appropriate for the student’s professional objectives and that is in accord with the policies of Graduate Council, the Architecture program and the HDNRE Program.

Particular courses may satisfy both the graduate major program requirements and those of the HDNRE program. If an HDNRE M.S. student continues into the HDNRE Ph.D. program, 15 credits of interdisciplinary course work must be selected, with the approval of the student’s dissertation committee.

Some courses may satisfy both the graduate major program requirements and those of the dual-title program. Final course selection is determined by the students in consultation with their dual-title program advisers and their major program advisers.

There will be a single qualifying examination, containing elements of both Architecture and HDNRE. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the candidacy examination may be delayed one semester beyond the normal period allowable.

The qualifying examination committee and the dissertation committee must include at least one Graduate Faculty member from HDNRE. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. The HDNRE representative on the qualifying examination committee will participate in constructing and evaluating the qualifying examination, and the HDNRE representative on the dissertation committee will participate in constructing and evaluating the comprehensive examination. If the chair of the dissertation committee is not also a member of the Graduate Faculty in HDNRE, the member of the committee representing HDNRE must be appointed as co-chair.
All Ph.D. students will be required to complete, present, and defend a dissertation that incorporates a topic related to both Architecture and HDNRE. Candidates for the dual-title Ph.D. degree in Architecture and HDNRE will be required to pass a final oral examination (the dissertation defense) covering the general field of Architecture and HDNRE, with emphasis on the student’s area of specialization. The defense is to be administered by the student’s dissertation committee. A favorable vote of a two-thirds majority is necessary for passing. To earn the Ph.D. degree, doctoral students must also write a dissertation that is accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

**Integrated Undergrad-Grad Programs**

**Integrated B.Arch. in Architecture and M.S. in Architecture**

Requirements listed here are in addition to requirements listed in GCAC-210 Integrated Undergraduate-Graduate (IUG) Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/integrated-undergraduate-graduate-degree-programs).

The Integrated B.Arch./M.S. in Architecture program permits students to integrate the fifth year of the professional B.Arch. degree, pursued at Penn State, with the M.S. research degree into a continuous program of study culminating in the awarding of both degrees.

**Admission Requirements**

The Department of Architecture offers a limited number of academically superior students enrolled in the fourth year of the Bachelor of Architecture degree program the opportunity to enroll in an integrated program leading to both the B.Arch. and the M.S. in Architecture degrees. The ability to coordinate as well as concurrently pursue the two degree programs enables the student to achieve greater depth and comprehensiveness than if the degrees are pursued sequentially, and to earn the two degrees in a shorter period of time. In particular, the program encourages the student to integrate the undergraduate thesis design project with the master’s thesis, thereby achieving a greater depth of inquiry. The number of openings to this special program is limited; admission is by invitation of the faculty and is extremely selective.

Students must apply to and meet the admission requirements of the Graduate School, as well as the graduate program in which they intend to receive their master’s degree. Applicants to the integrated program must be enrolled in the fourth year of a B.Arch. program or otherwise qualified to apply for admission to the fifth year of the B.Arch. program at Penn State. To be admitted, applicants must have a minimum 3.20 junior/senior overall grade-point average (on a 4.0 scale) as well as (1) a minimum 3.20 GPA in architectural design courses (studio), and (2) a minimum 3.20 GPA in all course work except architectural design courses (studio). Students must be admitted to the IUG program no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree.

All applicants for admission to the Integrated B.Arch./M.S. in Architecture degree program must submit the following:

- a completed Graduate School application (http://www.gradschool.psu.edu/prospective-students/how-to-apply) and payment of the application fee
- names of three faculty members or professionals acquainted with the applicant's academic history who can be contacted and invited to provide reference letters
- a statement of intent/plan of study, which should be primarily a description of the applicant's professional goals. The statement/plan shall clearly describe the student’s proposed general thesis topic and a strategy for pursuing it, including a list of proposed courses and a list of faculty whom the student foresees as contributing to the course of study. The plan should be reviewed periodically with an adviser as the student advances through the program.
- a portfolio of creative and design work executed at the undergraduate level, under professional guidance or independently, provided that such work can be evidenced as executed by the applicant. A minimum portfolio representation of one project for each year of academic undergraduate study, or its equivalent, is required

The best-qualified students will be accepted up to the number of spaces available for new students.

**Degree Requirements**

Students must complete the requirements for both the B.Arch. and the M.S. in Architecture degrees with the exception that not more than 12 credits earned in either degree program may be used to meet the requirements of both degrees. A minimum of 50 percent of the courses proposed to count for both degrees must be at the 500 or 800 level.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARCH 451</td>
<td>Architectural Professional Practice</td>
<td>3</td>
</tr>
<tr>
<td>ARCH 492</td>
<td>Architectural Design Studio</td>
<td>6</td>
</tr>
<tr>
<td>ARCH 511</td>
<td>Theoretical Perspectives in Architecture</td>
<td>3</td>
</tr>
<tr>
<td>ARCH 520</td>
<td>Methods of Inquiry in Architecture and Urban Design</td>
<td>3</td>
</tr>
<tr>
<td>ARCH 536</td>
<td>Design-Inquiry</td>
<td>1-12</td>
</tr>
<tr>
<td>ARCH 550</td>
<td>Ethics in the Built Environment</td>
<td>3</td>
</tr>
</tbody>
</table>

A minimum total of 180 credits are required to complete the Integrated B.Arch./M.S. in Architecture program and earn both degrees. The student must maintain a minimum 3.2 overall GPA and shall achieve no less than a B grade in each required course.

If students accepted into the IUG program are unable to complete the M.S. degree, they are still eligible to receive their undergraduate degree if all the undergraduate degree requirements have been satisfied.

**Student Aid**

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

All applicants who are accepted are considered for departmental financial aid.

**Courses**

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up
deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact
Graduate Program Head: Ute Poerschke
Director of Graduate Studies/Professor-in-Charge: Rebecca Henn
Primary Program Contact: Nina Bumgarner (ndb2@psu.edu)
Program Email: gradarch@psu.edu (gradarch.psu.edu)
Mailing Address: 121 Stuckeman Family Building, University Park, PA 16802
Telephone: (814) 865-0991
Program Website: Architecture (http://stuckeman.psu.edu/arch)

Art
Graduate Program Head
B. Stephen Carpenter
Program Code
ART
Campus(es)
University Park (M.F.A.)
Degrees Conferring
Master of Fine Arts (M.F.A.)
The Graduate Faculty
View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=ART)

The Penn State School of Visual Arts offers the degree of Master of Fine Arts (M.F.A.) in Art, a 60-credit graduate program supporting artistic work, academic inquiry, and creative investigation in the areas of ceramics, drawing & painting, graphic design, new media, photography, and sculpture. While students situate themselves within one of these areas of concentration, the structure of the program encourages interplay between media and disciplines in support of each individual’s graduate work.

Headed by a dedicated faculty of internationally acclaimed artists, the M.F.A. program is recognized for emphasizing excellence in the study of visual art and fostering artistic production that engages critically with contemporary culture. By creating a rigorous yet supportive environment in the context of a major public research university, the program encourages expansive growth and innovative collaboration in studio practice. The regular interaction between studio and classroom creates a close-knit intellectual community that furthers critical thinking and creative connectedness. As the transformative power of art in today's society continues to evolve, the Penn State School of Visual Arts encourages artists to address contemporary social and cultural issues through creative production.

Admission Requirements
Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

The Master of Fine Arts program in art, with its emphasis on professional study, is designed for the mature individual who by previous training and study has sufficiently prepared for the undertaking. It is strongly suggested that applicants have a minimum of 12 credits of art history at the undergraduate level. Any qualified student holding a bachelor's degree from a U.S. regionally accredited institution or a postsecondary degree that is equivalent to a U.S. baccalaureate degree earned from an officially recognized degree-granting international institution may seek admission. The School of Visual Arts requires a minimum of 3.00 junior/senior grade-point average (on a 4.00 scale) for admission to the master of fine arts program. Exceptions to the minimum 3.00 average may be made for students with special backgrounds, abilities, and interests, at the discretion of the program.

In addition to the previous requirements, all applicants must submit:

1. A portfolio of his/her work to illustrate his/her preparation for graduate study. A portfolio of digital images, rather than actual work, is required. A selection of no fewer than twenty examples should be presented. The majority should be in the area of the applicant’s interest.
2. A statement of professional aims. This statement should include the applicant’s intentions for his/her proposed study. Some indications of his/her philosophy, beliefs, and goals in regard to education and art should give evidence that he/she is prepared to undertake the work outlined for the Master of Fine Arts program.
3. Three letters of reference attesting to the applicant’s scholarship and ability to work independently.

Degree Requirements
Master of Fine Arts (M.F.A.)
Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

The School of Visual Arts requires a minimum total of 60 credits at the 400, 500, or 800 level, with a minimum of 24 credits at the 500 level, for the Master of Fine Arts degree. Not more than 10 credits may be transferred from other accredited graduate institutions, subject to restrictions outlined in GCAC-309 Transfer Credit (http://gradschool.psu.edu/graduate-education-policies/gcac-309-transfer-credit). Of the 60 credits required for graduation, candidates are expected to complete the following distribution of credits: 30 credits in a major area of concentration, 12 credits in art history and critical studies, 10 credits in related areas, and 8 credits in graduate seminar (ART 505).

In addition to course work, M.F.A. candidates must pass a candidacy review, which is usually held at the end of the second semester of study, submit an artist’s statement, pass the M.F.A. comprehensive oral examination and produce an M.F.A. exhibition. The approval of the M.F.A exhibition by a candidate’s committee represents the culminating experience of the program.

Student Aid
Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may
be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**Contact**

**Graduate Program Head:** B. Stephen Carpenter

**Director of Graduate Studies/Professor-in-Charge:** Jean Sanders

**Primary Program Contact:** Jeremy Fisher

**Email:** jhf149@psu.edu

**Mailing Address:** 210 Patterson Building, MFA in Studio Art, University Park, PA 16802

**Telephone:** (814) 865-6570

**Program Website:** Art (http://sova.psu.edu)

**Art Education**

**Graduate Program Head**

B. Stephen Carpenter

**Program Code**

AED

**Campus(es)**

University Park (Ph.D., M.S.)

World Campus (M.P.S.)

**Degrees Conferred**

Doctor of Philosophy (Ph.D.)

Master of Science (M.S.)

Master of Professional Studies (M.P.S.)

Dual-Title Ph.D. in Art Education and African American and Diaspora Studies

Dual-Title Ph.D. and M.S. in Art Education and Women's Studies

**The Graduate Faculty**

View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=AED)

This program helps students prepare for careers in:

- College teaching
- Administration
- Research
- Public school art teaching
- Art supervision

**Admission Requirements**

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. See GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

Students who seek admission to the graduate program must make formal application to The Graduate School and admissions committee of the Art Education program. To be admitted without deficiencies, the student is expected to have completed either a baccalaureate degree in art education or a program considered by the admissions committee to provide an appropriate background for the application's degree objectives. Related programs include work in studio art, art history, art education, education, museum education, etc. Deficiencies may be made up by course work that is not counted as credit toward an advanced degree. Students pursuing graduate degrees may simultaneously take course work leading to teaching certification and art supervisory certification. The students who plan to teach art education at the college level should note that some institutions require professors to hold a public school art teaching certificate and to have had public school teaching experience.

Students with a minimum 3.00 junior/senior grade-point average (on a 4.00 scale) and with appropriate course backgrounds will be considered for admission. The most qualified applicants will be accepted up to the number of spaces that are available for new students. Exceptions to the minimum 3.00 average may be made for students with special backgrounds, abilities, and interests. Transcripts should indicate high attainment in appropriate academic and creative work. Letters of recommendation should attest to scholarship and ability to work independently. In addition to the above requirements, there are specific requirements for each degree program:

**M.S. and Ph.D. Application Materials**

1. Completed official Penn State Graduate School Application for Admission (http://gradschool.psu.edu/prospective-students/how-to-apply).
2. Scores from the Graduate Record Examinations (GRE) or from the Miller Analogies Test (MAT) are required for admission.
3. Submit a one- to two-page Statement of Professional Intent which includes:
   a. professional objectives
   b. how these objectives would be furthered by graduate study,
   c. the areas in which research and creative work are planned, and
   d. what the applicant hopes to do with the graduate degree he or she is seeking to attain, and
   e. evidence that the applicant is prepared to undertake graduate level work.
4. Submit an example of scholarly writing.
5. Submit three (3) letters of recommendation. Letters of recommendation should attest to the applicant's scholarship and ability to work independently.
6. Submit official transcripts from all post-secondary institutions attended (http://www.gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission).
7. Submit a Portfolio (optional). Applicants may submit images of their creative works that represent arts-based research or images that illustrate their conception of art.
8. Indicate in your Statement of Professional Intent if you would like to be considered for an Assistantship/Fellowship.
M.P.S. Application Materials

1. Completed official Penn State Graduate School Application for Admission ([http://gradschool.psu.edu/prospective-students/how-to-apply](http://gradschool.psu.edu/prospective-students/how-to-apply)).
2. Statement of purpose in pursuing the M.P.S. in Art Education.
3. Three letters of recommendation.
4. Teaching portfolio to include teaching philosophy and a sample of curricular materials developed by the applicant.
5. A critical reflective written response to an article provided in the GRADS application site. The response should outline the key arguments made by the author(s), a critical evaluation of the logic and assumptions in the article, and a connection to the applicant’s own instructional or professional experience.
6. Curriculum vitae with evidence of professional leadership and service.
7. Official transcripts from all post-secondary institutions attended ([http://www.gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission](http://www.gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission)), including official military transcripts (if applicable). (All college or university transcripts are required regardless of the length of time that has passed, the grades earned, or the accreditation of the institutions attended.)
8. International applicants whose first language is not English or who have received a baccalaureate or master’s degree from an institution in which the language of instruction is not English, please refer to GCAC-305 Admission Requirements for International Students ([http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students](http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students)).

Degree Requirements

Master of Professional Studies (M.P.S.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements ([http://gradschool.psu.edu/graduate-education-policies](http://gradschool.psu.edu/graduate-education-policies)).

Students who seek admission to the M.P.S. in Art Education program should have current or recent teaching positions in a school, museum, cultural institution, or other community site at the time of application, with the expectation that the student continue to teach art in schools, museum, or other sites throughout the M.P.S. program. M.P.S. in Art Education program participants can start in any semester, taking one online art education course and one or more foundation or elective courses in other programs per semester. Applicants admitted to the online art education course and one or more foundation or elective based 3-credit courses:

- AED 812 Diversity, Visual Culture, and Pedagogy 3
- AED 813 Public Pedagogy 3

 electives
- 6 credits of Foundational courses at the 400, 500, or 800 level in art history, studio, philosophy, educational theory and policy, educational psychology, psychology, and/or anthropology 6
- 6 credits of electives 6

Culminating Experience
- AED 594 Research Topics 3

Total Credits 30

AED 594 is the culminating experience for the program with an action research project in one’s teaching context.

Master of Science (M.S.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. ([http://gradschool.psu.edu/graduate-education-policies](http://gradschool.psu.edu/graduate-education-policies))

A minimum of 30 credits at the 400, 500, 600, or 800 level is required, with at least 18 credits at the 500 and 600 level, combined. Students must take a minimum of 15 credits in art education. M.S. candidates are expected to complete the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AED 502</td>
<td>Research in Art Education</td>
<td>3</td>
</tr>
<tr>
<td>AED 505</td>
<td>Foundations of Art Education</td>
<td>3</td>
</tr>
<tr>
<td>AED 536</td>
<td>Curriculum Development in Art Education</td>
<td>3</td>
</tr>
<tr>
<td>or AED 588</td>
<td>History of Art Education</td>
<td></td>
</tr>
<tr>
<td>AED 590</td>
<td>Colloquium (1 credit for each two semesters enrolled in course work)</td>
<td>2</td>
</tr>
</tbody>
</table>

 Electives
- 6 credits of foundational studies at the 400, 500, or 800 level in areas such as art history, studio, philosophy, educational theory and policy, educational psychology, psychology, and anthropology 6
- 9 credits of electives 9

Culminating Experience
- AED 600 Thesis Research 6

Total Credits 32

M.S. candidates must prepare and orally defend a thesis. Requirements include 6 credits of thesis research within the 30 credits.

Doctor of Philosophy (Ph.D.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. ([http://gradschool.psu.edu/graduate-education-policies](http://gradschool.psu.edu/graduate-education-policies))

Course Requirements

All doctoral students are expected to complete the following core courses:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AED 502</td>
<td>Research in Art Education</td>
<td>3</td>
</tr>
<tr>
<td>AED 505</td>
<td>Foundations of Art Education</td>
<td>3</td>
</tr>
</tbody>
</table>
Admission Requirements

Students must apply and be admitted to the graduate program in Art Education and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the African American and Diaspora Studies dual-title program. Refer to the Admission Requirements section of the African American and Diaspora Studies Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/african-american-diaspora-studies).

Doctoral students must be admitted into the dual-title degree program in African American and Diaspora Studies prior to taking the qualifying examination in their primary graduate program.

Degree Requirements

To qualify for the dual-title degree, students must satisfy the degree requirements for the degree they are enrolled in Art Education, listed on the Degree Requirements tab. In addition, students must complete the degree requirements for the dual-title in African American and Diaspora Studies, listed on the African American and Diaspora Studies Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/african-american-diaspora-studies).

The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Art Education and must include at least one Graduate Faculty member from the African American and Diaspora Studies program. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. There will be a single qualifying examination, containing elements of both Art Education and African American and Diaspora Studies. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

Committee Composition

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of an Art Education and African American and Diaspora Studies dual-title Ph.D. student must include at least one member of the African American and Diaspora Studies Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in African American and Diaspora Studies, the member of the committee representing African American and Diaspora Studies must be appointed as co-chair.

Comprehensive Exams

The African American and Diaspora Studies Graduate Faculty member on the student’s committee is responsible for developing and administering the African American and Diaspora Studies portion of the student’s comprehensive exams. The exam must incorporate written and oral components in African American and Diaspora Studies based on the student’s research interest and specialization in African American and Diaspora Studies. The African American and Diaspora Studies portion of the exam may address one or more of the following components: broad history of the field, contemporary theory and debates, and either sexual and gender politics or a topic related to the student’s specific area of interest.

Dissertation

The candidate must complete a dissertation and pass a final oral defense of that dissertation on a topic that reflects their original research and

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AED 536</td>
<td>Curriculum Development in Art Education</td>
<td>3</td>
</tr>
<tr>
<td>AED 588</td>
<td>History of Art Education</td>
<td>3</td>
</tr>
<tr>
<td>AED 590</td>
<td>Colloquium (1 credit for each two semesters enrolled in course work)</td>
<td>2</td>
</tr>
</tbody>
</table>

Electives

6 additional credits in Art Education at the 400, 500, or 800 level | 6       |
education in both Art Education and African American and Diaspora Studies in order to earn the dual-title PhD degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

**Dual-Title M.S. and Ph.D. in Art Education and Women’s Studies**

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

**Admissions Requirements**

Students must apply and be admitted to the graduate program in Art Education and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Women’s Studies dual-title program. Refer to the Admissions Requirements section of the Women’s Studies Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/womens-studies). Doctoral students must be admitted into the dual-title degree program in Women’s Studies prior to taking the qualifying examination in their primary graduate program.

**Degree Requirements**

To qualify for the dual-title degree, students must satisfy the degree requirements for the degree they are enrolled in Art Education, listed on the Degree Requirements tab. In addition, students must complete the degree requirements for the dual-title in Women’s Studies, listed on the Women’s Studies Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/womens-studies).

The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Art Education and must include at least one Graduate Faculty member from the Women’s Studies program. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. There will be a single qualifying examination, containing elements of both Art Education and Women’s Studies. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of an Art Education and Women’s Studies dual-title Ph.D. student must include at least two members of the Women’s Studies Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in Women’s Studies, the member of the committee representing Women’s Studies must be appointed as co-chair. The Women’s Studies representative on the student’s dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their dissertation committee and reflects their original research and education in Art Education and Women’s Studies. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

**Student Aid**

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

**Courses**

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**Contact**

**Graduate Program Head:** B. Stephen Carpenter

**Director of Graduate Studies/Professor-in-Charge:** Kimberly Powell

**Primary Program Contact:** Jeremy Fisher

**Email:** jhf149@psu.edu

**Mailing Address:** 210 Patterson Building, University Park, PA 16802

**Telephone:** (814) 865-6570

**Program Website:** Art Education (http://sova.psu.edu/arted)

**Art History**

**Graduate Program Head:** Nancy Locke

**Program Code:** ARTH

**Campus(es):** University Park (Ph.D., M.A.)

**Degrees Conferring:** Doctor of Philosophy (Ph.D.) Master of Arts (M.A.)

**The Graduate Faculty View** (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=ARTH)

A graduate degree in art history prepares students for careers as scholars and educators, as museum curators, as public advocates of cultural heritage, and as arts administrators, to name just a few of the professions that recent program alumni have entered. Breadth of knowledge is as essential for museum professionals as it is for academic researchers. For this reason, advanced study of the visual arts and material culture from diverse periods and geographies is required of all graduate students, with Ph.D. candidates attaining deep expertise in at least one field of art historical research. The department’s faculty includes specialists in African, Asian, and European art and the arts of the Americas.
Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Scores from the Graduate Record Examinations (GRE) Aptitude Test (verbal, quantitative, and analytical) are required for admission to the Department of Art History. Special emphasis will be given to the verbal part of the GRE scores.

Candidates with a 3.00 junior/senior grade-point average and a minimum of 21 credits in art history will be considered for admission to the master’s program. Lacking these, a promising candidate may be provisionally admitted (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/provisional-admission) on condition that deficiencies be remedied, but without graduate degree credit. Applicants to the Ph.D. program must have an M.A. in art history or a closely related field. The best-qualified applicants will be accepted up to the number of spaces that are available for new students.

Degree Requirements

Master of arts (M.A.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

Candidates for the M.A. degree are required to complete a minimum total of 36 credits at the 400, 500, 600, or 800 level is required, with at least 18 credits at the 500 and 600 level, combined (including a master’s thesis or paper), divided as follows:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARTH 551</td>
<td>Historiography of Art History (taken during one’s first fall semester)</td>
<td>3</td>
</tr>
<tr>
<td>9 credits at the 400-level, of which 3 credits must be taken in each of the following three areas:</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>(1) African/Asian/Oceania/Pre-Columbian Americas</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(2) Ancient, Byzantine/Medieval</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(3) Renaissance/Baroque/Modern/Contemporary</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9 credits of 500-level seminars in art history.</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>9 additional credits in art history at the 400- or 500-level.</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Culminating Experience</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 credits of ARTH 600 for a master’s thesis or 6 credits of ARTH 596 for a master’s paper</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Total Credits</td>
<td>36</td>
<td></td>
</tr>
</tbody>
</table>

1 ARTH 551 and ARTH 596 may not be used to fulfill this requirement. Each seminar in this 9-credit requirement must be taken with a different faculty member.

2 With the approval of one’s adviser and the graduate officer, 3 credits of this requirement may be a course at the 400- or 500-level outside the Department of Art History.

3 ARTH 596 may be used only by a master’s candidate for a master’s paper; all other individual studies should use ARTH 496. The thesis must be accepted by the advisers and/or committee members, the head of the graduate program, and the Graduate School.

In addition, candidates must demonstrate a reading proficiency in one foreign language. A reading competency in one foreign language must be demonstrated before the end of one year of study. The foreign language must be relevant to the student’s areas of study and will be determined through consultation with the student’s faculty adviser, subject to the approval of the Graduate Officer. A master’s examination must also be passed before completing the M.A. degree.

Doctor of Philosophy (Ph.D.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

Thirty additional credits, not including doctoral dissertation research, are required for the Ph.D. At least 24 of these credits must be in art history and 3 to 6 must be in a related area outside art history. At least 9 of the art history credits must be at the 500 level, exclusive of ARTH 510 and ARTH 596. At the discretion of the candidate’s dissertation committee, the candidate may be required to take additional specialized courses pertaining to his or her major area of study. A reading competency in two foreign languages must be demonstrated before the end of one year of study. The two foreign languages must be relevant to the student’s areas of study and will be determined through consultation with the student’s faculty adviser, subject to the approval of the Graduate Officer. For the Ph.D., a qualifying examination, a comprehensive examination, and a final oral examination must be successfully completed in addition to the student’s doctoral dissertation. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

Dual-Titles

Dual-Title Ph.D. in Art History and Asian Studies

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-208/dual-title-graduate-degree-programs).

Graduate students with research and educational interests in Asian Studies may apply to the Art History/Asian Studies dual-title program. The goal of the dual-title degree in Art History and Asian Studies is to enable graduate students from Art History to acquire the knowledge and skills of their major area of specialization in Art History while at the same time gaining the interdisciplinary perspective of Asian Studies.

In order to prepare graduate students for the competitive job market, this program provides them with a solid disciplinary foundation that will allow them to compete for the best jobs in their field. For such students the dual-title Ph.D. in Asian Studies will add value to their degree and their status as candidates. It will produce excellent historians who are experts in Asian Studies as well. The dual-title degree Art History and Asian Studies will build curricular bridges beyond the student’s major field so as to provide a unique training regime for the global scholar.

Admission Requirements

For admission to the dual-title Ph.D. degree under this program, a student must first apply and be admitted to the Art History graduate program. Once accepted into the Art History program, the student can apply to
the Admissions Committee of the Asian Studies during the first two semesters of study and before the qualifying examination. The Asian Studies admissions committee reviews applications and recommends students for admission to the Asian Studies program to the Graduate School. Refer to the Admission Requirements section of the Asian Studies Bulletin page. (http://bulletins.psu.edu/graduate/programs/majors/asian-studies) Applicants interested in the program should make that known clearly on their applications and include remarks in their essays that explain their training, interests, and career goals in an area of Asian Studies. Doctoral students must be admitted into the dual-title degree program in Asian Studies prior to taking the qualifying examination in their primary graduate program.

Degree Requirements
To qualify for an Asian Studies degree, students must satisfy the requirements of the Art History program in which they are primarily enrolled. In addition, students must complete the degree requirements for the dual-title in Asian Studies, listed on the Asian Studies Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/asian-studies). Within this framework, final course selection is determined by the student, their Asian Studies adviser, and their Art History program adviser.

Upon a student’s acceptance by the Asian Studies admissions committee, the student will be assigned an Asian Studies academic adviser in consultation with the Asian Studies chair. As students develop specific scholarly interests, they may request that a different Asian Studies Graduate Faculty member serve as their adviser. The student and advisor will discuss a program of study that is appropriate for the student’s professional objectives and that is in accord with the policies of the Graduate School, the Art History department and the Asian Studies program.

The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Art History and must include at least one Graduate Faculty member from the Asian Studies program. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. There will be a single qualifying examination, containing elements of both Art History and Asian Studies. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of an Art History and Asian Studies dual-title Ph.D. student must include at least one member of the Asian Studies Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in Asian Studies, the member of the committee representing Asian Studies must be appointed as co-chair. The Asian Studies representative on the student’s dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their dissertation committee and reflects their original research and education in Art History and Asian Studies. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

Student Aid
Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact
Graduate Program Head: Nancy Locke
Director of Graduate Studies/Professor-in-Charge: Madhuri Desai
Primary Program Contact: C Cooper
Email: ccw2@psu.edu

Mailing Address: Art History, 240 Borland Building, University Park, PA 16802
Telephone: (814) 865-4873

Program Website: Art History (http://www.arthistory.psu.edu)

Asian Studies

Graduate Program Head
On-cho Ng
Program Code
ASIA
Campus(es)
University Park
Degrees Conferred
Dual-Title
The Graduate Faculty
View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=ASIA)

Students electing this program through their primary graduate programs will earn a Ph.D. in (graduate program name) and Asian Studies. The following graduate programs offer dual-title degrees in Asian Studies: Applied Linguistics, Art History, Comparative Literature, History, and Political Science.

The primary objective of the dual-title degree program in Asian Studies is to engage critically and substantively with the teaching, research, and scholarship of Asia, a diverse area with a population of some 4.5 billion. The program integrates knowledge and methodology across disciplines through partnerships with the departments of History, Political Science, Comparative Literature, and Applied. Graduate students are trained in such a way that they are equipped to represent, understand, analyze, and appraise the crucial and current scholarly issues in Asian Studies in the
context of their disciplinary foci. The program aims to produce doctoral graduates with a competitive advantage for employment that relates to Asia in academia and other professional fields.

**Admission Requirements**

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

Students must apply and be admitted to their primary graduate program and The Graduate School before they can apply for admission to the Asian Studies dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Asian Studies dual-title program. Doctoral students must be admitted into the dual-title degree program in Asian Studies prior to taking the qualifying examination in their primary graduate program.

Applicants should have a junior/senior cumulative average of a 3.00 (on a 4.00 scale) and appropriate course background. Prospective students seeking admission to the dual-title degree program will write a statement of purpose that addresses the ways in which their research and professional goals will reflect an interest in interdisciplinary and Asian Studies-related research.

**Degree Requirements**

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

To qualify for a dual-title degree, students must satisfy the requirements of the primary graduate program in which they are enrolled. In addition, they must satisfy the degree requirements for the dual-title in Asian Studies, listed below. The requirements for the dual-title Ph.D. include Asian-related coursework, Asia-related components to the qualifying and comprehensive exams, strong all-skills proficiency in one Asian language and either two years' college study (or equivalent) of another Asian language or else an alternative proficiency appropriate to the student’s field; and the completion of an Asian Studies-related dissertation.

**Course work:** 15 credits of Asia-related coursework at the 400 or 500 level. At least 9 of these 15 credits will be from ASIA 501 and ASIA 502, and ad hoc 597 seminars on individual topics. The remainder of the credits may come from Asian Studies or from the student’s primary graduate program, as approved by the student’s doctoral adviser and the Asian Studies program director of graduate studies.

**Language requirement:** Students will show strong all-skills proficiency in one Asian language and either two years' college study (or equivalent) of another Asian language or else an alternative proficiency appropriate to the student’s field.

The qualifying examination committee for the dual-title Ph.D. degree must include at least one Graduate Faculty member from the Asian Studies program. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. There will be a single qualifying examination, containing elements of both the primary graduate degree program and Asian Studies. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the candidacy examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of an Asian Studies dual-title doctoral degree student must include at least one member of the Asian Studies Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in Asian Studies, the member of the committee representing Asian Studies must be appointed as co-chair. The Asian Studies representative on the student’s dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their dissertation committee and reflects their original research and education in both their primary graduate program and Asian Studies. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

**Student Aid**

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School's website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

**Courses**

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**Learning Outcomes**

1. **Knowledge about Asia.** Graduates will demonstrate (a) an integrated understanding of the history of and current developments in theories and methods of studying Asia, (b) the ability to use such theories and methods in their research and/or practice, and (c) substantial knowledge concerning their area of specialization concerning Asia.

2. **Critical Thinking.** Graduates will demonstrate (a) critical thinking skills in the evaluation and critique of research in their specific area of specialization, (b) the ability to identify questions and solve issues in scholarly and professional environments, and (c) competence in formulating one’s own scholarly opinions based on the integration of knowledge from diverse sources.

3. **Communication.** Graduates will demonstrate the ability to (a) communicate effectively in scholarly and professional environments, (b) defend their ideas to others in research and practice, and (c) disseminate their knowledge and skills to enhance awareness to groups beyond their areas of specialization.

4. **Research Skills.** Students will demonstrate the ability to (a) critically analyze and integrate diverse research findings (b) systematically identify and frame research questions, design a research question, analyze the resulting data, and draw appropriate and interesting
conclusions that contribute to current scholarly debates in their fields, and (c) organize their findings in written format, and/or present the findings in academic presentations or professional meetings.

5. Diversity and Ethical Considerations. Students will demonstrate (a) an awareness of, and ability to work professionally with diverse individuals, groups, and communities, who represent various cultural and personal backgrounds and characteristics, (b) knowledge and application of ethical principles related to the responsible conduct of research, as well as to professional activities with individuals, groups, and organizations.

Contact

Graduate Program Head: On-cho Ng

Director of Graduate Studies/Professor-in-Charge: Erica Brindley

Primary Program Contact: Laura Shaffer

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Mailing Address: 438 Burrowes Building, University Park, PA 16802

Telephone: (814) 865-1352

Program Website: Asian Studies (http://asian.la.psu.edu)

Astrobiology

Graduate Program Head: James F. Kasting

Program Code: ABIOL

Campus(es): University Park

Degrees Conferred: Dual-Title

The Graduate Faculty

View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=ABIOL)

Students electing this degree program through participating programs earn a degree with a dual-title in the Ph.D., i.e., Ph.D. in (graduate program name) and Astrobiology. The following graduate programs offer dual-title degrees in Astrobiology:

- Astronomy and Astrophysics
- Biology
- Biochemistry, Microbiology, and Molecular Biology
- Geosciences
- Meteorology

The Astrobiology dual-title degree program is administered by the Department of Geosciences for the participating graduate programs. A program committee with representatives from each participating department maintains program definition, defines the nature of the qualifying examination and assigns the examining committee, identifies courses appropriate to the program, and recommends policy and procedures for the program's operation to the dean of the Graduate School and to the deans of the participating colleges. The dual-title degree program is offered through participating programs in the College of Earth and Mineral Sciences and the Eberly College of Science and, where appropriate, other graduate programs in the University. The program enables students from several graduate programs to gain the perspectives, techniques, and methodologies of Astrobiology, while maintaining a close association with major program areas of application.

Astrobiology is a field devoted to the exploration of life outside of Earth and to the investigation of the origin and early evolution of life on Earth. For admission to pursue a dual-title degree under this program, a student must apply to the Graduate School and one of the participating major graduate programs, and then subsequently to the Astrobiology program committee. Application to the dual-title degree program can occur upon matriculation, but must be completed before the qualifying examination in the major program is scheduled.

Students intrigued by the possibility of pursuing research in Astrobiology should also visit the Penn State Astrobiology Research Center (http://psarc.weebly.com) and the NASA Astrobiology Institute (https://nai.nasa.gov).

Admission Requirements

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

Graduate students with research and educational interests in astrobiology may apply to the Astrobiology dual-title degree program. Candidates must submit transcripts of their undergraduate and graduate course work, a written personal statement indicating the career goals they hope to serve by attaining an Astrobiology dual-title, and a statement of support from their dissertation adviser. A strong undergraduate preparation in the basic sciences is expected, with evidence of an interest in multiple disciplines.

Degree Requirements

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

To qualify for a dual-title degree, students must satisfy the requirements of the major graduate program in which they are enrolled, in addition to the minimum requirements of the Astrobiology program. The minimum course requirements for the dual-title in Astrobiology are ABIOL 574, ABIOL 590, ABIOL 570, and at least 2 credits of 400- or 500-level course work outside of the student’s major program in an area relevant to Astrobiology (through consultation with their adviser).

All students must pass a qualifying examination that assesses their potential in the field of astrobiology. This examination may be part of the qualifying examination in the student’s major graduate program if an Astrobiology faculty member serves on the examination committee and if acceptable to the major program. If not, the Astrobiology dual-title program will offer a second qualifying examination. The structure and timing of the second qualifying examination will be determined jointly by the dual-title and major program.

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of an Astrobiology dual-title doctoral degree student must include at least one member of the Astrobiology Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. If the chair of the dissertation
committee is not also a member of the Graduate Faculty in Astrobiology, the member of the committee representing Astrobiology must be appointed as co-chair. The Astrobiology representative on the student’s dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their dissertation committee and reflects their original research and education in both their primary graduate program and Astrobiology. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School. Financial aid is generally available through the major program and through highly competitive University Graduate Fellowships (UGF). In addition, Penn State’s Astrobiology Research Center (PSARC) provides support for students through research assistantships and graduate fellowships. Typically, students in Astrobiology are supported 12 months per year on some form of assistantship, fellowship, or summer wages provided by PSARC, UGF, or their department.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Learning Outcomes

1. KNOW: Students will develop and demonstrate advanced knowledge of a sub-specialty of geosciences, including understanding of, for example, historical and cutting-edge concepts, approaches, and techniques used in the field.
2. ANALYZE & CREATE: Students will demonstrate the ability to independently conceive a research hypothesis or question, and to contextualize the results of data collection and analysis.
3. RESEARCH IMPLEMENTATION: Students will demonstrate the ability to develop and implement scientific approaches, utilizing data collection, analysis, or numerical models, to address a question or hypothesis.
4. COMMUNICATE: Students will develop the ability to communicate their research findings to an audience of their peers in both written and oral form.
5. QUANTIFY: Students will develop the ability to incorporate quantitative analysis of data to support interpretations.
6. CRITICAL THINKING: Graduates will be able to critically analyze and assess work by others in their field of specialty.
7. PROFESSIONAL PRACTICE: Students will demonstrate knowledge of ethical standards in research and scholarship, and the ability to collaborate in a collegial and ethical manner with other professionals within their field or with diverse scientific backgrounds.

Contact

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Primary Program Contact: Angela Packer
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Telephone: (814) 865-7394
Program Website: Astrobiology (http://php.scripts.psu.edu/dept/psarc)

Astronomy and Astrophysics

Graduate Program Head: Randall McEntaffer
Program Code: ASTRO
Campus(es): University Park (Ph.D., M.S.)
Degrees Conferred: Doctor of Philosophy (Ph.D.)
Master of Science (M.S.)
Dual-Title Ph.D. in Astronomy and Astrophysics and Astrobiology

The Graduate Faculty

View (https://secure.gradsch.psu.edu/gsms/index.cfm?searchType=fac&prog=ASTRO)

The graduate program in Astronomy and Astrophysics prepares students for careers in astronomy, space science and education. Graduate instruction and research opportunities are available in theoretical, observational, and instrumental astronomy and astrophysics. Currently active areas of theoretical research include high-energy astrophysics (including theory of neutron stars, black holes, and gamma ray bursts), relativity and cosmology, stellar dynamics and planet formation, and computational methodology. Observational areas include spectroscopic and photometric observations of high-redshift quasars, galaxies and the intergalactic medium; gamma-ray bursts; X-ray and visible light studies of quasars, starburst and other active galaxies; visible light studies of nearby galaxies and their stellar populations; infrared study of brown dwarfs and protoplanetary disks; spectroscopy and modeling of binary, magnetically active, pre- and post-main sequence stars; spectroscopic searches for planetary systems. Instrumental areas include: development of X-ray telescopes and detectors; and high-precision visible and near-infrared light spectrographs. Department faculty members participate in several university cross-disciplinary organizations: Astrobiology Research Center, Center for Astrostatistics, Center for Exoplanets and Habitable Worlds, and the Institute for Gravitation and the Cosmos.

The department played a seminal role in and leads many science investigations using two NASA-launched satellites, the Chandra X-ray Observatory and the Swift panchromatic gamma-ray burst mission, and the innovative 9-meter Hobby-Eberly Telescope located at the McDonald Observatory in Texas. Faculty and students also observe with other space-based observatories (GALEX, Hubble Space Telescope, Spitzer Space Telescope, XMM-Newton) and ground-based telescopes (Gemini and other national facilities, Magellan, Keck, South Africa Large Telescope, Very Large Telescopes). Physics faculty members closely
associated with the Department are involved in particle and gravitational wave observations using the Auger, AMANDA, Ice Cube, and LIGO instruments. The Department has extensive computing facilities, and research is also conducted with university and national supercomputing resources.

Graduate students also have ample opportunity to acquire experience in undergraduate teaching and public outreach.

**Admission Requirements**

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Scores from the Graduate Record Examinations (GRE), including the Physics test, are required for admission.

Normally, students admitted to the program are required to have a bachelor’s degree in physics and/or astronomy with a grade-point average of at least 3.0 in their junior/senior courses in physics, astronomy, math, and related subjects. Typical GRE scores for entering students are 720 or more on the general test, and 680 or more on the Physics test.

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. See GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

Applicants to the Astronomy and Astrophysics program must have a minimum TOEFL score of 590 on the paper-based test, or a total score of 96 with a 23 on the speaking section for the Internet-based test (iBT).

**Degree Requirements**

**Master of Science (M.S.)**

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

The Master of Science degree requires completion of the Ph.D. course requirements (except the 3 credits of ASTRO 589) with 3.00 grade point average, passage of the qualifying exam, and submission of an acceptable scholarly paper, completed while enrolled in ASTRO 596.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>3-credit courses, including:</td>
<td></td>
</tr>
<tr>
<td>ASTRO 501</td>
<td>Fundamental Astronomy</td>
<td>3</td>
</tr>
<tr>
<td>ASTRO 502</td>
<td>Fundamental Astrophysics</td>
<td>3</td>
</tr>
<tr>
<td>at least four additional ASTRO 500-level courses</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>at least two PHYS 500-level courses</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>2 additional 3-credit courses</td>
<td>6</td>
<td></td>
</tr>
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</table>

*In addition, the following courses are required:*

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASTRO 590</td>
<td>Colloquium</td>
<td>1</td>
</tr>
<tr>
<td>ASTRO 602</td>
<td>Supervised Experience in College Teaching</td>
<td>3</td>
</tr>
</tbody>
</table>

**Culminating Experience**

**Doctor of Philosophy (Ph.D.)**

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

A minimum of 37 credits is required for the Ph.D., including:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>One 400-level class may be substituted for a course that is not one of the ASTRO 500-level courses.</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Credits for ASTRO 602 cannot be counted towards the minimum credits required for the degree.</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>M.S. students must submit an acceptable scholarly paper, completed while enrolled in ASTRO 596.</td>
<td></td>
</tr>
</tbody>
</table>

The qualifying examination is an oral examination covering any area of astronomy. Students who fail the examination may make a second attempt. At the Comprehensive Examination, the student presents a significant body of original research conducted at Penn State. This Examination tests the student’s mastery of the chosen field of research. The student prepares an extended written report and oral presentation, and answers questions on the research and closely related areas. Graduation requires the completion of a dissertation of original research and a final oral examination (the dissertation defense). To earn the Ph.D. degree, doctoral candidates must write a dissertation that is accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

**Dual-Titles**

**Dual-Title Ph.D. in Astronomy and Astrophysics and Astrobiology**

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://
forms of student aid are described in the Tuition & Funding Graduate assistantships available to students in this program and other programs, and the Graduate School.

Admissions Requirements
Students must apply and be admitted to the graduate program in Astronomy and Astrophysics and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Astrobiology dual-title program. Refer to the Admission Requirements section of the Astrobiology Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/astrobiology). Doctoral students must be admitted into the dual-title degree program in Astrobiology prior to taking the qualifying examination in their primary graduate program.

Degree Requirements
To qualify for the dual-title degree, students must satisfy the degree requirements for the Ph.D. in Astronomy and Astrophysics, listed on the Degree Requirements tab. In addition, students must complete the degree requirements for the dual-title in Astrobiology, listed on the Astrobiology Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/astrobiology). The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Astronomy and Astrophysics and must include at least one Graduate Faculty member from the Astrobiology program. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. There will be a single qualifying examination, containing elements of both Astronomy and Astrophysics and Astrobiology. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of an Astronomy and Astrophysics and Astrobiology dual-title Ph.D. student must include at least one member of the Astrobiology Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in Astrobiology, the member of the committee representing Astrobiology must be appointed as co-chair. The Astrobiology representative on the student’s dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their dissertation committee and reflects their original research and education in Astronomy and Astrophysics and Astrobiology. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

Student Aid
Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding Graduate Teaching Assistantships, externally funded graduate Research Assistantships, and/or University fellowships are typically provided to student admitted and continuing in good standing. Many students also apply for externally funded fellowships.

Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Learning Outcomes
Master of Science (M.S.)
1. Know/Think/Apply: Graduates will have demonstrated command of basic observational astronomy and astrophysics, including observing techniques, methods of data analysis, and common theoretical frameworks and techniques. This will include the ability to apply physics and mathematics knowledge to standard problems in astrophysics, as well as application of statistical principles to data analysis.
2. Communicate: Graduates will be able to clearly and cogently describe the background and motivation of their work, describe their methodology, and present and defend their arguments and conclusions in oral presentations, written papers and reports.
3. Ethical Professional Conduct: Graduates will demonstrate working knowledge of the standards for ethical conduct in research through their professional behavior and work.

Doctor of Philosophy (Ph.D.)
1. Know/Think: Graduates will have demonstrated command of basic observational astronomy and astrophysics, including observing techniques, methods of data analysis, and common theoretical framework works and techniques. This will include the ability to apply physics and mathematics knowledge to standard problems in astrophysics, as well as application of statistical principles to data analysis.
2. Apply/Think/Create: Graduates will be able to carry out original research in theoretical astrophysics, observational astronomy, or laboratory astrophysics (including but not limited to instrumentation development). This entails identifying and evaluating the status of outstanding questions, developing strategies to answer them, and formulating hypotheses and testing them through one or more of the following means: calculations or simulations, model development, analysis of existing data, acquisition and analysis of new data, and design and/or construction of new instruments.
3. Communicate: Graduates will be able to clearly and cogently describe the background and motivation of their research, describe their research methodology, and present and defend their arguments and conclusions in oral presentations, written papers and reports, and, where applicable, proposals.
4. Ethical Professional Conduct: Graduates will demonstrate working knowledge of the standards for ethical conduct in research through their professional behavior and work.
Contact
Graduate Program Head: Randall McEntaffer
Primary Program Contact: Kaylee Harter
Email: kah281@psu.edu
Mailing Address: 525 Davey Laboratory, University Park, PA 16802
Telephone: (814) 865-0419
Program Website: Astronomy and Astrophysics (http://astro.psu.edu)

Biobehavioral Health
Graduate Program Head: Thomas Gould
Program Code: BBH
Campus(es): University Park (Ph.D., M.S.)
Degrees Conferred:
- Doctor of Philosophy (Ph.D.)
- Master of Science (M.S.)
- Dual-Title Ph.D. in Biobehavioral Health and Bioethics
- Dual-Title Ph.D. in Biobehavioral Health and Clinical and Translational Sciences

The Graduate Faculty
View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=BBH)

The graduate program in Biobehavioral Health (BBH) is an interdisciplinary graduate program provided by the College of Health and Human Development and involving faculty from its departments. The focus of the program is on the interaction of biological, behavioral, sociocultural, and environmental variables in the etiology and prevention of health problems and in the promotion of healthy human development. The program is designed to cultivate competence in basic and applied research, in the evaluation of biobehavioral health intervention strategies, and in university teaching. Graduates are prepared for research, teaching, or policy roles in health care settings, private and public research laboratories, government agencies, and universities including medical schools.

Special resources available in the college that students may draw upon and potentially participate in for their research programs include a Health and Human Development Consultation Center, Nutrition Clinic, and Speech and Hearing Clinic; Centers for Gerontology, the Study of Child and Adolescent Development, Developmental and Health Genetics, Locomotion Studies, Worksite Health Enhancement, and Developmental and Health Research Methodology; special laboratories in Behavioral Endocrinology, Biomechanics, Human Performance, Motor Behavior, and Nutrition; and extensive computer resources. Additional resources, including elaborate mainframe and super computer capabilities, are available in other parts of the University.

Admission Requirements
Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Scores from the Graduate Record Examinations (GRE), or from the Medical College Admission Test (MCAT), are required for admission. Applicants should have a minimum grade-point average of 3.00 (A=4.00), an above-average score on the GRE or MCAT, and three supporting recommendations. At the discretion of the graduate program, exceptions may be made to these requirements for students with special backgrounds, abilities, and interests. Admission will be offered to candidates who are the best qualified, in the judgment of the faculty, taking all factors in to account.

Entering students should have a basic background in biological sciences, the behavioral sciences, or a combination of the two. In addition, they should have a basic background in quantitative methods. In exceptional cases, superior students who do not meet these requirements may be admitted provisionally (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/provisional-admission), while correcting their deficiencies. This must occur during their first two semesters in the program.

Degree Requirements
Master of Science (M.S.)
Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

Master of Science degree candidates must take five core courses in biobehavioral health and 12 additional credits in methods individually designed in consultation with and with the approval of their adviser and committee. All M.S. degree candidates must complete a formal master's thesis or a master's paper. Candidates selecting the thesis option must complete an additional 6 credits of master's thesis research (BBH 600) for a total of 33 credits. Candidates selecting the paper option must complete an additional 6 credits of individual studies (BBH 596) in lieu of the 6 thesis credits. The master's thesis will typically describe original research. The master's paper may describe original research, but may also involve a substantial review of the literature, or a substantial description of a new research-related procedure. The choice of thesis or paper options will be made by the student in consultation with the adviser. The student's advisory committee judges the quality and acceptability of the paper or thesis. Additionally, the thesis must be submitted to, and accepted by the Graduate School.

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<thead>
<tr>
<th>Code</th>
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<th>Credits</th>
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<tbody>
<tr>
<td>BBH 501</td>
<td>Biobehavioral Systems in Health and Development: Theory and Processes</td>
<td>3</td>
</tr>
<tr>
<td>BBH 502</td>
<td>Health: Biobehavioral Perspectives</td>
<td>3</td>
</tr>
<tr>
<td>BBH 503</td>
<td>Biobehavioral Systems in Health and Development: Processes and Integration</td>
<td>3</td>
</tr>
<tr>
<td>BBH 504</td>
<td>Behavioral Health Intervention Strategies</td>
<td>3</td>
</tr>
<tr>
<td>BBH 505</td>
<td>Behavioral Health Research Strategies</td>
<td>3</td>
</tr>
</tbody>
</table>

Other Methods Courses
12 credits at the 400- or 500-level to be selected in consultation with the student's adviser

Culminating Experience

<table>
<thead>
<tr>
<th>Code</th>
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</tr>
</thead>
<tbody>
<tr>
<td>BBH 600</td>
<td>Thesis Research</td>
<td>6</td>
</tr>
<tr>
<td>or BBH 596</td>
<td>Individual Studies</td>
<td></td>
</tr>
</tbody>
</table>

Total Credits 33
Doctor of Philosophy (Ph.D.)
Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

All doctoral students must take five core courses in Biobehavioral Health and 12 additional credits in research methods individually designed in consultation with and with the approval of the student’s adviser and committee to develop doctoral-level competence in biobehavioral health and one or more related specialized areas.

Communication and Language Requirement
Doctoral students must demonstrate competency in spoken English as judged by the faculty and in technical writing as demonstrated in research papers and/or publications. In addition, they must demonstrate competence in one of the following areas:

1. a foreign language
2. computer science
3. college teaching
4. logic or philosophy of science

Dual-Titles
Dual-Title Ph.D. in Biobehavioral Health and Bioethics
Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

Admission Requirements
Students must apply and be admitted to the graduate program in Biobehavioral Health and the Graduate School before they can apply for admission to the dual-title degree program in Bioethics. Students must apply and be admitted to the dual-title degree program in Bioethics prior to taking the qualifying exam. In addition, applicants should have a junior/senior cumulative average of at least 3.0 (on a 4.0 scale) and an appropriate background in undergraduate coursework. Prospective dual-title students will write a statement of purpose that addresses the ways in which their research and professional goals reflect an interest in interdisciplinary bioethics research. Refer to the Admission Requirements section of the Bioethics Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/bioethics).

Degree Requirements
Biobehavioral Health Ph.D. students may pursue additional training in bioethics through the dual-title Ph.D. program in Bioethics. To qualify for the dual-title degree, students must satisfy the requirements of the Biobehavioral Health Ph.D. program. In addition, students must complete the degree requirements for the dual-title Ph.D. in Bioethics, listed on the Bioethics Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/bioethics). Within this framework, final course selection is determined by the student, their Biobehavioral Health adviser, and their Bioethics program adviser.

Qualifying exam
In accordance with Graduate Council policy, there will be a single qualifying examination for both the primary program and the dual-title program. At least one member of the qualifying exam committee must come from the Bioethics program. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role.

Comprehensive exam
In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of a Biobehavioral Health and Bioethics dual-title doctoral degree student must include at least one member of the Bioethics Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. If the chair of the committee is not also a member of the Graduate Faculty in Bioethics, the member of the committee representing Bioethics must be appointed as co-chair. The faculty member (or members) affiliated with the Bioethics Program will be responsible for administering a portion of the comprehensive exam that will require the student to demonstrate an understanding of various theoretical and methodological approaches to bioethics, and an ability to apply them to issues and problems (including, where appropriate, practical problems) in their primary field.

Dissertation and dissertation defense
A dissertation on a bioethics-related topic or with a substantial bioethics component is required of students in the dual-title Ph.D. program. The bioethics-related topic of the dissertation or the bioethics component will be approved by the student’s dissertation committee. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

Dual-Title Ph.D. in Biobehavioral Health and Clinical and Translational Sciences
Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

Admission Requirements
Doctoral students with research and educational interests in clinical and translational science may apply for the Dual-Title Ph.D. degree in Biobehavioral Health and Clinical and Translational Sciences following admission to the Graduate School and Biobehavioral Health graduate degree program and prior to taking the qualifying examination in Biobehavioral Health. An admissions committee comprised of faculty affiliated with the dual-title program will evaluate applicants. Applicants must have a graduate GPA of at least 3.5 in a research area related to human health. Prospective dual-title program students will write a statement of purpose that addresses the ways in which their research and professional goals will be enhanced by an interdisciplinary course of study in clinical and translational sciences. Refer to the Admission Requirements section of the CTS Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/clinical-translational-sciences).

Degree Requirements
This dual-title degree program emphasizes interdisciplinary scholarship at the interface of basic sciences, clinical sciences, and human health. Students in the dual-title program are required to have two advisers from separate disciplines: one individual serving as the primary mentor in the graduate program in Biobehavioral Health and another individual serving as the secondary mentor in an area covered by the dual-title program who is a member of the Clinical and Translational Sciences faculty.

To qualify for the dual-title degree, students must satisfy the degree requirements for the Ph.D. degree, listed on the Degree Requirements tab. In addition, students must complete the degree requirements for the dual-title Ph.D. in CTS, listed on the CTS Bulletin page (http://
biobehavioral.health.bulletins.psu.edu/graduate/programs/majors/clinical-translational-sciences). Some courses may satisfy both BBH program requirements and those of the CTS program. Up to 12 credits of CTS approved courses can be double-counted from the BBH required course work. Final course selection must be approved by the student’s dissertation committee.

In accordance with Graduate Council policy, the qualifying examination committee must include at least one member of the Clinical and Translational Sciences Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. There will be a single qualifying examination which will include content from both the graduate program in Biobehavioral Health and the Clinical and Translational Sciences programs. The qualifying exam must be taken within four semesters (summer sessions do not count) of entry into the doctoral program.

The student’s dissertation committee must include at least one member of the Clinical and Translational Sciences Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. If the chair of the committee is not also a member of the Graduate Faculty in Clinical and Translational Sciences, the member of the committee representing Clinical and Translational Sciences must be appointed as co-chair. The fields of Biobehavioral Health and Clinical and Translational Sciences will be integrated in the student’s comprehensive examination.

All students are required to conduct dissertation research that contributes fundamentally to the fields of Biobehavioral Health and Clinical and Translational Sciences. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

**Student Aid**

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

**Courses**

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**Learning Outcomes**

**KNOW:**

1a. Graduates will be able to demonstrate mastery of the literature regarding biological, psychological, sociocultural, ethical, behavioral, and environmental influences on various health behaviors;

1b. Graduates will be methodologically proficient so as to comprehend the results of a broad scientific literature encompassing these areas.

**APPLY/CREATE:**

2a. Graduates will be able to review the relevant literature and generate ideas for novel research questions;

2b. Graduates will be able to design a research plan to answer novel research questions that move the field forward and carry it out to completion.

**COMMUNICATE:**

3a. Graduates will be able to write articles suitable for publication in top tier peer review journals;

3b. Graduates will be able to present the results of their research in a clear and concise manner to an audience in a professional society meeting;

3c. Graduates will be able to write research grant proposals to external funding agencies (e.g., NIH, NSF, or foundations).

**THINK:**

4. Graduates will be about to think critically about research regarding biological, psychological, sociocultural, ethical, behavioral, and environmental influences on various health behaviors.

**PROFESSIONAL PRACTICE:**

5. Graduates will demonstrate leadership, professionalism, and the highest ethical standards.

**Contact**

**Graduate Program Head:** Thomas Gould

**Director of Graduate Studies/Professor-in-Charge:** Jennifer Graham-Engeland

**Primary Program Contact:** Shannon Anthony

**Email:** sls9@psu.edu

**Mailing Address:** 219 Biobehavioral Health Bldg, University Park, PA 16802

**Telephone:** (814) 863-7424

**Program Website:** Biobehavioral Health (http://bbh.hhdev.psu.edu/graduate)
Biochemistry, Microbiology, and Molecular Biology

Graduate Program Head
Wendy Hanna-Rose

Program Code
BMMB

Campus(es)
University Park (Ph.D., M.S.)

Degrees Conferred
Doctor of Philosophy (Ph.D.)
Master of Science (M.S.)
Dual-Title Ph.D. in Biochemistry, Microbiology, and Molecular Biology and Astrobiology
Dual-Title Ph.D. in Biochemistry, Microbiology, and Molecular Biology and Biogeochemistry

The Graduate Faculty

The major goal of the program in Biochemistry, Microbiology, and Molecular Biology is to train students for independent research and teaching in the principal areas of those scientific disciplines. Students may enter the program from a variety of backgrounds such as biochemistry, biology, biophysics, cell biology, chemistry, genetics, microbiology, molecular biology, physics, and other related disciplines. The student’s research may begin during the first year.

Research areas of faculty include:

- antibiotic discovery
- cell and developmental biology
- cell cycle control
- chromatin structure
- cryo-electron microscopy
- DNA binding proteins
- electron paramagnetic resonance spectroscopy
- enzymology
- genomics
- iron, lipid, cellulose and xenobiotic metabolism
- neurobiology
- metabolomics
- metallbiochemistry
- microbiology
- nuclear magnetic resonance spectroscopy
- parasitology
- pathogenesis
- photosynthesis
- plant biology
- proteomics
- regulation of gene expression
- RNA binding proteins
- RNA structure
- signal transduction
- transcriptomics
- virology
- X-ray crystallography

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Scores on the Graduate Record Examination (GRE) Test (verbal, quantitative, and analytical) are required for admission. Entering students should have taken courses in biology, biochemistry, chemistry, physics, genetics, and/or microbiology. Admission to the program is based on prior research experience, personal statement of interests and objectives, course records and grades, GRE scores, letters of recommendation, and interviews. All students are admitted with the intent of obtaining a Ph.D. degree, although a master’s degree is obtained in some cases. The program does not admit for the terminal master’s degree.

Degree Requirements

Master of Science (M.S.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

A minimum of 30 credits at the 400, 500, 600, or 800 level is required, with at least 18 credits at the 500 and 600 level, combined. Master’s students must complete the following core courses in BMMB:

<table>
<thead>
<tr>
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<th>Credits</th>
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<tbody>
<tr>
<td>BMMB 501</td>
<td>Core Concepts in Biomolecular Science</td>
<td>5</td>
</tr>
<tr>
<td>BMMB 502</td>
<td>Critical Analysis of the Biochemical, Microbial, and Molecular Biology Scientific Literature</td>
<td>1</td>
</tr>
<tr>
<td>BMMB 507</td>
<td>Seminar in Biochemistry, Microbiology, and Molecular Biology</td>
<td>2</td>
</tr>
<tr>
<td>BMMB 509</td>
<td>Ethics in Biomedical Science</td>
<td>1</td>
</tr>
</tbody>
</table>

Culminating Experience

BMMB 600 Thesis Research 6
or BMMB 610 Thesis Research Off Campus

Students are required to write a thesis, and at least 6 credits in thesis research (BMMB 600 or BMMB 610) must be taken in conjunction with completing the thesis. The thesis must be accepted by the advisers and/or committee members, the head of the graduate program, and the Graduate School, and the student must pass a thesis defense.

Doctor of Philosophy (Ph.D.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

Each student must take a total of 19 credits in 400-,500- and 800-level courses, required and elective, from a list approved by the program faculty. Doctoral students must complete the core courses in BMMB:
### Dual-Titles

**Dual-Title Ph.D. Program in BIOCHEMISTRY, MICROBIOLOGY, AND MOLECULAR BIOLOGY and Astrobiology**

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation) once the student has passed the qualifying examination.

Doctoral students must pass a qualifying examination, a comprehensive oral examination, and a final oral examination (the dissertation defense). Continuation in the Ph.D. program is decided on the basis of the student’s performance in courses, research and teaching. In addition, an oral qualifying examination is taken during the fall semester of the second year. This examination tests the student’s ability to utilize what they have learned in solving problems based on the scientific method. A comprehensive oral examination is taken before the student’s Ph.D. dissertation committee within approximately three semesters after the student has passed the qualifying examination. The student is expected to present a written dissertation proposal including data that has been gathered, future research directions, and experimental approaches. Questioning may involve, but is not limited to, that dissertation proposal. The faculty requires that each student demonstrate the ability to collect, organize, and present the results of their research in a professional manner before graduation. This is accomplished by preparing a manuscript based on the Ph.D. dissertation research. The manuscript must be written by the student and submitted for publication in a refereed journal prior to the final oral examination (the dissertation defense). The dissertation defense is taken before the student’s dissertation committee at the end of the program. The student must also present a public seminar on the dissertation research within the two-week period preceding the dissertation defense. To earn the Ph.D. degree, the student’s dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

#### Other Relevant Information

The director of graduate studies is in charge of advising students about academic and related matters until they have chosen a dissertation adviser. Beginning students carry out a series of rotation projects in at least three different faculty laboratories before deciding on a research area. Students generally decide on their dissertation research adviser at the end of their first fall semester.

All students are required to participate as teaching assistants in undergraduate laboratory courses as part of their training. Students are required to register for BMMB 602 (Supervised Experience in College Teaching) for two semesters; however, these credits cannot be counted towards the minimum credits required for the degree.

Graduate students with research and educational interests in astrobiology may apply to the Astrobiology Dual-Title Ph.D. Program. Students must apply and be admitted to the graduate program in BMMB and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Astrobiology dual-title program. Refer to the Admission Requirements section of the Astrobiology Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/astrobiology). Doctoral students must be admitted into the dual-title degree program in Astrobiology prior to taking the qualifying examination in their primary graduate program.

To qualify for the dual-title degree, students must satisfy the degree requirements for the Ph.D. degree in BMMB, listed on the Degree Requirements tab. In addition, students must complete the degree requirements for the dual-title in Astrobiology, listed on the Astrobiology Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/astrobiology).

The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from BMMB and must include at least one Graduate Faculty member from the Astrobiology program. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. There will be a single qualifying examination, containing elements of both BMMB and Astrobiology. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the candidacy examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of a BMMB and Astrobiology dual-title Ph.D. student must include at least one member of the Astrobiology Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in Astrobiology, the member of the committee representing Astrobiology must be appointed as co-chair. The Astrobiology representative on the student’s dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their dissertation committee and reflects their original research and education in BMMB and Astrobiology. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

#### Required Courses

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</tr>
<tr>
<td>BMMB 509</td>
<td>Ethics in Biomedical Science</td>
<td>1</td>
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</table>

Additional course work and research are individually planned by the student and the research adviser in consultation with the dissertation committee. The dissertation committee is established in compliance with Graduate Council policy (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation) once the student has passed the qualifying examination.

#### Code Title

- **BMMB 501**: Core Concepts in Biomolecular Science
- **BMMB 502**: Critical Analysis of the Biochemical, Microbial, and Molecular Biology Scientific Literature
- **BMMB 507**: Seminar in Biochemistry, Microbiology, and Molecular Biology
- **BMMB 509**: Ethics in Biomedical Science
Dual-Title Ph.D. Program in BIOCHEMISTRY, MICROBIOLOGY, AND MOLECULAR BIOLOGY and Biogeochemistry

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

Graduate students with research and educational interests in biogeochemistry may apply to the Biogeochemistry Dual-Title Ph.D. Program. Students must apply and be admitted to the graduate program in BMMB and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Biogeochemistry dual-title program. Refer to the Admission Requirements section of the Biogeochemistry Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/biogeochemistry).

Doctoral students must be admitted into the dual-title degree program in Biogeochemistry prior to taking the qualifying examination in their primary graduate program.

Students in the Biogeochemistry Dual Title program are required to have two advisers from separate disciplines: one individual serving as a primary adviser in their major degree program and a secondary adviser in an area within a field covered by the dual-title program and a member of the Biogeochemistry faculty. To qualify for the dual-title degree, students must satisfy the degree requirements for the Ph.D. degree in BMMB, listed on the Degree Requirements tab. In addition, students must complete the degree requirements for the dual-title in Biogeochemistry, listed on the Biogeochemistry Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/biogeochemistry).

The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from BMMB and must include at least one Graduate Faculty member from the Biogeochemistry program. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. There will be a single qualifying examination, containing elements of both BMMB and Biogeochemistry. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of a BMMB and Biogeochemistry dual-title Ph.D. student must include at least one member of the Biogeochemistry Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in Biogeochemistry, the member of the committee representing Biogeochemistry must be appointed as co-chair. The Biogeochemistry representative on the student’s dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their dissertation committee and reflects their original research and education in BMMB and Biogeochemistry. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School's website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Learning Outcomes

1. **Know**: demonstrate knowledge of core principles and primary literature in their specialty area including comprehension of methods, results, and data analysis in the specialty area.
2. **Apply/Create**: demonstrate ability to design and carry out a major research project in the field, including a description of previous work in the field and assemble new findings into a written work that advances understanding in the field.
3. **Communicate**: demonstrate ability to convey scientific ideas and results in clear, concise and original writing as well as in formal oral presentations.
4. **Think**: demonstrate ability to critically analyze work by others in the fields of biochemistry, microbiology, and molecular biology. Demonstrate ability to integrate their own findings into existing knowledge.
5. **Professional Practice**: demonstrate comprehension of and commitment to ethical standards in the discipline. Demonstrate the ability to teach key concepts.
6. **Teach**: demonstrate the ability to teach key concepts of the discipline of biochemistry, microbiology, and molecular biology to undergraduate students.

Contact

Graduate Program Head: Wendy Hanna-Rose

Director of Graduate Studies/Professor-in-Charge: Ken Keiler

Primary Program Contact: Linda Kunes

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Mailing Address: 107 Althouse Laboratory, University Park, PA 16802

Telephone: (814) 865-2538

Program Website: Biochemistry, Microbiology, and Molecular Biology (http://bmb.psu.edu/graduate)
Bioengineering

Graduate Program Head
William Hancock

Program Code
BIOE

Campus(es)
University Park (Ph.D., M.S.)

Degrees Conferred
Doctor of Philosophy (Ph.D.)
Master of Science (M.S.)

The Graduate Faculty
View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=BIOE)

This intercollege program provides graduate-level training in engineering and the life sciences, and their integration. Students graduating from this program will have acquired expertise in the application of engineering principles to fundamental problems in biology, clinical problems in medicine, or in the development of new biomedical instrumentation. They are also expected to produce scholarly work to be published in peer-reviewed journals and presented at national conferences. Graduate curricula and student assessment in bioengineering is under the direction of the program chair and a graduate curriculum committee that is composed of Graduate Faculty representing several departments in the Colleges of Engineering, Health and Human Development, Science, and Medicine.

Opportunities for specialized research are offered by Graduate Faculty working on electrical, mechanical, and biophysical properties of biological materials and the application of this knowledge to understanding molecular, cellular, tissue, and organ level processes involved in health and disease. Specific applications include:

- artificial organs
- biomaterials
- bioMEMs
- nanotechnology
- biophotonics
- cellular and medical imaging
- cardiovascular engineering
- cell signaling and protein dynamics
- mechanobiology
- neural interfaces
- tissue engineering
- regenerative medicine

Extensive computer facilities and specialized equipment are available to support a combination of studies that employ experimental observations and their analysis through mathematical modeling and computer simulations.

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Students with a degree in engineering, physics, or the life sciences are eligible for admission. All students must have a strong background in physics and mathematics. This background should include chemistry, calculus-based physics, and mathematics through calculus and differential equations. Students who lack this background may still be considered for provisional admission (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/provisional-admission) but will have to make up any deficiency early in their graduate program. These remedial courses will be required in addition to the stated graduate program course requirements. Students with a 3.0 junior/senior grade-point average and with appropriate course backgrounds will be considered for admission. The best-qualified applicants will be accepted up to the number of spaces available. Exceptions to the minimum average may be made for students with special backgrounds, abilities, and interests, at the discretion of the program.

Scores from the Graduate Record Examinations (GRE) are required for admission. However, at the discretion of the program a student may be admitted for graduate study in the Bioengineering program without these scores.

Degree Requirements

Master of Science (M.S.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

A minimum of 30 credits are required for a master's degree in Bioengineering, with at least 24 credits at the 500-, 600-, or 800-level. Students must take the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOE 591</td>
<td>Bioengineering Ethics and Professional Development</td>
<td>1</td>
</tr>
<tr>
<td>BIOE 600</td>
<td>Thesis Research</td>
<td>6</td>
</tr>
</tbody>
</table>

Total Credits 30

1 Coursework must include at least 6 credits each in bioengineering, life sciences, and technical/quantitative electives.

2 Students will select additional course work and research credits from a list of approved electives maintained by the program office, as appropriate, to obtain the total minimum of 30 credits.

Credits earned at other institutions but not used to earn a degree may be applied toward the requirements for a graduate degree, subject to restrictions outlined in GCAC-309 Transfer Credit (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-309/transfer-credit).

A thesis is required for the M.S. degree. This thesis will be defended in front of the student's academic advisory committee. The thesis must be accepted by the academic advisory committee members, the head of the graduate program, and the Graduate School, and the student must pass a thesis defense.
Doctor of Philosophy (Ph.D.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

Upon entering the program, a student, along with his/her research adviser, will select an academic advisory committee consisting of three members of the IDGP in Bioengineering Graduate Faculty (including the adviser). Working with this committee, students will select courses appropriate to their research and their professional goals.

### Required Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOE 591</td>
<td>Bioengineering Ethics and Professional</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Development</td>
<td></td>
</tr>
<tr>
<td>6 credits</td>
<td>in bioengineering, life sciences, and</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>technical/quantitative electives</td>
<td></td>
</tr>
<tr>
<td>12 credits</td>
<td>that are lecture- or laboratory-based (not</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>independent study) and at the 500-level</td>
<td></td>
</tr>
<tr>
<td>6 credits</td>
<td>at the 500-level in courses relevant to</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>their research</td>
<td></td>
</tr>
<tr>
<td>4 credits</td>
<td>in graduate program seminar series (1</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>credit every semester until passing the</td>
<td></td>
</tr>
<tr>
<td></td>
<td>comprehensive exam)</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>Credits</td>
<td>29</td>
</tr>
</tbody>
</table>

600-level research credits are assigned every semester in attendance. Graduate credits earned at other institutions, including those used toward a degree, may be used to satisfy some of the Ph.D. degree requirements at Penn State, but in these cases credits are not transferred. Regardless of previous courses taken, every doctoral student must take a minimum of 6 course credits at the 500-level at the University Park campus.

Supporting courses are available at University Park in: anatomy, biochemistry, biology, biophysics, chemistry, laboratory animal medicine, materials science, mathematics, physics, physiology, and the engineering departments.

### Exams

After completion of the first year, completion of at least 18 graduate credits and within three semesters (not including summer) of entry into the doctoral program, all students must complete and pass the qualifying exam, which consists of a written research proposal and oral defense of that proposal on a topic other than the subject of the student’s dissertation. This exam also tests for English competency, which is a Graduate Council requirement. A comprehensive examination consisting of a written research proposal and oral defense of that proposal on the student's Ph.D. dissertation topic is administered by the student's dissertation committee, typically at the end of second year of residency. A final oral examination based on a defense of the doctoral dissertation is required of all candidates. This exam occurs typically after the fourth or fifth year of residency and consists of a formal public seminar followed by a closed meeting of the dissertation committee and the candidate.

In preparation for the comprehensive exam, students, along with their adviser, will choose a dissertation committee in accordance with Graduate Council policy (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation). The dissertation committee consists of a minimum of four members of the Graduate Faculty including the adviser who serves as the chair. The adviser must be a member of the Intercollege Graduate Degree Program (IGDP) in Bioengineering. At least three committee members must be members of the IGDP in Bioengineering. The committee must also include an “Outside Field Member” who is not a member of the IGDP in Bioengineering. Finally, at least one member of the dissertation committee must have his/her primary appointment outside the administrative unit in which the adviser’s primary appointment is held. The Graduate School will appoint the committee and notify all persons.

To earn the Ph.D. degree, doctoral candidates must write a dissertation that is accepted by the dissertation committee, the head of the graduate program, and the Graduate School, and the student must pass a final oral examination (the dissertation defense).

### Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School's website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

### Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

### Contact

**Graduate Program Head:** William Hancock  
**Primary Program Contact:** Jenna Sieber  
**Email:** jns5431@psu.edu  
**Mailing Address:** 205 Hallowell Building, University Park, PA 16802  
**Telephone:** (814) 865-8087  
**Program Website:** Bioengineering (http://www.bme.psu.edu)

### Bioethics

**Graduate Program Head:** Jonathan H. Marks  
**Program Code:** BIOET  
**Campus(es):** University Park  
**Degrees Conferred:** Dual-Title  
**The Graduate Faculty**  
View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=BIOET)

Students electing to pursue this program through participating departments will earn a degree with a dual-title at the Ph.D. level, i.e., Ph.D. in (major program name) and Bioethics.

The following graduate programs offer dual degrees in bioethics: Anthropology, Biobehavioral Health, Communication Arts and Sciences, Nursing.
The Bioethics dual-title program is housed in the College of the Liberal Arts with administrative support (e.g., staff support) provided by the Rock Ethics Institute. The Bioethics Program Committee, which contains representatives from participating colleges and departments, maintains the program’s definition and goals, identifies faculty and courses relevant to the program, and recommends policies and procedures for the program’s operation.

The dual-title graduate degree in bioethics will acknowledge and foster scholarly work across disciplines, increasing the intellectual rigor and breadth of graduate work through immersion in both bioethics and the primary discipline. The dual-title degree will also provide opportunities for students to learn how to synthesize knowledge and develop expertise within and across disciplinary boundaries.

In addition to the intellectual and academic advantages of interdisciplinarity, the dual-title degree program will strengthen the reputation of individual programs/departments through an innovative degree program, increase recruitment of top quality graduate students, and increase job opportunities for students after graduation.

**Admission Requirements**

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs ([http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs](http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs)).

Dual-title Bioethics graduate students will first be admitted to their major programs in accordance with the requirements stipulated by the Graduate Council and the major program. They will then be admitted to graduate study in the Bioethics program by an admissions committee consisting of faculty affiliated with the Bioethics program. Applicants should have a junior/senior cumulative average of at least 3.0 (on a 4.0 scale) and an appropriate background in undergraduate course work. Prospective dual-title students will write a statement of purpose that addresses the ways in which their research and professional goals reflect an interest in interdisciplinary bioethics research.

**Degree Requirements**

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs ([http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs](http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs)).

General requirements for the dual-title Ph.D. in Bioethics are:

- Required course work described below.
- Comprehensive examination in bioethics and the related field, with the format and content to be determined by agreement with the major department.
- Dissertation on a bioethics-related topic or that includes a substantial bioethics component.

### Required Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOET 501</td>
<td>Perspectives and Methods in Bioethics</td>
<td>3</td>
</tr>
<tr>
<td>BIOET 502</td>
<td>Perspectives in Macro-Bioethics</td>
<td>3</td>
</tr>
<tr>
<td>BIOET 590</td>
<td>Bioethics Colloquium</td>
<td>1</td>
</tr>
<tr>
<td>3 additional BIOET credits at the 500 level</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

8 credits from a list of approved electives at the 400 and 500 level, with at least two credits at the 500 level.

1 With the approval of the Director of the Bioethics Graduate Program, students may also fulfill the requirement for the three additional 500-level BIOET credits through one of four alternatives:

- BIOET 590 (since the topics will vary from semester, students may take this course in subsequent semesters for additional credit)
- BIOET 594
- BIOET 596

- an additional elective course determined to satisfy this requirement on the grounds that the syllabus indicates a sufficiently strong bioethics content.

2 Students in the program will take the remaining credits by choosing from a wide variety of existing elective courses at the 400 and 500 levels from a list maintained by the Director of the Bioethics Graduate Program in consultation with the Bioethics Program Committee. Students also have the right to petition the Director of the Bioethics Graduate Program to request that additional courses be added to the list of electives. The elective courses chosen by the student must be approved by either the Director of the Bioethics Graduate Program or, with the agreement of the Director, by another member of the Bioethics Program Committee. In addition, students may pursue an internship or practicum (BIOET 595), provided that this is approved in advance by the Director of the Bioethics Graduate Program.

**Language Competency Requirements**

The student will fulfill the language requirement specified by the major department through which the student is admitted to the dual-title degree program.

**Qualifying Examination**

The qualifying examination committee for the dual-title Ph.D. degree must include at least one Graduate Faculty member from the Bioethics program. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. There will be a single qualifying examination, containing elements of both the primary graduate degree program and Bioethics. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

**Committee Composition**

In addition to the general Graduate Council requirements for dissertation committees ([http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation](http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation)), the dissertation committee of a Bioethics dual-title doctoral degree student must include at least one member of the Bioethics Graduate Faculty. Where major programs are supportive of this, graduate students will be encouraged to have a second committee member so qualified. Faculty members who hold appointments in both programs may serve in a combined role. If the committee chair does not serve in this combined role, the faculty member representing the Bioethics program must be designated as co-chair of the committee. The dual-title representative(s) will be expected to participate in constructing and grading comprehensive examination questions that cover the secondary area of study.

**Comprehensive Exams**

The faculty member (or members) affiliated with the Bioethics program will be responsible for administering a portion of the comprehensive exam that will require the student to demonstrate an understanding
of various theoretical and methodological approaches to bioethics, and an ability to apply them to issues and problems (including, where appropriate, practical problems) in their major field.

Dissertation
A dissertation on a bioethics-related topic or with a substantial bioethics component is required of students in the dual-title Ph.D. program. The bioethics-related topic of the dissertation or the bioethics component will be approved by the student’s committee. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

Student Aid
Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact
Graduate Program Head: Jonathan Marks
Program Email: bioethics@psu.edu
Mailing Address: 129 Willard Building, University Park, PA 16802
Telephone: (814)865-5938
Program Website: Bioethics (http://bulletins.psu.edu/graduate/programs/majors/bioethics/www.bioethics.psu.edu)

Biogeochemistry
Graduate Program Head: Mary Ann Bruns
Program Code: BGC
Campus(es): University Park
Degrees Conferred: Dual-Title
The Graduate Faculty: View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=BGC)

Students electing this degree program through participating programs earn a degree with a dual-title in the Ph.D., e.g., Ph.D. in (graduate program name) and Biogeochemistry.

The following graduate programs offer dual-title Ph.D. degrees in Biogeochemistry:

- Biochemistry, Microbiology, and Molecular Biology
- Chemistry
- Ecology
- Environmental Engineering (ENV_E)
- Geosciences
- Materials Science and Engineering
- Plant Pathology
- Soil Science

The Biogeochemistry dual-title degree program is administered by the Department of Geosciences with support from the Department of Ecosystem Science and Management for the participating graduate programs. A program committee with representatives from participating departments maintains program definition, identifies courses appropriate to the program, and recommends policy and procedures for the program’s operation to the dean of the Graduate School and to the deans of the participating colleges.

The dual-title degree program is offered through participating programs in the College of Earth and Mineral Sciences, College of Agricultural Sciences, College of Engineering, Eberly College of Science, and the Intercollege Graduate Degree Programs.

The program enables students from several graduate programs to gain the perspectives, techniques, and methodologies of Biogeochemistry, while maintaining a close association with major program areas of study.

Admission Requirements
Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

Graduate students with research and educational interests in biogeochemistry may apply to the Biogeochemistry dual-title degree program. For admission to pursue a dual-title degree under this program, a student must apply to (1) the Graduate School and (2) one of the participating major graduate programs; and then subsequently to (3) the Biogeochemistry program committee. Students may only apply to the dual-title program once they have been accepted into a major program. Once a student has been accepted to a major program, application to the dual-title degree program can occur immediately or at a later time, such as upon matriculation. The application to the dual-title degree program, however, must be accepted before the qualifying examination in the major program is scheduled.

Candidates must submit transcripts of their undergraduate and graduate course work, a written personal statement indicating their interests in the interdisciplinary area of Biogeochemistry and the career goals they hope to serve by attaining a Biogeochemistry dual-title, and a statement of support from their dissertation adviser, if assigned. A strong undergraduate preparation in the basic sciences is expected, with evidence of an interest in multiple disciplines.

Degree Requirements
Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).
To qualify for a dual-title degree, students must satisfy the requirements of the major graduate program in which they are enrolled, in addition to the minimum requirements of the Biogeochemistry program. Students are required to have two advisers from separate disciplines: one individual serving as a primary adviser in their major degree program (i.e., Soil Science, BMMB, Material Science & Engineering, Chemistry, Ecology, Environmental Engineering, Geosciences, or Plant Pathology) and a secondary adviser in an area within a field covered by the dual-title program who is a member of the Biogeochemistry Graduate Faculty. The major program adviser normally will also be a member of the Biogeochemistry Graduate Faculty. The two faculty advisers can represent different academic programs, but this is not required, as faculty from a scientifically diverse department could represent very different areas of expertise.

To fulfill the course requirements for the dual-title in Biogeochemistry, students must complete a total of 15 graduate credits chosen in consultation with the adviser from an approved list of courses in the areas of:

- biochemistry and microbiology,
- environmental chemistry,
- environmental engineering,
- geochemistry,
- materials science and engineering,
- and soil science.

All students must pass a qualifying examination that includes an assessment of their potential in the field of biogeochemistry. In all cases, the result of a single qualifying exam for both entrance to the student's major Ph.D. program and this dual-title program will be reported to the Graduate School. The qualifying examination committee must include at least one member of the Biogeochemistry Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. Because students must first be admitted to a graduate major program of study before they may apply to and be considered for admission into a dual-title graduate degree program, dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

The student's dissertation committee must include at least one member of the Biogeochemistry Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. If the chair of the committee representing the student's major degree program is not also a member of the Graduate Faculty in Biogeochemistry, the member of the committee representing Biogeochemistry must be appointed as co-chair. The field of Biogeochemistry must be integrated into the comprehensive examination.

A Ph.D. dissertation that contributes fundamentally to the field of Biogeochemistry is required. A public oral presentation of the dissertation is required, which may be part of the final defense within the major degree program.

Ph.D. candidates must complete a dissertation on a topic that contributes fundamentally to the fields of both the student’s major degree program and Biogeochemistry. In order to earn the dual-title Ph.D. degree, the dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School, and the student must pass a final oral examination (the dissertation defense).

### Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding section of The Graduate School's website. Students on graduate assistantships must adhere to the course load limits set by The Graduate School.

A limited number of Research Assistantships are also available through the Biogeochemistry dual-title degree program.

### Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

### Contact

**Graduate Program Head:** Mary Ann Bruns

**Primary Program Contact:** Mary Ann Bruns

**Email:** mvb10@psu.edu

**Mailing Address:** Dept. of Ecosystem Science and Management, 116 Ag Sciences & Industries Bldg, University Park, PA 16802

**Telephone:** (814) 863-0779

**Program Website:** Biogeochemistry (http://www.biogeochemistry.psu.edu)

### Bioinformatics and Genomics

**Graduate Program Head**

Cooduvalli Shashikant

**Program Code**

BGEN

**Campus(es)**

Hershey (Ph.D., M.S.)

University Park (Ph.D., M.S.)

**Degrees Conferred**

Doctor of Philosophy (Ph.D.)

Master of Science (M.S.)

Joint M.D./Ph.D. with the College of Medicine

**The Graduate Faculty**

View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fa&prog=BGEN)

The IGDP in BG is an interdepartmental program that engages faculty members from six colleges on two campuses. This broad-reaching program provides students a wide range of understanding of multiple disciplines with specific expertise in a chosen area, and encourages interdisciplinary research that is truly changing biological research as well as health and lifestyles.
Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

- Fully completed, official online Penn State Graduate Application (http://gradschool.psu.edu/prospective-students/how-to-apply).
- Paid, nonrefundable application fee (see Requirements for Graduate Admission (http://www.gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/application-fees) for current fee).
- Official transcripts from all post-secondary institutions attended (http://www.gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission).
- Completed BG-specific questions on the Graduate Application.
- Application for a U.S. visa (international applicants only).
- Officially submitted Graduate Record Examination (GRE) General Test scores. Successful applicants generally have scores above the 75th percentile for each of the verbal, quantitative, and analytical writing sections.
- Names and contact information, including business email addresses, for three references.
- Statement of goals that pertain to the life sciences including motivation for pursuing a research degree; research experience and interests; and professional experience. The statement should include problems that are of interest to the applicant and how the applicant's past experiences have prepared him or her to pursue this research.
- Successful applicants generally will have a minimum 3.5 on a 4.0 scale junior/senior undergraduate grade point average, and will have completed course work in both quantitative and life science subjects.

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. See GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

Applicants to the BG program must have a minimum TOEFL score of 575 for the paper-based test, or a total score of 90 with a 19 on the speaking section for the Internet-based test (iBT). Successful applicants generally have a minimum score of 100 (including 23 on the speaking component) on the Internet-based test.

Degree Requirements

master of science (M.S.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

For master's degree, a minimum of 30 graduate credits and a 3.0 overall GPA are required. At least 18 credits in the 500 and 600 series combined must be included in the program. Required courses for master's degree are:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MCIBS 551</td>
<td>Genomics</td>
<td>3</td>
</tr>
<tr>
<td>MCIBS 554</td>
<td>Foundations in Data Driven Life Sciences</td>
<td>3</td>
</tr>
</tbody>
</table>

Doctor of Philosophy (Ph.D.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

For the Ph.D., a minimum of 35 credits is required. During the first year of study, Ph.D. candidates are required to take 17 credits of core required courses:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MCIBS 551</td>
<td>Genomics</td>
<td>3</td>
</tr>
<tr>
<td>MCIBS 554</td>
<td>Foundations in Data Driven Life Sciences</td>
<td>3</td>
</tr>
<tr>
<td>STAT 555</td>
<td>Statistical Analysis of Genomics Data</td>
<td>3</td>
</tr>
<tr>
<td>MCIBS 541</td>
<td>Critical Analysis of Bioinformatics and Genomics Research Topics (1 credit per semester, maximum of 2 credits)</td>
<td>2</td>
</tr>
<tr>
<td>MCIBS 589</td>
<td>Colloquium in Bioinformatics and Genomics</td>
<td>3</td>
</tr>
<tr>
<td>MCIBS 591</td>
<td>Ethics in the Life Sciences</td>
<td>1</td>
</tr>
<tr>
<td>MCIBS 596</td>
<td>Individual Studies (representing three Research Rotations)</td>
<td>2</td>
</tr>
</tbody>
</table>

Total Credits 17

Each candidate for the Ph.D. degree must fulfill written and spoken English communication requirements that are satisfied by preparing written and oral reports describing the laboratory rotations during the first year.

At the end of the first year, continuation in the Ph.D. program is determined by performance in course work, laboratory rotations, and the BG Graduate Program Qualifying Examination. Students join their research laboratory by the end of the second semester of the first year.

The dissertation committee of a Ph.D. student is formed upon entry into the dissertation laboratory, and must comply with all Graduate Council requirements (http://gradschool.psu.edu/graduate-education-policies/).
Students are strongly encouraged to consider joint co-advisers, each representing a different area of expertise within the field of bioinformatics and genomics.

During the second year, students may take additional courses in consultation with the dissertation committee. Students may select an option area in which they conduct research and take additional courses specified by the Option (see below). Students are not required to choose an Option. Additionally, students will complete one semester of Teaching Assistantship in a graduate or undergraduate course and complete required training to perform duties of Teaching Assistantship.

Ph.D. students must pass a comprehensive examination prior to the end of the fifth semester of enrollment, the written portion of which is in the format of a grant application. As part of this examination, the candidate also gives an oral presentation of this proposal to their dissertation committee.

A dissertation must be prepared and defended by each Ph.D. student. Students must present their dissertation in accordance with Graduate Council and Graduate School guidelines as described in the THESIS GUIDE: Requirements for the Preparation of Master’s Theses and Doctoral Dissertations (http://www.gradschool.psu.edu/current-students/etd/thesisdissertationguidepdf). To earn the Ph.D. degree, the dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School and the student must pass a final oral examination (the dissertation defense).

The final examination of the doctoral candidate is an oral examination administered and evaluated by the entire dissertation committee. It consists of an oral presentation of the dissertation by the candidate and a period of questions and responses. These will relate in large part to the dissertation, but may cover the candidate’s entire program of study. Because a major purpose of the examination is also to assess the general scholarly attainments of the candidate. The portion of the examination in which the dissertation is presented is open to the University community and the public; therefore, it is expected that the examination will take place at University Park or the Hershey campus. It is expected that the Ph.D. candidate will have at least one paper submitted for publication in a major peer-reviewed scientific journal prior to the final oral examination.

Ph.D. students in Bioinformatics and Genomics may enroll in one of two options, but are not required to do so.

### Option in Algorithms and Computation

Students are admitted to the Option in Algorithms and Computation after successfully completing:

1. the first year of the IGDP in BG;
2. three research rotations, of which at least two must be with faculty affiliated with the Algorithms and Computation Option; and
3. the qualifying examination.

During the second year, Ph.D. students choosing this option will be required to take:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSE/BMMB 566</td>
<td>Algorithms and Data Structures in Bioinformatics</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 465</td>
<td>Data Structures and Algorithms</td>
<td>3</td>
</tr>
<tr>
<td>or CSE 565</td>
<td>Algorithm Design and Analysis</td>
<td></td>
</tr>
<tr>
<td>Two courses from a list of prescribed electives which includes but is not limited to the following:</td>
<td>6</td>
<td></td>
</tr>
</tbody>
</table>

### Option in Statistical Genomics

Students are admitted to the Option in Statistical Genomics, after successfully completing:

1. the first year of the IGDP in BG;
2. three research rotations, of which at least two must be with faculty affiliated with the Statistical Genomics Option; and
3. the qualifying examination.

During the second year, Ph.D. students choosing this option will be required to take:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT 501</td>
<td>Regression Methods</td>
<td>3</td>
</tr>
<tr>
<td>or STAT 511</td>
<td>Regression Analysis and Modeling</td>
<td></td>
</tr>
<tr>
<td>STAT 557</td>
<td>Data Mining I</td>
<td>3</td>
</tr>
<tr>
<td>Two courses from a list of prescribed electives which includes but is not limited to the following:</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>STAT 414</td>
<td>Introduction to Probability Theory</td>
<td></td>
</tr>
<tr>
<td>STAT 415</td>
<td>Introduction to Mathematical Statistics</td>
<td></td>
</tr>
<tr>
<td>STAT 416</td>
<td>Stochastic Modeling</td>
<td></td>
</tr>
<tr>
<td>STAT 502</td>
<td>Analysis of Variance and Design of Experiments</td>
<td></td>
</tr>
<tr>
<td>STAT 504</td>
<td>Analysis of Discrete Data</td>
<td></td>
</tr>
<tr>
<td>STAT 505</td>
<td>Applied Multivariate Statistical Analysis</td>
<td></td>
</tr>
<tr>
<td>STAT 540</td>
<td>Statistical Computing</td>
<td></td>
</tr>
</tbody>
</table>

### Joint Degrees

#### Joint M.D. / Ph.D. with the College of Medicine

Requirements listed here are in addition to requirements listed in GCAC-211 Joint Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/joint-degree-programs).

#### Admission Requirements

Students interested in simultaneously pursuing an M.D. and Ph.D. degree must apply to the College of Medicine M.D. program using the national American Medical College Application Service (AMCAS) application system and indicate their intent to pursue the joint degree program. The College of Medicine M.D./Ph.D. Admissions Committee reviews applications and evaluates candidates for acceptance into both the M.D. and Ph.D. program. Students not accepted into the joint degree program can be referred to either the M.D. or Ph.D. program, depending on their qualifications.

The general admission requirements for the Ph.D. degree are listed on the Admission Requirements tab. Additional requirements for the joint degree are listed below. Admissions requirements and applications for
admission for Penn State College of Medicine are available at the M.D. Program (http://med.psu.edu/md) section of the Penn State College of Medicine website. After the review committee has accepted an applicant to the joint degree program, s/he must apply to the Graduate School (http://www.gradschool.psu.edu/prospective-students/how-to-apply) for admission to the graduate program. Students must be admitted to the joint degree program prior to taking the first course they intend to count towards the graduate degree.

In addition to the basic college level premedical school requirements for the Penn State College of Medicine (one each year of biology, chemistry, physics, math, and organic chemistry), the M.D./Ph.D. program has the following requirements:

- **Academic Achievement.** Applicants to our program generally have very strong grades and MCAT scores. In recent years, successful applicants have an average GPA of 3.75 and MCAT scores of 33-34. Applicants are not required to take the GREs.

- **Research Experience.** We are especially interested in students with a strong and sustained background in research. Students who have spent 1-2 years after graduation conducting research are strongly encouraged to apply. Alternatively in-depth research experience as an undergraduate can suffice.

- **Recommendations.** We are especially interested in receiving letters of recommendation from faculty with whom you conducted research and who can comment on your passion and potential for research.

- **Goals.** Applicants must be able to clearly articulate the reasons for pursuing the joint degree.

- **International Students.** All qualified students are eligible to apply regardless of citizenship.

**Degree Requirements**

Students must fulfill all requirements for each degree in order to be awarded that degree, subject to the double-counting of credits as outlined below. Degree requirements for the M.D. program are listed on the Penn State College of Medicine (http://med.psu.edu/md) website. Degree requirements for the Ph.D. degree are listed in the Ph.D. Degree Requirements section.

During the first two years of medical school, the student conducts at least three research rotations. After successful completion of the first two years of medical school the candidate enters the MCIBS Graduate Program.

During the summer after the second year of medical school, M.D./Ph.D. students take Step 1 of the United States Medical Licensing Examination (USMLE), which serves in lieu of the knowledge-based part of the qualifying examination for the BG program. Successful completion of BMS 506A and BMS 506B, which are taken in the second year of medical school, with a grade of B or higher meets the critical thinking and paper analysis requirement of the qualifying exam.

The dissertation committee of an M.D./Ph.D. student in the BG program is formed upon entry into the dissertation laboratory, and must comply with all Graduate Council requirements (http://gradschool.psu.edu/graduate-education-policies/gsac/gsac-600/phd-dissertation-committee-formation). The committee must include at least two members of the BG program Graduate Faculty and one M.D./Ph.D. steering committee member.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MCIBS 589</td>
<td>Colloquium in Bioinformatics and Genomics</td>
<td>1-2</td>
</tr>
<tr>
<td>MCIBS 591</td>
<td>Ethics in the Life Sciences</td>
<td>1</td>
</tr>
<tr>
<td>MCIBS 551</td>
<td>Genomics</td>
<td>3</td>
</tr>
<tr>
<td>MCIBS 554</td>
<td>Foundations in Data Driven Life Sciences</td>
<td>3</td>
</tr>
<tr>
<td>MCIBS 541</td>
<td>Critical Analysis of Bioinformatics and Genomics Research Topics</td>
<td>1</td>
</tr>
<tr>
<td>STAT 555</td>
<td>Statistical Analysis of Genomics Data</td>
<td>3</td>
</tr>
</tbody>
</table>

**Electives**

In addition, based on the background and needs of the student the following elective courses will also be taken:

- BIOL 405 Molecular Evolution 3
- STAT 500 Applied Statistics 3
- BMMB 852 Applied Bioinformatics 2

Total Credits 20-21

The BG program will accept SPM 711 in lieu of 6 credits of elective courses and 2 credits of MCIBS 596. If students accepted into the joint degree program are unable to complete the M.D. degree, they are still eligible to receive the Ph.D. degree if all Ph.D. degree requirements have been satisfied.

The M.D./Ph.D. student prepares a written comprehensive examination in the format of a grant application and gives an oral presentation of this proposal to their dissertation committee.

M.D./Ph.D. candidates are required to have at least one paper submitted for publication in a major peer-reviewed scientific journal prior to the final doctoral examination, and this must be accepted before they return to the third year of medical school. A dissertation must be prepared and defended by each M.D./Ph.D. candidate.

**Student Aid**

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

**Courses**

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**Contact**

**Graduate Program Head:** Cooduvalli Shashikant

**Director of Graduate Studies/Professor-in-Charge:** James Broach

**Primary Program Contact:** Jean Pierce

**Email:** jep32@psu.edu
Mailing Address: 101 Huck Life Sciences Building, University Park, PA 16802

Program Website: Bioinformatics and Genomics (https://www.huck.psu.edu/content/graduate-programs/bioinformatics-and-genomics)

Biology

Graduate Program Head
Stephen Schaeffer

Program Code
BIOL

Campus(es)
University Park (Ph.D., M.S.)

Degrees Conferred
Doctor of Philosophy (Ph.D.)
Master of Science (M.S.)
Dual-Title Ph.D. in Biology and Astrobiology

The Graduate Faculty
View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=BIOL)

The department directs graduate programs in a broad spectrum of research areas, including:

- bioinformatics
- cell biology
- developmental biology
- ecology
- evolution
- genetics
- neuroscience
- phylogenetics
- physiology

The department houses the Institute of Molecular Evolutionary Genetics.

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Scores from the Graduate Record Examinations (GRE) are required for admission. At the discretion of a graduate program, a student may be admitted provisionally (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/provisional-admission) for graduate study in a program without these scores.

Admission is restricted to students who have the baccalaureate degree in a biological science and who present a cumulative undergraduate average of at least 3.00 on a scale of 4.00. Each applicant must provide a personal statement of interests and objectives and letters from three persons verifying the applicant’s academic competence.

Degree Requirements

Master of science (M.S.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

Students obtaining an M.S. degree in Biology must complete course work as described in the link above, with guidance from their academic adviser. A thesis is usually required and must be defended before a faculty committee. The research must represent an original contribution, and the time allotted to it is about one year.

Doctor of Philosophy (Ph.D.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

The only courses required across the department are BIOL 592 and BIOL 590, a colloquium covering the Biology Seminar Series. Course work specific to individual plans of study are decided upon by the student in consultation with their graduate adviser and dissertation committee. All doctoral degree students must pass a written and oral qualifying examination that is usually administered during their third semester of study. After a student has completed all of their course work and made substantial progress on the design and execution of their dissertation research, a comprehensive examination is administered by their dissertation committee. The Ph.D. dissertation must represent a significant original contribution suitable for publication, and will usually require between two and four years of laboratory or field research. When complete the dissertation must be defended before the student’s dissertation committee. The dissertation defense is normally immediately preceded by a public presentation of the dissertation research by the student.

The department awards Ph.D. degrees in Biology covering the full spectrum of subjects represented by our diverse faculty. If desired, a student may elect to pursue one of the following options as part of his/her program of study.

Options

The M.S. and the Ph.D. in Biology may be taken with an option in either Cell and Developmental Biology, Ecological and Molecular Plant Physiology, Molecular Evolutionary Biology, Neuroscience, or Plant Biology.

Molecular Evolutionary Biology Option

1. The student must meet the criteria for the M.S. or Ph.D. in Biology.
2. The student’s research adviser must be a member of the Biology program and/or a full member of the Institute of Molecular Evolutionary Genetics. Other committee members may be chosen as needed providing that a majority of the committee is associated with the IMEG.
3. In addition to the normal Biology program requirements, the student must take (for both an M.S. or Ph.D. in Biology) 3 credits of course work in BIOL 591 and 9 credits from among the following courses (to be selected in consultation with the student’s committee):

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 405</td>
<td>Molecular Evolution</td>
<td></td>
</tr>
<tr>
<td>BIOL 422</td>
<td>Advanced Genetics</td>
<td></td>
</tr>
<tr>
<td>BIOL 427</td>
<td>Evolution</td>
<td></td>
</tr>
</tbody>
</table>
4. Any other course work or training deemed appropriate by the student's committee.

**Plant Biology Option**
1. The student must meet the criteria for the M.S. or Ph.D. in Biology.
2. The student’s research adviser must be a member of the Biology program. Other committee members may be chosen as needed to assure that a well-rounded graduate advisory committee is established.
3. In addition to the normal Biology program requirements, the student must take the required colloquia in the field of specialization and (for both an M.S. or Ph.D. in Biology) a minimum of 6 credits from among the following courses (to be selected in consultation with a student’s committee):

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 414</td>
<td>Taxonomy of Seed Plants</td>
<td></td>
</tr>
<tr>
<td>BIOL 422</td>
<td>Advanced Genetics</td>
<td></td>
</tr>
<tr>
<td>BIOL 427</td>
<td>Evolution</td>
<td></td>
</tr>
<tr>
<td>BIOL 441</td>
<td>Plant Physiology</td>
<td></td>
</tr>
<tr>
<td>BIOL 448</td>
<td>Ecology of Plant Reproduction</td>
<td></td>
</tr>
<tr>
<td>BIOL 514</td>
<td>Topics in Systematics and Evolution</td>
<td></td>
</tr>
<tr>
<td>BIOL 591</td>
<td>Molecular Evolutionary Biology Seminar</td>
<td></td>
</tr>
<tr>
<td>BIOL 597</td>
<td>Special Topics</td>
<td></td>
</tr>
</tbody>
</table>

4. Any other course work or training deemed appropriate by the student’s committee.

**Student Aid**

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School's website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

**Courses**

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**Learning Outcomes**

1. **Knowledge:** Demonstrate comprehensive knowledge of their major concentration area within biology including the fundamental questions in the field. The comprehensive knowledge may integrate multiple areas of biology. Demonstrate knowledge in other relevant areas of concentration (statistics) necessary for research in the biological sciences.
2. **Apply:** Demonstrate advanced research skills, including posing hypotheses, designing critical experiments, collecting data, evaluating data, and drawing conclusions in the study of biological problems.
3. **Communication:** Use professional standards of the field of Biology from evaluation of literature to communication of research findings in written and spoken presentations. These presentations might include talks or posters given at local or national meetings.
4. **Create:** Make an original and substantial contribution to the field of Biology and produce publishable scholarship that is presented within multiple chapters within their dissertation. Ideally, students will submit and publish research papers in peer reviewed journals during the course of their Ph.D. program.
5. **Teach:** Demonstrate effective skills in undergraduate teaching using effective pedagogical practice.

**Contact**

**Graduate Program Head:** Stephen Schaeffer

**Primary Program Contact:** Jennifer Knecht

**Email:** jlk67@psu.edu

**Mailing Address:** 208 Mueller Lab, University Park, PA 16802

**Telephone:** (814)863-7034

**Program Website:** Biology (http://bio.psu.edu)

**Biomedical Engineering**

<table>
<thead>
<tr>
<th>Graduate Program Head</th>
<th>Pak Kin Wong</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Program Code</strong></td>
<td>BME</td>
</tr>
<tr>
<td><strong>Campus(es)</strong></td>
<td>University Park (M.S.)</td>
</tr>
<tr>
<td><strong>Degrees Conferred</strong></td>
<td>Master of Science (M.S.)</td>
</tr>
<tr>
<td><strong>The Graduate Faculty</strong></td>
<td>View (<a href="https://secure.gradsch.psu.edu/gmps/index.cfm?searchType=fac&amp;prog=BME">https://secure.gradsch.psu.edu/gmps/index.cfm?searchType=fac&amp;prog=BME</a>)</td>
</tr>
</tbody>
</table>

The Department of Biomedical Engineering offers a one-year master's program consisting of advanced instruction in biomedical engineering fundamentals, courses in advanced biotechnology and applications, and a culminating research proposal that incorporates experiments and computational work. This degree will result in the students developing foundational knowledge and skills in biomedical engineering that will make them competitive for industry leadership positions or doctoral-level graduate programs in BME and related disciplines.

The one-year master's program focuses on fundamentals of integrating life sciences and engineering, in addition to providing instruction in cutting-edge biotechnology methods in bio-imaging, drug delivery, regenerative medicine, bio-manufacturing, and biomaterials. Students can only start the M.S. program in the Fall semester.

**Admission Requirements**

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Students with a degree in engineering, physics, or the life sciences are eligible for admission. All students must have a strong background in
physics and mathematics. This background should include chemistry, calculus-based physics, and mathematics through calculus and differential equations. Students who lack this background may still be considered for provisional admission (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/provisional-admission) but will have to make up any deficiency early in their graduate program. These remedial courses will be required in addition to the stated graduate program course requirements. Students with a 3.0 junior/senior grade-point average and with appropriate course backgrounds will be considered for admission. The best-qualified applicants will be accepted up to the number of spaces available. Exceptions to the minimum average may be made for students with special backgrounds, abilities, and interests.

Scores from the Graduate Record Examinations (GRE) are required for admission. However, at the discretion of the program a student may be admitted for graduate study in the Bioengineering program without these scores.

### Degree Requirements

#### Master of Science (M.S.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

Mentored Projects: By the end of September, a student will identify an adviser. A mentored project assigned by the adviser will be completed and a culminating project using the data as a basis for the scholarly paper will be submitted and evaluated. These projects are completed while enrolled in BME 594.

A minimum of 32 credits at the 400, 500, or 800 level is required for the M.S. in Biomedical Engineering, with at least 24 credits in BIOE at the 500 or 800 level. Students must take the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>credits of foundation courses at the BIOE 500-level</td>
<td>9</td>
</tr>
<tr>
<td>12</td>
<td>credits of fundamentals and/or applications courses (with a minimum of 3 credits from each category)</td>
<td>12</td>
</tr>
<tr>
<td>BIOE 591</td>
<td>Bioengineering Ethics and Professional Development</td>
<td>1</td>
</tr>
<tr>
<td>BIOE 590</td>
<td>Colloquium (two 1-credit graduate seminars)</td>
<td>2</td>
</tr>
<tr>
<td>BME 429</td>
<td>Biomedical Mechanics and Techniques Laboratory</td>
<td>2</td>
</tr>
</tbody>
</table>

**Culminating Experience**

- **BME 594** | Research Topics | 6

**Total Credits**: 32

Credits earned at other institutions but not used to earn a degree may be applied toward the requirements for a graduate degree, subject to restrictions outlined in GCAC-309 Transfer Credit (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/transfer-credit).

### Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

### Contact

**Graduate Program Head**: Pak Kin Wong

**Primary Program Contact**: Jenna Sieber

**Email**: jns5431@psu.edu

**Mailing Address**: 205 Hallowell Building, University Park, PA 16082

**Telephone**: (814)865-8087

**Program Website**: Biomedical Engineering (http://www.bme.psu.edu)

### Biomedical Sciences

**Graduate Program Head**: Ralph Keil

**Program Code**: BMS

**Campus(es)**: Hershey (Ph.D., M.S.)

**Degrees Conferred**

- Doctor of Philosophy (Ph.D.)
- Master of Science (M.S.)
- Dual-Title Ph.D. in Biomedical Sciences and Clinical and Translational Science
- Joint M.D./Ph.D. with the College of Medicine

**The Graduate Faculty**

View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=BMS).

The Biomedical Sciences (BMS) Graduate Program with its Options in Biochemistry and Molecular Genetics, Cellular and Integrative Physiology, Translational Therapeutics, and Virology and Immunology provides students curricular training with a unique focus on human health and disease and the opportunity to concentrate in one or more disciplinary approaches including: biochemistry, biophysics, cell biology, genetics, immunology, pharmacology, physiology, structural biology, and virology. Students receive rigorous training that provides the skills necessary to be leaders in biomedical research and other endeavors that benefit from a rigorous scientific background, including industry, education, intellectual property development, technology licensing, journalism, entrepreneurship, and public policy.

The BMS Graduate Program is an interdepartmental program that engages faculty from numerous basic science and clinical science departments. This broad-reaching program provides students a wide-ranging understanding of multiple disciplines with specific expertise in a chosen area, and encourages interdisciplinary research that is the hallmark of biomedical sciences in the 21st century.
Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

1. Submission of online Penn State Graduate School application (http://www.gradschool.psu.edu/prospective-students/how-to-apply) and payment of nonrefundable application fee
2. Graduate Record Examinations (GRE) general test scores
3. Three letters of recommendation
4. Statement of goals including
   a. reasons for applying to the BMS Graduate Program,
   b. previous research experiences,
   c. particular areas of research interests if known, and
   d. long-term career goals
5. Official transcripts from all post-secondary institutions attended (http://www.gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission); Note that post-secondary course work should include biochemistry and molecular biology or genetics.

Degree Requirements

Master of Science (M.S.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

Although the BMS Graduate Program awards M.S. degrees, it does not actively recruit students to earn M.S. degrees.

To receive the M.S. degree in BMS, at least 32 credits from courses at the 400, 500, 600, and 800 level are required.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMS 502</td>
<td>Cell and Systems Biology</td>
<td>3</td>
</tr>
<tr>
<td>BMS 503</td>
<td>Flow of Cellular Information</td>
<td>3</td>
</tr>
<tr>
<td>BMS 504</td>
<td>Art of Scientific Communication I</td>
<td>1</td>
</tr>
<tr>
<td>BMS 505</td>
<td>Art of Scientific Communication II</td>
<td>1</td>
</tr>
<tr>
<td>BMS 590</td>
<td>Colloquium</td>
<td>2</td>
</tr>
<tr>
<td>BMS 591</td>
<td>Biomedical Research Ethics</td>
<td>1</td>
</tr>
<tr>
<td>BMS 596</td>
<td>Individual Studies (Research Rotation)</td>
<td>2</td>
</tr>
<tr>
<td>BMS 801</td>
<td>Writing Grant Proposals for Biomedical Research</td>
<td>1</td>
</tr>
<tr>
<td>BMS 802</td>
<td>Colloquium or Journal Club fulfilled by taking 2 credits of any of the following:</td>
<td>2</td>
</tr>
<tr>
<td>BCHM 590</td>
<td>Colloquium</td>
<td></td>
</tr>
<tr>
<td>PSIO 501</td>
<td>Scientific Analysis and Presentation</td>
<td></td>
</tr>
<tr>
<td>PHARM 590</td>
<td>Colloquium</td>
<td></td>
</tr>
<tr>
<td>MICRO 590</td>
<td>Colloquium</td>
<td></td>
</tr>
<tr>
<td>MICRO 572</td>
<td>Literature Reports</td>
<td></td>
</tr>
<tr>
<td>NEURO 590</td>
<td>Colloquium</td>
<td></td>
</tr>
<tr>
<td>VIRIM 580</td>
<td>Critical Reading in Immunobiology</td>
<td></td>
</tr>
</tbody>
</table>

Electives

At least 11 credits of elective courses at the 500 or 800 level selected in consultation with the student's thesis adviser and thesis committee.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>BMS 600</td>
<td>Thesis Research</td>
<td>6</td>
</tr>
</tbody>
</table>

Total Credits: 32

1. No more than 6 credits of BMS 600 may be counted toward the 32 credit minimum.

Each candidate for the M.S. degree must fulfill written and spoken English communication requirements that are satisfied by preparing written and oral reports describing the laboratory rotations during the first year.

Students must complete original laboratory research that culminates in a thesis. The thesis must be accepted by the master's committee, the chair of the graduate program, and the Graduate School.

Doctor of Philosophy (Ph.D.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

To receive the Ph.D. degree in Biomedical Sciences, at least 29 credits from courses at the 400, 500, 600, and 800 level are required.

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<td>3</td>
</tr>
<tr>
<td>BMS 504</td>
<td>Art of Scientific Communication I</td>
<td>1</td>
</tr>
<tr>
<td>BMS 505</td>
<td>Art of Scientific Communication II</td>
<td>1</td>
</tr>
<tr>
<td>BMS 590</td>
<td>Colloquium</td>
<td>5</td>
</tr>
<tr>
<td>BMS 591</td>
<td>Biomedical Research Ethics</td>
<td>1</td>
</tr>
<tr>
<td>BMS 596</td>
<td>Individual Studies (Research)</td>
<td>2</td>
</tr>
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<td>2</td>
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<td>Colloquium</td>
<td></td>
</tr>
<tr>
<td>PSIO 501</td>
<td>Scientific Analysis and Presentation</td>
<td></td>
</tr>
<tr>
<td>PHARM 590</td>
<td>Colloquium</td>
<td></td>
</tr>
<tr>
<td>MICRO 590</td>
<td>Colloquium</td>
<td></td>
</tr>
<tr>
<td>MICRO 572</td>
<td>Literature Reports</td>
<td></td>
</tr>
<tr>
<td>NEURO 590</td>
<td>Colloquium</td>
<td></td>
</tr>
<tr>
<td>VIRIM 580</td>
<td>Critical Reading in Immunobiology</td>
<td></td>
</tr>
</tbody>
</table>

Electives

At least 10 credits of elective courses at the 500 or 800 level selected in consultation with the student's dissertation adviser and dissertation committee.

Total Credits: 29

Each candidate for the Ph.D. degree must fulfill written and spoken English communication requirements that are satisfied by preparing written and oral reports describing the laboratory rotations during the first year.

The first-year Fall curriculum provides the student an understanding of basic cellular processes through a core curriculum that includes two
integrated three-credit courses: Flow of Cellular Information (BMS 503) and Cell and Systems Biology (BMS 502). These courses develop concepts related to genome structure and function, regulation of gene expression, regulation of energy supply and demand, cellular and subcellular structures, cell-to-cell signaling, and the organization and function of cells in multicellular systems. The Fall curriculum also includes the one-credit Art of Scientific Communication I (BMS 504) course that reinforces concepts developed in the integrated courses and aids students in the transition from textbooks to primary literature as a source of information.

The first-year Spring curriculum offers an opportunity to explore one or more curricular paths that lead to entry into one of the Options or to design an individualized curricular path within the BMS Graduate Program. The Spring curriculum also includes the one-credit Art of Scientific Communication II (BMS 505) course that further develops the student’s knowledge acquisition from the primary literature and assists improvement of presentation and writing skills necessary for subsequent journal clubs, literature-based courses, and scientific learning and discourse throughout their career.

In addition, students complete at least three research rotations during the first year that expose them to the wide range of research interests of the Penn State Graduate Faculty from both basic and clinical science departments at the College of Medicine in Hershey. These rotations serve to inform the students with regard to choosing a dissertation adviser and dissertation committee.

The BMS Graduate Program Advisory Committee, which includes representation from the Program and each Option of the Program, advises students about academic and related matters until the student has a dissertation adviser. If desired, students formally make a decision to join an Option by the end of the Spring semester of their first year and must satisfy all admission requirements of the Option.

Students must have a dissertation adviser by the end of the summer of the first year. The student and dissertation adviser then plan additional course work and develop a research plan in consultation with the dissertation committee.

Curriculum in the second year is determined by the choice to participate in one of the Options, or an individualized curricular path designed by the student in consultation with the dissertation adviser and dissertation committee.

All doctoral students must pass a qualifying examination, a comprehensive examination, and a final oral examination (the dissertation defense). At the end of the first year, continuation in the Ph.D. program is determined by performance in course work, laboratory rotations, and the BMS Graduate Program Qualifying Examination. Students join their research laboratory by the end of the summer of the first year.

Ph.D. students prepare a written comprehensive examination in the format of a grant application prior to the end of the fifth semester of enrollment. As part of this examination, the candidate also gives an oral presentation of this proposal to their dissertation committee.

To earn the Ph.D. degree, doctoral students must write a dissertation that is accepted by the dissertation committee, the chair of the graduate program, and the Graduate School. Students are required to have at least one first-author publication accepted or published based on their dissertation research prior to the final oral examination. A student may petition the Chair of the BMS Graduate Program to waive this requirement due to extenuating circumstances (e.g., adviser relocation, abnormal issues with publication process). All waivers must be approved by the Vice Dean for Research and Graduate Studies of the College of Medicine.

**OPTIONS**

The Options offered within the BMS Graduate Program provide the student a curricular specialization focused on different approaches to biomedical research.

**Biochemistry and Molecular Genetics (BMG) Option**

The objective of the BMG Option is to provide course work and laboratory training that focus on the principles and application of biochemical and molecular genetic analysis. These approaches play key roles in identifying and characterizing cellular processes and elucidating the structure and function of key macromolecules including DNA, RNA, proteins, lipids, and carbohydrates. The Option also stresses the biological intersections of these classes of macromolecules. The combination of didactic courses, colloquia, seminars, and laboratory research provides students with an integrated approach for applying biochemical and molecular genetic analyses to interrogate and manipulate basic cellular processes and macromolecules of biomedical significance. The training afforded by this Option exposes graduates to the fundamentals needed to experimentally address scientific questions in areas such as epigenetic control of gene expression, structure/function, biomolecular engineering, and systems analysis using genetic and biochemical approaches.

**Admission Requirements**

To be admitted to the BMG Option, students must successfully complete:

1. the first year of the BMS Graduate Program, and
2. three research rotations, at least two with faculty in the BMG Option.

**Degree Requirements for the M.S.**

In addition to the 13 credits of required BMS Core Courses for the M.S. degree and 6 credits of thesis research, students pursuing the M.S. degree in the BMG Option must take:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>BCHEM 521</td>
<td>Biochemistry: Structure/Function/Regulation of Biological Molecules</td>
<td>3</td>
</tr>
<tr>
<td>BCHEM 522</td>
<td>Molecular Genetics: Genes to Genomes</td>
<td>3</td>
</tr>
<tr>
<td>BCHEM 590</td>
<td>Colloquium</td>
<td>2</td>
</tr>
<tr>
<td>BMS 512</td>
<td>Data Analysis For The Biomedical Laboratory Scientist, A Practical Approach</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>At least 3 credits of 500-level elective courses selected in consultation with the student’s thesis adviser and thesis committee.</td>
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</tr>
<tr>
<td></td>
<td><strong>Total Credits</strong></td>
<td><strong>13</strong></td>
</tr>
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</table>

**degree Requirements for the Ph.D.**

In addition to the 17 credits of required BMS Core Courses for the Ph.D. degree, students pursuing the Ph.D. degree in the BMG Option must take:

<table>
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<tr>
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</thead>
<tbody>
<tr>
<td>BCHEM 521</td>
<td>Biochemistry: Structure/Function/Regulation of Biological Molecules</td>
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<tr>
<td>BCHEM 522</td>
<td>Molecular Genetics: Genes to Genomes</td>
<td>3</td>
</tr>
<tr>
<td>BCHEM 590</td>
<td>Colloquium</td>
<td>2</td>
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</tbody>
</table>
Cellular and Integrative Physiology (CIP) Option

The objective of the CIP Option is to provide students training that focuses on cellular and integrative physiology, which includes the functions and interactions between different tissues and cell types and different organ systems. The training afforded by this Option exposes graduates to the fundamentals needed to experimentally address scientific questions in areas such as intracellular organization, and the regulation of key biological processes including cell signaling, ion channel and transport function, gene expression, protein translation and turnover, molecular motors, and intercellular communication. In addition, the Option stresses the importance of systems biology and inter-organ signaling to understand the biological basis of health and disease. The combination of didactic courses, colloquia, seminars, and laboratory research provides students with an integrated approach for applying advanced imaging, biochemical, and molecular analyses to interrogate and manipulate basic cellular processes and macromolecules of biomedical significance.

Admission Requirements
To be admitted to the CIP Option, students must successfully complete:
1. the first year of the BMS Graduate Program, and
2. three research rotations, at least two with faculty in the CIP Option.

Degree Requirements for the M.S.
In addition to the 13 credits of required BMS Core Courses for the M.S. degree and 6 credits of thesis research, students pursuing the M.S. degree in the CIP Option must take:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>PSIO 504</td>
<td>Cellular and Integrative Physiology</td>
<td>3</td>
</tr>
<tr>
<td>PSIO 505</td>
<td>Cellular and Integrative Physiology II</td>
<td>3</td>
</tr>
<tr>
<td>BMS 581</td>
<td>Molecular and Translational Approaches to Human Disease</td>
<td>3</td>
</tr>
<tr>
<td>PSIO 501</td>
<td>Scientific Analysis and Presentation</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>At least 2 credits of 500-level elective courses selected in consultation with the student's thesis adviser and thesis committee.</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>Credits</td>
<td>13</td>
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</tbody>
</table>

Degree Requirements for the Ph.D.
In addition to the 17 credits of required BMS Core Courses for the Ph.D. degree, students pursuing the Ph.D. degree in the CIP Option must take:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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</tr>
</thead>
<tbody>
<tr>
<td>PSIO 504</td>
<td>Cellular and Integrative Physiology</td>
<td>3</td>
</tr>
<tr>
<td>PSIO 505</td>
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<td>3</td>
</tr>
<tr>
<td>BMS 581</td>
<td>Molecular and Translational Approaches to Human Disease</td>
<td>3</td>
</tr>
<tr>
<td>PSIO 501</td>
<td>Scientific Analysis and Presentation</td>
<td>2</td>
</tr>
</tbody>
</table>

At least 2 credits of 500-level elective courses selected in consultation with the student’s dissertation adviser and dissertation committee.

Total Credits 13

Translational Therapeutics (TT) Option

The TT Option is designed to give students a combination of didactic instruction, informal interaction, and laboratory experience that enables them to obtain a firm foundation in the principles, methods, and contributions of pharmacology, defined broadly as the science of the interaction of chemical agents with biological systems. Of primary importance, this Option focuses on identification of disease targets, development of therapeutic strategies, and refinement of drug delivery approaches. With this preparation, graduates of the TT Option will be capable of designing and executing high-quality independent research, and of assuming positions of responsibility within the therapeutic community.

This Option offers studies in the general areas of drug discovery and development, molecular pathophysiology, drug metabolism, molecular pharmacology, endocrine pharmacology, neuropharmacology, cardiovascular-renal pharmacology, pharmacogenetics, and clinical pharmacology. Primary emphasis is placed on the molecular mechanism by which drugs act in the body and by which the body transforms drugs.

Admission Requirements
To be admitted to the TT Option, students must successfully complete:
1. the first year of the BMS Graduate Program, and
2. three research rotations, at least two with faculty in the TT Option.

Degree Requirements for the M.S.
In addition to the 13 credits of required BMS Core Courses for the M.S. degree and 6 credits of thesis research, students pursuing the M.S. degree in the TT Option must take:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>PHARM 520</td>
<td>Principles of Drug Action</td>
<td>2</td>
</tr>
<tr>
<td>PHARM 551</td>
<td>Anti-infective Therapeutics</td>
<td>1</td>
</tr>
<tr>
<td>PHARM 552</td>
<td>Integrated System Pharmacology</td>
<td>1</td>
</tr>
<tr>
<td>PHARM 553</td>
<td>Gastrointestinal and Immunomodulatory Therapeutics</td>
<td>1</td>
</tr>
<tr>
<td>PHARM 554</td>
<td>Anticancer Therapeutics</td>
<td>1</td>
</tr>
<tr>
<td>PHARM 561</td>
<td>Neuropharmacology</td>
<td>2</td>
</tr>
<tr>
<td>PHARM 562</td>
<td>Endocrine Pharmacology</td>
<td>2</td>
</tr>
<tr>
<td>PHARM 590</td>
<td>Colloquium</td>
<td>1</td>
</tr>
</tbody>
</table>

At least 2 credits of 500-level elective courses selected in consultation with the student’s dissertation adviser and dissertation committee.

Total Credits 13

Degree Requirements for the Ph.D.
In addition to the 17 credits of required BMS Core Courses for the Ph.D. degree, students pursuing the Ph.D. degree in the TT Option must take:

<table>
<thead>
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<td>1</td>
</tr>
<tr>
<td>PHARM 552</td>
<td>Integrated System Pharmacology</td>
<td>1</td>
</tr>
</tbody>
</table>

Required Courses

At least 2 credits of 500-level elective courses selected in consultation with the student’s dissertation adviser and dissertation committee.

Total Credits 13
Virology and Immunology (VIRIM) Option
The objective of the VIRIM Option is to provide graduate students the opportunity to focus their graduate-level coursework and laboratory research in areas related to virology and immunology. The areas of research within virology include viral oncology, virus-cell interactions, the structure and assembly of viruses, functional role of viral gene products, the molecular biology of virus replication, and viral induced latency. The areas of research within immunology include adaptive and innate immunity, cellular and humoral immunity, antigen presentation, tumor immunology, vaccine development, and neuroimmunology. The VIRIM Option allows students to develop an integrative research approach using aspects of biochemistry, molecular and cellular biology, and genetics to approach scientific questions associated with areas of virology and immunology.

Admission Requirements
To be admitted to the VIRIM Option, students must successfully complete:
1. the first year of the BMS Graduate Program, and
2. three research rotations, at least two with faculty members in the VIRIM Option.

Degree Requirements for the M.S.
In addition to the 13 credits of required BMS Core Courses for the M.S. degree and 6 credits of thesis research, students pursuing the M.S. degree in the VIRIM Option must take:

<table>
<thead>
<tr>
<th>Code</th>
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</tr>
</thead>
<tbody>
<tr>
<td>MICRO 550</td>
<td>Medical Microbiology</td>
<td>2</td>
</tr>
<tr>
<td>MICRO 581</td>
<td>Immunology A: Basic Concepts in Innate and Adaptive Immunity</td>
<td>1</td>
</tr>
<tr>
<td>MICRO 582</td>
<td>Immunology B: Adaptive Immunity</td>
<td>1</td>
</tr>
<tr>
<td>BMS 562</td>
<td>Principles of Immunology C: Dysfunction and Manipulation of the Immune System</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>or BMS 566 Viral Oncogenesis</td>
<td></td>
</tr>
<tr>
<td>BMS 564</td>
<td>Concepts in Virology</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>or MICRO 560 Concepts in Immunology</td>
<td></td>
</tr>
<tr>
<td>BMS 567</td>
<td>Viral Pathogenesis</td>
<td>1</td>
</tr>
<tr>
<td>GENET 581</td>
<td>Genetics of Model Organisms: Bacterial and Viral Pathogenesis: A</td>
<td>1</td>
</tr>
<tr>
<td>MICRO 572</td>
<td>Literature Reports</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>or VIRIM 580 Critical Reading in Immunobiology</td>
<td></td>
</tr>
<tr>
<td>MICRO 590</td>
<td>Colloquium</td>
<td>1</td>
</tr>
</tbody>
</table>

At least 2 credits of 500-level elective courses selected in consultation with the student’s dissertation adviser and dissertation committee.

Total Credits 12

Degree Requirements for the Ph.D.
In addition to the 17 credits of required BMS Core Courses for the Ph.D. degree, students pursuing the Ph.D. degree in the VIRIM Option must take:

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<td>BMS 562</td>
<td>Principles of Immunology C: Dysfunction and Manipulation of the Immune System</td>
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<td></td>
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</tr>
<tr>
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<tr>
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<tr>
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<td>Literature Reports</td>
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</tr>
<tr>
<td></td>
<td>or VIRIM 580 Critical Reading in Immunobiology</td>
<td></td>
</tr>
<tr>
<td>MICRO 590</td>
<td>Colloquium</td>
<td>1</td>
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</tbody>
</table>

At least 1 credit of a 500-level elective course selected in consultation with the candidate’s dissertation adviser and dissertation committee.

Total Credits 13

Dual-Titles

Dual-Title Ph.D. in Biomedical Sciences and Clinical and Translational Sciences
Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

Admission Requirements
Potential dual-title students can express an interest in the dual-title program as early as during the recruitment process for the BMS Graduate Program. Students must apply and be admitted to the graduate program in BMS and the Graduate School before they can apply for admission to the dual-title Ph.D. in Clinical and Translational Sciences (CTS). Refer to the Admission Requirements section of the Clinical and Translational Sciences Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/clinical-translational-sciences). Students must apply and be admitted to the dual-title program in CTS prior to taking the qualifying exam.

Degree Requirements
To qualify for the dual-title degree in Biomedical Sciences and Clinical and Translational Sciences, students must satisfy the BMS Ph.D. degree requirements listed on the Degree Requirements tab. In addition, students pursuing the dual-title Ph.D. in BMS and CTS must complete the degree requirements for the dual-title CTS Ph.D., listed on the CTS Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/clinical-
translational-sciences). Up to 7 credits for the Ph.D. degree in BMS that overlap with the CTS elective requirements can be counted toward the CTS dual-title.

The choice of CTS electives is subject to approval by the student's academic adviser(s) from the BMS and CTS programs. The electives should complement the student's work in BMS. A list of approved electives is maintained by the CTS program office.

The qualifying examination contains elements of both BMS and CTS. In accordance with Graduate Council policy, the qualifying examination committee must include at least one member of the CTS Graduate Faculty. Faculty with graduate appointments in both programs may serve in a combined role. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee must include at least one member of the CTS Graduate Faculty. Faculty members who hold appointments in the Graduate Faculty of both programs may serve in a combined role. If the chair of the dissertation committee is not a member of the Graduate Faculty in CTS, the member of the committee representing CTS must be appointed as co-chair. The fields of BMS and CTS will be integrated in the student's comprehensive exam, and the dissertation committee member representing CTS is responsible for insuring coverage of information relevant to the CTS field of study.

The candidate must complete a dissertation on a topic that reflects their original research and education in both BMS and CTS. To earn the dual-title Ph.D. degree, the dissertation must be accepted by the dissertation committee, the chair of the graduate program, and the Graduate School, and the student must pass a final oral examination (the dissertation defense).

**Joint Degrees**

**Joint M.D./Ph.D. with the College of Medicine**

Requirements listed here are in addition to requirements listed in GCAC-211 Joint Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/joint-degree-programs).

**Admission Requirements**

Prospective students interested in simultaneously pursuing a M.D. and Ph.D. degree must apply to the College of Medicine M.D. program using the national American Medical College Application Service (AMCAS) application system and indicate their intent to pursue the joint-degree program. Applicants must also meet the admission requirements of the Graduate School and the Ph.D. admission requirements listed on the Admission Requirements tab, however, GRE scores are not required. The M.D./Ph.D. Admissions Committee reviews applications and evaluates candidates for acceptance into both the M.D. and Ph.D. programs. After the review committee has accepted an applicant to the joint degree program, s/he must apply to the Graduate School (http://www.gradschool.psu.edu/prospective-students/how-to-apply) for admission to the graduate program. Students must be admitted to the joint degree program prior to taking the first course they intend to count towards the graduate degree. Applicants not accepted into the joint-degree program may be referred to either the M.D. or Ph.D. program, depending on their qualifications.

Applicants to this program generally have very strong grades and MCAT scores, as well as a strong and sustained background in research. Applicants must be able to clearly articulate reasons for pursuing the joint degree. Letters of recommendation from faculty who have advised the applicant in research and who can comment on the applicant's passion and potential for research are strongly encouraged.

**Degree Requirements**

Students must fulfill all requirements for each degree in order to be awarded that degree. Degree requirements for the M.D. program are listed on the Penn State College of Medicine website (http://www.med.psu.edu/web/md/home). If students accepted into the joint degree program are unable to complete the M.D. degree, they are still eligible to receive the Ph.D. degree if all the Ph.D. degree requirements have been satisfied.

During the first two years of medical school, the student conducts at least three research rotations. After successful completion of the first two years of medical school, the student enters the BMS graduate program and may be admitted to one of the M.D./Ph.D. students take Step 1 of the United States Medical Licensing Examination (USMLE), which serves as the qualifying examination for the BMS Graduate Program.

In addition to the requirements for the dissertation committee (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation) for a Ph.D. student in the BMS Graduate Program, at least one member of the dissertation committee must be on the M.D./Ph.D. Steering Committee. This member may serve other roles on the dissertation committee.

M.D./Ph.D. students must complete 28 credits:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMS 502</td>
<td>Cell and Systems Biology</td>
<td>2</td>
</tr>
<tr>
<td>BMS 503</td>
<td>Flow of Cellular Information</td>
<td>2</td>
</tr>
<tr>
<td>BMS 596</td>
<td>Individual Studies</td>
<td>2</td>
</tr>
<tr>
<td>BMS 506A</td>
<td>Biological Basis of Human Health and Disease A</td>
<td>2</td>
</tr>
<tr>
<td>BMS 506B</td>
<td>Biological Basis of Human Health and Disease B</td>
<td>2</td>
</tr>
<tr>
<td>BMS 512</td>
<td>Data Analysis For The Biomedical Laboratory Scientist, A Practical Approach</td>
<td>2</td>
</tr>
<tr>
<td>BMS 590</td>
<td>Colloquium</td>
<td>4</td>
</tr>
<tr>
<td>BMS 591</td>
<td>Biomedical Research Ethics</td>
<td>1</td>
</tr>
<tr>
<td>BMS 801</td>
<td>Writing Grant Proposals for Biomedical Research</td>
<td>1</td>
</tr>
<tr>
<td>BCHEM 590</td>
<td>Colloquium</td>
<td>2</td>
</tr>
<tr>
<td>PSIO 501</td>
<td>Scientific Analysis and Presentation</td>
<td>1</td>
</tr>
<tr>
<td>PHARM 590</td>
<td>Colloquium</td>
<td>1</td>
</tr>
</tbody>
</table>
At least 6 elective credits of 500-level elective courses selected in consultation with the student’s dissertation adviser and dissertation committee.

The M.D./Ph.D. candidate prepares a written comprehensive examination in the format of a grant application and gives an oral presentation of this proposal to their dissertation committee.

A dissertation must be prepared and defended by each M.D./Ph.D. candidate. The dissertation must be accepted by the dissertation committee, the chair of the graduate program, and the Graduate School, and the student must pass a final oral examination (the dissertation defense). Students are required to have at least one first-author publication accepted or published based on their dissertation research prior to the final oral examination.

The language of instruction at Penn State is English. English proficiency is considered for admission.

Excellent facilities, including equipment and instrumentation, are available for research in the designated areas. Collaborative arrangements allow access to a large variety of other resources:

- Materials Research Institute;
- Penn State Institutes of the Energy and Environment;
- Housing Research Center;
- USDA Pasture Systems and Watershed Management Research Lab;
- a mushroom research and demonstration facility;
- and a 1,500-acre agricultural research center for cooperative work with agronomic and horticultural production systems as well as animal production systems.

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Graduate Record Examination (GRE). All students must submit GRE general aptitude test scores (i.e., verbal, quantitative, and analytical) to be considered for admission.

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. See GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-305-admission-requirements-international-students) for more information.
All applicants must provide official transcripts from all post-secondary institutions attended (http://www.gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission), a statement of purpose written by the applicant, and at least three letters of recommendation. Admission into the BRS Graduate Program is based upon a thorough review of all applicant qualifications, and the best-qualified applicants will be accepted up to the number of students for which program resources are available.

**Master of Science (M.S.)**

Completion of a relevant undergraduate Bachelor degree program is required for admission to the M.S. degree program; relevant programs span a diverse set of academic disciplines, including but not limited to: Agricultural Sciences, Biology, Chemistry, Business, Engineering, and Environmental Sciences. Students with junior-senior GPA of at least 3.00 (4.00 base) will be competitive in the admission process.

**Doctor of Philosophy (Ph.D.)**

The program requirement for acceptance to graduate study toward a Ph.D. degree in BRS is typically an M.S. degree with research thesis in BRS or related discipline such as: Agricultural Sciences, Biology, Chemistry, Business, Engineering, and Environmental Sciences, or with a B.S. degree in Agricultural Systems Management (ASM) or BRS or equivalent. Outstanding students interested in direct admission from a B.S., B.A., or M.B.A. program to the Ph.D. Program should contact the Graduate Program Coordinator for further clarification and details. Direct admission will be based on critical evaluation of the student’s:

- potential to conduct publishable research,
- academic record,
- an additional language (other than the student’s mother tongue),
- performance on standardized tests,
- statement of purpose,
- and reference letters.

Students who apply directly to the Ph.D. program with a B.S. degree and are deemed by the admissions committee to meet the standards for admission to the Ph.D. program may be considered either for admission into the M.S. program or for admission to the Ph.D. program on a provisional basis (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/provisional-admission). The student will remain in provisional status in the Ph.D. program until completing the following specific courses with a minimum grade-point average of 3.00:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABE 559</td>
<td>Biological and Agricultural Systems Simulation</td>
<td>3</td>
</tr>
<tr>
<td>BRS 500</td>
<td>Research Methods</td>
<td>3</td>
</tr>
<tr>
<td>BRS 501</td>
<td>Biobased Polymers</td>
<td>3</td>
</tr>
<tr>
<td>BRS 502</td>
<td>Human Behavior and ethics in Management and Technology</td>
<td>1</td>
</tr>
<tr>
<td>BRS 511</td>
<td>Structural BioComposites</td>
<td>3</td>
</tr>
<tr>
<td>BRS 550</td>
<td>Applied Bioproducts Marketing</td>
<td>3</td>
</tr>
<tr>
<td>BRS 551</td>
<td>Sustainable Business Strategies</td>
<td>2</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td></td>
<td><strong>18</strong></td>
</tr>
</tbody>
</table>

For provisional status to change, the specific courses must be completed within the first two semesters of study.

**Degree Requirements**

**Master of Science (M.S.)**

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

All candidates for the M.S. degree must:

- prepare and complete a thesis
- complete a minimum of 30 credits at the 400, 500, 600, or 800 level (including a minimum of 18 credits at the 500 and 600 level, combined, and a minimum of 6 credits of research)
- obtain a minimum grade-point average of 3.00.

Only courses in which grades of C or better are earned may be counted toward the requirements of the master’s degree. Each program must include:

<table>
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</tr>
</thead>
<tbody>
<tr>
<td>BRS 500</td>
<td>Research Methods</td>
<td>3</td>
</tr>
<tr>
<td>BRS 501</td>
<td>Biobased Polymers</td>
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</tr>
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<td>Human Behavior and ethics in Management and Technology</td>
<td>3</td>
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**Doctor of Philosophy (Ph.D.)**

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

Official entrance into a Ph.D. program occurs upon successful completion of the Ph.D. Qualifying Examination. Ph.D. degree requirements include successful completion of the following:

- approved graduate course work,
- Ph.D. language and communication requirements,
- a comprehensive examination,
- and defense, approval, and submission of a dissertation.

No University-level (Graduate Council) minimum number of courses completed or credits earned are specified for the Ph.D.; the student’s dissertation committee will recommend the minimum requirements as appropriate for each individual student's program of study and dissertation research. Unless previously taken for the M.S., each Ph.D. student must complete:

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</tr>
</tbody>
</table>

**Electives**

Two courses from list of electives maintained by the program office

At least one statistics course

**Culminating Experience**

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<tr>
<th>Code</th>
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</tr>
</thead>
<tbody>
<tr>
<td>BRS 600</td>
<td>Thesis Research</td>
<td>6</td>
</tr>
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**Electives**

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<tbody>
<tr>
<td>BRS 600</td>
<td>Thesis Research</td>
<td>6</td>
</tr>
</tbody>
</table>
The candidate is expected to develop a program of study and submit it to the appointed dissertation committee for consideration and approval. All requirements for a Ph.D. degree, whether satisfied on this campus or elsewhere, must be completed within eight years after passing the qualifying examination.

**Qualifying Examination**

The Ph.D. Qualifying Examination Committee will administer the Qualifying Examination. This committee will consist of four BRS graduate faculty members, including the Adviser, the ABE Department Head (or annually appointed designee), the BRS Graduate Program Coordinator, and one faculty member selected by the student. In cases where a member serves two roles on the committee, an additional member will be appointed by the Graduate Program Coordinator. The Qualifying Examination will consist of developing a Ph.D. research proposal following the completion of BRS 500, presenting the proposal, and defending/discussing the proposed research with the Committee. The Qualifying Examination will be completed by the student soon after s/he has completed at least 18 credits but before the end of the third semester. Successful completion of the Qualifying Examination does not mean that the student’s Ph.D. research proposal is approved. Rather, final approval of the candidate's research proposal will be the responsibility of the dissertation committee.

**Dissertation Committee**

The dissertation committee must meet all of the Graduate Council requirements (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), and:

1. the chairperson and at least one other member must be BRS Graduate Faculty members,
2. at least one member must be from a department other than ABE and s/he should be a Graduate Faculty member of a program other than BRS,
3. at least one member must represent any minor department(s) if the student selects a minor(s), and
4. the dissertation committee can be appointed only after the Qualifying Examination has been passed.

**PH.D. Language and Communication Requirement**

The purpose of the communication requirement is to strengthen the student’s professional communication skills. The candidate must take a minimum of one three-credit course and receive a grade of B or better. Course selections must be approved by the academic adviser prior to registration. Courses used to satisfy this requirement must include the substantial practice of writing and/or speaking.

**Comprehensive Examination**

When a Ph.D. candidate has substantially completed the course work, including the communication requirements, s/he is required to take a Comprehensive Examination covering the major, minor, and related areas of study. The Comprehensive Examination will be both written and oral. The nature and details of the Comprehensive Examination will be determined by the student’s dissertation committee. In general, the student will be required to demonstrate ability to synthesize information acquired through formal coursework and to use technical literature to find information required for solving biorenewable systems problems. A favorable vote of at least two-thirds of the committee is required for passing. If a candidate fails, the committee will determine whether another examination may be taken.

**Final Oral Examination**

Upon recommendation of the Adviser, a Ph.D. candidate who has satisfied all other requirements for the degree will be scheduled to take a Final Oral Examination. The student must be a registered full-time or part-time degree student for the semester in which the Final Oral Examination is taken. This examination is open to the public and the student should notify all departmental faculty and graduate students. The examination is related largely to the dissertation, but may cover the candidate's entire field of study without regard to courses that have been taken either at Penn State University or elsewhere. The defense of the dissertation should be well-prepared including any appropriate visual aids. One of the aims of the preparation should be to synthesize the important conclusions in a time-efficient presentation, leaving ample time for questions and discussion. A favorable vote of at least two-thirds of the committee is required for passing. If a candidate fails, the committee will determine whether another examination may be taken.

**Student Aid**

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

**Courses**

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**Learning Outcomes**

**Master of Science (M.S.)**

1. Know: Graduates will demonstrate knowledge of the chemistry, structure-property relationships and industrial applications of biobased polymers.
2. Critical and analytical thinking: Graduates will be able to critically and creatively conceptualize and evaluate biorenewable industrial problem formulations, analyses, and solutions.
3. Apply/Create: Graduates will demonstrate proficiency in biorenewable industry problem formulation, planning, organization and implementation of appropriate methods of analyses and solutions.
4. Communicate: Graduates will be able to effectively communicate technical knowledge, including ideas, data analysis, findings, or decision justification in written and oral presentation appropriate to the audience.
5. Professional practice: Graduates will be able to apply analytical skills for effective decision making in the biorenewable resource industries.
Doctor of Philosophy (Ph.D.)

1. Know: Graduates will demonstrate knowledge of the chemistry, structure-property relationships and industrial applications of biobased polymers.
2. Create: Graduates will demonstrate knowledge of one or more of the following: engineering technologies, science, safety, marketing, business, or management principles and methodologies as they pertain to biorenewable systems.
3. Apply: Graduates will be able to communicate, both orally and in-writing, business and/or technical concepts within the context of biorenewable industries. Graduates will be able to analyze and interpret data and demonstrate an ability to draw sound conclusions from data.
4. Critical and analytical thinking: Graduates will be able to independently analyze and critique motivations for conducting research, the research process, research results, and the implications of research and its results to our world.
5. Communicate: Graduates will be able to actively listen, convey accurately and clearly ideas and results both orally and in writing, and engage in positive, effective deliberation.
6. Professional practice: Graduates will be prepared to become leaders in our society by being able to apply systems analysis skills for effective decision making in the operations and/or management of biorenewable resource industries.

Contact

Graduate Program Head: Paul Heinemann

Director of Graduate Studies/Professor-in-Charge: Jeffrey Catchmark

Primary Program Contact: Wendy Thomas

Email: wjt11@psu.edu

Mailing Address: 249 Agricultural Engineering Building, University Park, PA 16802

Telephone: (814) 863-1524

Program Website: BioRenewable Systems (https://abe.psu.edu/graduateprograms/brs)

Biostatistics

Graduate Program Head

Program Code

Campus(es)

Degrees Conferred

The Graduate Faculty

Arthur Berg

BIOST

Hershey (Ph.D.)

Doctor of Philosophy (Ph.D.)

View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fcac&prog=BIOST)

Biostatistics is the science that applies statistical theory and mathematical principals to research in medicine, biology, environmental science, public health, and related fields. Biostatisticians working in the area of public health develop and use mathematical and scientific methods to:

1. determine risk factors for disease and injuries, and
2. identify health trends within communities.

Biostatisticians working in the area of medicine develop and use mathematical and scientific methods to design and analyze:

1. clinical trials to investigate new therapies for treating acute and chronic illness,
2. observational studies to understand disease onset and progression,
3. basic science studies to determine the mechanisms of disease, and
4. human genetics studies to investigate the inherited susceptibility to disease.

Career opportunities are available in universities, academic medical centers, government, and private industry. The demand for individuals with graduate-level degrees in biostatistics is extremely high.

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. See GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300-admission-requirements-international-students) for more information.

Applicants must complete prior to admission:

1. A two-semester graduate-level course in applied statistics from a recognized graduate program. The comparable courses offered by the Department of Statistics are STAT 511 and STAT 512.
2. A two-semester graduate-level course in mathematical statistics from a recognized graduate program. The comparable courses offered by the Department of Statistics are STAT 513 and STAT 514.

Prospective applicants must demonstrate:

3. For admission to the Graduate School, all applicants must have received from a regionally accredited institution a baccalaureate degree earned under residence and credit conditions substantially equivalent to those required by Penn State. International applicants must hold the equivalent of an American four-year baccalaureate degree.

4. Results from one of the following standardized tests taken within the past five (5) years:
   a. Graduate Record Examination (GRE)
   b. Graduate Management Admission Test (GMAT)
   c. Medical College Admission Test (MCAT)
   d. Law School Admission Test (LSAT)
   e. (This requirement is waived for applicants who have an advanced degree in a related field beyond the baccalaureate.)

5. Completion of the Graduate School application (http://gradschool.psu.edu/prospective-students/how-to-apply), which includes three (3) letters of recommendation and a Curriculum Vitae or resume.

6. Payment of the application fee.
## Degree Requirements

### Doctor of Philosophy

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

Each student in the Biostatistics Ph.D. program is expected to acquire knowledge in the disciplines of Biostatistics.

Each student must complete a total of 31 credits of graduate level course work, the majority of which are 500 level courses, specifically:

- 22 credits in required courses
- 6 additional credits in Epidemiology or Health Services Research
- 3 credits in elective courses, plus
- Dissertation

After the completion of the first year of course work, each student is required to take a qualifying examination, based on the coursework in PHS 523, PHS 524, PHS 525, PHS 526 and PHS 527. The decision to allow the student to continue in the program will be made by a committee of Graduate Faculty in the Biostatistics program. In addition, a comprehensive examination is administered at the completion of all course work, followed by the final oral examination in defense of the Ph.D. dissertation.

### Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHS 500</td>
<td>Research Ethics for Clinical Investigators</td>
<td>1</td>
</tr>
<tr>
<td>PHS 523</td>
<td>Multivariate Analysis</td>
<td>3</td>
</tr>
<tr>
<td>PHS 524</td>
<td>Longitudinal Data Analysis</td>
<td>3</td>
</tr>
<tr>
<td>PHS 526</td>
<td>Categorical Data Analysis</td>
<td>3</td>
</tr>
<tr>
<td>PHS 527</td>
<td>Survival Analysis</td>
<td>3</td>
</tr>
<tr>
<td>PHS 528</td>
<td>Bayesian Methods</td>
<td>3</td>
</tr>
<tr>
<td>PHS 580</td>
<td>Clinical Trials: Design and Analysis</td>
<td>3</td>
</tr>
<tr>
<td>STAT 553</td>
<td>Asymptotic Tools</td>
<td>3</td>
</tr>
<tr>
<td>Select 6 credits of the following:</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>PHS 535</td>
<td>Quality of Care Measurement</td>
<td></td>
</tr>
<tr>
<td>PHS 536</td>
<td>Health Survey Research Methods</td>
<td></td>
</tr>
<tr>
<td>PHS 550</td>
<td>Principles of Epidemiology</td>
<td></td>
</tr>
<tr>
<td>PHS 551</td>
<td>Advanced Epidemiological Methods</td>
<td></td>
</tr>
<tr>
<td>PHS 552</td>
<td>Molecular Epidemiology of Chronic Disease</td>
<td></td>
</tr>
<tr>
<td>PHS 570</td>
<td>Health Economics and Economic Evaluation</td>
<td></td>
</tr>
</tbody>
</table>

### Electives

Select 3 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHS 516</td>
<td>Statistical Genetics</td>
<td></td>
</tr>
<tr>
<td>STAT 561</td>
<td>Statistical Inference I</td>
<td></td>
</tr>
<tr>
<td>STAT 562</td>
<td>Statistical Inference II</td>
<td></td>
</tr>
</tbody>
</table>

Total Credits 31

### Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School's website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

### Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses number between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

### Contact

**Graduate Program Head:** Arthur Berg

**Primary Program Contact:** Marjorie Sawyer

**Email:** mds21@psu.edu

**Mailing Address:** PO Box 855, 90 Hope Drive, Hershey, PA 17033-0855

**Telephone:** (717) 531-7178

**Program Website:** Biostatistics (http://med.psu.edu/biostatistics-phd)

### Biotechnology

**Graduate Program Head**

Loida Escote-Carlson

**Program Code**

BIOT

**Campus(es)**

University Park (M.BIOT.)

**Degrees Conferred**

Master of Biotechnology (M.BIOT.)

Integrated B.S. in Biotechnology and M.BIOT. in Biotechnology

**The Graduate Faculty**

View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=BIOT)

The Master of Biotechnology degree program is offered through a collaboration of the Department of Biochemistry and Molecular Biology and the Huck Institutes of the Life Sciences. It is a multidisciplinary program involving faculty members from different academic departments in Penn State University as well as ad hoc mentors from the academic faculty and from industry.

The Master of Biotechnology curriculum is designed to give students broad knowledge and training in the scientific and practical aspects of biotechnology. It involves innovative, hands-on, and multidisciplinary learning approaches to educate and train students in the science behind biotechnology, its business and legal aspects, and the ethical and social issues that it brings about. In addition, the courses and the activities required of all students in this program develop transferable professional skills such as team-working and communication skills, which are very important in industry in particular.

Graduates of this program are expected to have the knowledge and training for diverse career options: as academic educators, as scientists in both academic and industry settings, as members of decision-making business and management teams in government and biotechnology industries, as bioentrepreneurs, and as members and leaders of governmental, public, and private organizations that deal with social, ethical and legal issues in biotechnology. Because of their broad
knowledge in biotechnology, graduates of this program are expected to fill a niche in industry where knowledge and ability to interphase and communicate with various functional groups within the organization are required.

**Admission Requirements**

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

The program is appropriate for students with a baccalaureate degree in biological sciences, chemistry, or engineering or other baccalaureate degrees that include sufficient credits from relevant courses in the life sciences. Applicants must have a minimum junior/senior grade point average of 3.00 (on a 4.00 scale). Graduate Record Examinations (GRE) scores are required for verbal, quantitative, and analytical writing. Typically, students are admitted as part of a cohort to commence studies in the Fall. The best-qualified applicants will be accepted up to the number of spaces available for new students.

**Degree Requirements**

**Master of Biotechnology**

Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

A minimum of 30 credits at the 400, 500, or 800 level is required for completion of the degree, 18 credits of which must be from courses in the 500 or 800 level, with a minimum of 6 credits at the 500 level. Students are required to take 16 to 18 credits from core courses listed below. Additional credits are from industry internship or cooperative education (co-op) and elective courses. A list of approved elective courses is maintained by the graduate program office. All Master of Biotechnology candidates are required to write a research paper based on a research project conducted in an academic, government, or industry research laboratory as the culminating experience for the degree. The research paper is completed while the student is enrolled in MCIBS 594.

<table>
<thead>
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</thead>
<tbody>
<tr>
<td>BMB 400</td>
<td>Molecular Biology of the Gene</td>
<td>3</td>
</tr>
<tr>
<td>BIOTC 479</td>
<td>Methods in Biofermentations</td>
<td>3</td>
</tr>
<tr>
<td>or BE 468</td>
<td>Microbiological Engineering</td>
<td></td>
</tr>
<tr>
<td>MCIBS 571</td>
<td>Current Issues in Biotechnology</td>
<td>2</td>
</tr>
<tr>
<td>MCIBS 590</td>
<td>Colloquium</td>
<td>2</td>
</tr>
<tr>
<td>MCIBS 591</td>
<td>Ethics in the Life Sciences</td>
<td>1</td>
</tr>
<tr>
<td>MCIBS 593</td>
<td>Molecular Biology Laboratory</td>
<td>3</td>
</tr>
<tr>
<td>Electives</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Culminating Experience</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MCIBS 594</td>
<td>Research Topics</td>
<td>3-6</td>
</tr>
</tbody>
</table>

These courses are chosen from offerings in various academic departments based on students’ interest or track and career objectives. These also include MCIBS 595 (Internship) and any 596 (Individual Studies) course under a faculty member whose research relates to a student’s area of interest. A list of approved elective courses is maintained by the graduate program office.

**Integrated Undergrad-Grad Programs**

**Integrated B.S. in Biotechnology and M.BIOT. in Biotechnology**

Requirements listed here are in addition to requirements listed in GCAC-210 Integrated Undergraduate-Graduate (IUG) Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/integrated-undergraduate-graduate-degree-programs).

The integrated B.S. in Biotechnology-Master of Biotechnology degree program is designed to enable qualified undergraduate students in the B.S. Biotechnology program to graduate in five years with the Master of Biotechnology degree.

**Admission Requirements**

Students must apply to the program via the Graduate School application for admission (http://www.gradschool.psu.edu/prospective-students/how-to-apply), and must meet all the admission requirements of the Graduate School and the Biotechnology graduate program for the Master of Biotechnology degree, listed on the Admission Requirements tab. Students shall be admitted to an IUG program no earlier that the beginning of the third semester of undergraduate study at Penn State (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree, as specified in the proposed IUG plan of study.

Students must have a GPA of 3.5 at the time of application to the integrated degree program when they have completed at least 75 credits of their B.S. curriculum. The GRE scores normally required in the Master of Biotechnology in Biotechnology program will be waived for applicants to the integrated B.S.-Master of Biotechnology degree.

In consultation with an adviser, students must prepare a plan of study appropriate to this integrated program, and must present their plan of study in person to the head of the graduate program or the appropriate committee overseeing the integrated program prior to being admitted to the program. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser as the student advances through the program.

**Degree Requirements**

Student must fulfill all degree requirements for each degree in order to be awarded that degree, subject to the double-counting of credits as outlined below. Degree requirements for the Bachelor of Science in Biotechnology are listed in the Undergraduate Bulletin (http://bulletins.psu.edu/undergraduate). Degree requirements for the Master of Biotechnology in Biotechnology degree are listed on the Degree Requirements tab.

Students must sequence their courses so all undergraduate degree requirements are fulfilled before taking courses to count solely towards the graduate degree. If students accepted into the IUG program are unable to complete the M.BIOT degree, they are still eligible to receive their undergraduate degree if all the undergraduate degree requirements have been satisfied.
Up to 12 credits may be double-counted towards the degree requirements for both the graduate and undergraduate degrees; a minimum of 50% of the double-counted courses must be at the 500 or 800 level. Credits associated with the culminating experience for the graduate degree cannot be double-counted.

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**Student Aid**

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

**Courses**

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**Learning Outcomes**

1. **KNOW.** Students will be able to demonstrate conceptual and practical knowledge of the broad aspects of biotechnology: the core areas in science and the technologies that drive progress in biotechnology, the business, intellectual property, regulatory, legal, social and ethical aspects of the biotechnology industry; students will also be able to show practical understanding of the professional skills vital to employment and career success in biotechnology.

2. **APPLY/CREATE/THINK.** Students will be able to demonstrate critical review of scientific literature, proficiency in the conduct of scientific research independently or in a team setting, as well as in non-bench research-related responsibilities in broad areas of biotechnology as necessary. Students will also demonstrate adequate professional preparation for competitive curricular employment (internships and cooperative education or co-op) and entry-level employment post-degree.

3. **COMMUNICATE.** Students will demonstrate skills in communicating scientifically through group work, research papers and oral presentations, and professionally through networking, interviews, resumes or curriculum vitae (CVs), and other required career-related activities.

4. **PROFESSIONAL PRACTICE.** Students will demonstrate knowledge of interpersonal workplace dynamics, the ability to perform in a team environment and adapt to a very dynamic biotechnology workplace, participation in professional networking, and engagement in professional activities and organizations serving the discipline and the industry.

**Contact**

Graduate Program Head: Loida Escote-Carlson

Primary Program Contact: Terrie Young

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Telephone: (814)863-3273

Program Website: Biotechnology (http://www.huck.psu.edu/education/biotechnology)

**Business Administration (Behrend)**

Graduate Program Head: Greg Filbeck

Program Code: BADM

Campus(es): Erie (M.B.A.)

Degrees Conferred: Master of Business Administration (M.B.A.)

The Graduate Faculty View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=BADM)

The Penn State Erie M.B.A. is a general degree emphasizing development of the planning and problem-solving skills crucial in middle and upper management. Course work emphasizes the integration of business functions and the practical application of theory in the business world, using cases, simulated problems and actual situations students are experiencing at work. Many students are fully employed professionals who bring a wealth of knowledge and experience to the classroom. Both full-time and part-time study are possible and the program can be completed by attending evening and daytime classes.

**Admission Requirements**

Applicants apply for admission to the program via the Graduate School application (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Admission is granted only to candidates who demonstrate high promise of success for graduate work. Applicants are required to take the Graduate Management Admissions Test (GMAT) (http://www.mba.com/us). Admission decisions are based on the following:

- undergraduate grade-point average;
- the degree of correspondence between the applicant’s objectives and those of the program;
- three letters of reference;
- and GMAT score.
Favorable consideration will be given to applicants who have significant work experience. A minimum GMAT score of 450 is required. However, admission is competitive and higher scores may be required, depending on the qualifications of the applicants. Admission is open during the fall and spring semesters, as well as during the summer session.

Applicants must demonstrate proficiency in writing by having earned a grade of B or higher in a college English composition or writing course or by achieving a score of four or higher on the GMAT Analytical Writing Assessment. Students who fail to meet at least one of these two criteria must complete a college English composition or writing course and earn a grade of B or higher or retake the GMAT test and score four or higher on the Analytical Writing Assessment. This requirement must be satisfied during either the first semester or summer session of the student’s matriculation.

1. GMAT Waivers will be considered in the following circumstances:
   - The applicant has a completed master’s degree, M.D., J.D., or Ph.D. from a regionally accredited institution.
   - The applicant has post-graduate full-time professional work experience of 7 years or more.
   - The applicant has post-graduate full-time work experience of 3 to 7 years and an Undergraduate GPA of 3.3 or higher.
   - The applicant has less than three years of post-graduate full time work experience and an Undergraduate GPA of 3.6 or higher.

### Degree Requirements

#### Master of Business Administration

Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

The Master of Business Administration degree program consists of two parts:

#### Demonstration of Subject Matter Competence

Students are expected to demonstrate fundamental competence in accounting, finance, economics, management, marketing, operations, and statistics prior to taking the Required Courses. Applicants who have, within seven years prior to the date of their admission to the degree program, completed a baccalaureate degree in business from a regionally accredited institution that includes introductory courses in these disciplines will be considered to have demonstrated competence as long as the previously completed courses carry grades of B or higher. An applicant who, within seven years prior to his or her admission to the degree program, completed a baccalaureate degree in a non-business field from a regionally accredited institution that includes equivalent undergraduate or graduate courses carrying a grade of B or higher will also be considered to have demonstrated competence. Applicants who attained currency of knowledge through relevant business experience or continuing professional education in one or more of the subject areas may demonstrate competence through examination.

#### Required Course work

These courses provide greater depth of knowledge in the subject areas included. This component of the MBA program consists of seven 3-credit courses that cover advanced topics in cost management, managing effective organizations, quantitative methods for business, leadership and ethics, corporate finance, marketing strategy, and strategic management and business policy.

#### Code Title Credits

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>BADM 510</td>
<td>Cost Management for Decision Making and Control</td>
<td>3</td>
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<tr>
<td>BADM 512</td>
<td>Managing Effective Organizations</td>
<td>3</td>
</tr>
<tr>
<td>BADM 513</td>
<td>Quantitative Methods for Business</td>
<td>3</td>
</tr>
<tr>
<td>BADM 526</td>
<td>Leadership and Ethics</td>
<td>3</td>
</tr>
<tr>
<td>BADM 532</td>
<td>Corporate Finance</td>
<td>3</td>
</tr>
<tr>
<td>BADM 554</td>
<td>Marketing Strategy</td>
<td>3</td>
</tr>
</tbody>
</table>

#### Electives

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<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BADM 514</td>
<td>Strategic Planning and Business Policy</td>
<td>3</td>
</tr>
</tbody>
</table>

**Total Credits** 30

1. All students are required to take 9 credits of elective courses covering advanced topics of their choice. MBA students may apply a maximum of 6 credits of approved 400-level course work toward elective requirements. Course work at the 400 level must be approved by the director of the MBA program and cannot have been used for another degree.

2. The program capstone is BADM 514, which is a semester long industry and business analysis problem, culminating in a final, integrated paper.

#### Transfer Credits

Credits earned at other institutions but not used to earn a degree may be applied toward the requirements for a graduate degree, subject to restrictions outlined in GCAC-309 Transfer Credit (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-309/transfer-credit). Application of transfer credits to the student’s academic program must be approved by the director of the MBA program.

#### Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

#### Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.
Learning outcomes

1. CRITICAL THINKING: Students will be able to apply critical thinking techniques to business situations to construct relevant analyses, arguments, and conclusions.
   a. Students will clearly identify the key issues in the analysis.
   b. Students will present the appropriate analytic framework or warrant.
   c. Students will identify and assess important assumptions and question their validity.
   d. Students will identify and assess the quality of supporting data/evidence & provides additional data/evidence related to the issue.
   e. Students will draw and discuss conclusions, implications, and consequences.

2. ORAL COMMUNICATION: Students will be able to demonstrate effective oral communication.
   a. Students will demonstrate satisfactory speaking skills.
   b. Students will demonstrate effective engagement of audience through non-verbal cues.
   c. Students will organize oral presentations.
   d. Students will develop a clear and well-structured argument providing sufficient evidence to support each argument.

3. WRITTEN COMMUNICATION: Students will be able to demonstrate effective writing skills.
   a. Students will organize written assignments effectively.
   b. Students will develop a clear and well-structured argument.
   c. Students will identify and provide evidence sufficient to support the argument.
   d. Students will find reliable sources and cite and reference them correctly.
   e. Students will demonstrate proper writing mechanics with respect to spelling, punctuation, and grammar.

4. ETHICS: Students will be able to recognize ethical issues and apply ethical theories in business situations at individual and/or organizational levels.
   a. Students will identify ethical issues/inter-relationships between business and society.
   b. Students will identify stakeholders.
   c. Students will identify consequence of decisions/actions to stakeholders.
   d. Students will recognize the potential implications of managerial actions on employee ethical conduct.
   e. Students will analyze an ethical dilemma using multiple ethical principles.
   f. Students will correctly apply ethical principles.
   g. Students will recommend a course of action.
   h. Supports action plan recommendation with ethical analysis.

5. FUNCTIONAL AREA KNOWLEDGE: Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material across various business domains.
   a. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the Marketing domain.
   b. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the Management domain.

   c. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the Finance domain.
   d. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the Accounting domain.
   e. Students will be able to apply foundational knowledge to analyze and solve problems and interpret written and visual material in the Strategic Integration domain.

Contact

Graduate Program Head: Greg Filbeck

Primary Program Contact: Alice Puzarowski

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Mailing Address: 5101 Jordan Road, Burke Center, Erie, PA 16563

Telephone: (814) 898-6200

Program Website: Business Administration at Erie (http://psbehrend.psu.edu/admissions-financial-aid/graduate-admissions/master-of-business-administration)

Business Administration (Capital)

Graduate Program Head: Stephen Schappe

Program Code: BADMN

Campus(es): Harrisburg (M.B.A.)

Degrees Conferred: Master of Business Administration (M.B.A.)

Integrated B.S. in Accounting and M.B.A. in Business Administration
Integrated B.S. in Finance and M.B.A. in Business Administration
Integrated B.S. in Information Systems and M.B.A. in Business Administration
Integrated B.S. in Management and M.B.A. in Business Administration
Integrated B.S. in Marketing and M.B.A. in Business Administration
Integrated B.S. in Project and Supply Chain Management and M.B.A. in Business Administration
Joint J.D. / M.B.A. with Dickinson Law

The Graduate Faculty

View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=BADMN)

The M.B.A. program is intended to provide graduates with a foundation for personal and professional growth and lifelong learning; a firm grounding in the academic disciplines underlying the field of business; participative strengths; and decision making, problem solving, and critical thinking skills. Major emphasis is placed on the social, legal, and ethical context of business—particularly ethical values needed in the conduct of business. Program faculty place high value on teaching and
currency of curriculum, an emphasis on oral and written communication, collaborative learning, and cross-functional integration of concepts.

The degree is offered in its entirety on the Penn State Harrisburg campus located in Middletown, PA. To provide flexibility for students, some courses are also offered online or in a hybrid format (i.e., a blend of resident instruction and online). Students should contact the program office for information on specific semester course offerings.

Admission Requirements
Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

The admission decision is based on the applicant’s entire admission portfolio consisting of:

- undergraduate degree,
- post baccalaureate course work,
- either the Graduate Management Admission Test (GMAT) or Graduate Record Examination (GRE) scores,
- professional experience,
- letters of recommendation,
- and statements provided in the application.

An applicant with significant work experience may be admitted with a lower GMAT or GRE score, while an applicant with limited work experience may be admitted with a higher GMAT or GRE score and an outstanding undergraduate background.

The GMAT or GRE requirement may be waived for the following applicants:

- Graduates from business, engineering, science, or related fields with a cumulative undergraduate GPA of at least 3.5 from accredited U.S. schools.
- Members of Beta Gamma Sigma, the international business honors society.
- Ph.D., J.D., M.D., or Master’s degree holders in business, engineering, science, or related fields from accredited U.S. schools.

Please note that there is no GMAT or GRE waiver for applicants seeking graduate assistantships.

Please visit the GMAT website (http://www.mba.com/us) or the GRE website (http://www.ets.org/gre) for information about these examinations.

The candidate must apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). The applicant is required to submit:

- a completed online application form (http://gradschool.psu.edu/prospective-students/how-to-apply) with application fee
- official transcripts from all post-secondary institutions attended (http://gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission)
- GMAT or GRE test scores (the test must have been taken within the past five years)
- two letters of recommendation
- resume

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. See GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

Candidates may enter the program at the beginning of the fall or spring semester, or the summer session. To allow time for applications to be processed, all information, including the GMAT or GRE score, must be received by the admissions office no later than:

- Fall Semester - July 18
- Spring Semester - November 18
- Summer Session - April 18

Applicants from outside the United States must follow the early admission dates in order to allow the necessary clearances and paperwork to be processed in time. International application deadline dates are:

- Fall Semester - May 31
- Spring Semester - September 30
- Summer Session - February 28

To be considered for a graduate assistantship, applicants must submit a complete application by March 1. Students on graduate assistantships must adhere to the course load limits (http://bulletins.psu.edu/graduate/academicprocedures/procedures5) set by The Graduate School.

Degree Requirements

Master of Business Administration (M.B.A.)
Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

Preparation for the Program
Credits obtained to fulfill program preparation and foundation courses cannot be applied towards the requirements for the degree.

Analytic Skills Requirement
Students must demonstrate competence in analytic skills. This requirement can be satisfied in one of two ways:

1. by satisfactory completion of a college-level mathematics course; or
2. by successful completion of a proficiency examination in mathematics approved by the M.B.A. program. This requirement must be satisfied by the first semester or summer session of the student’s matriculation, and completed with a grade of C or higher.

Computer Skills Requirement
Students are required to demonstrate proficiency in the use of computer applications. This requirement can be satisfied through a college-level computer applications course within the past five years with a grade of a B or higher, or by documented, significant, computer-related work experience. If this requirement has not been met prior to admission, a college-level computer course such as MIS 204 or CMPSC 203 is required. Course work must be completed by the first semester or summer session of the student’s matriculation with a grade of B or higher.
Communications Skills Requirement
Successful completion of the M.B.A. program requires the ability to think clearly, and to write and speak persuasively. Part of this requirement can be satisfied by achieving a score of "4" or higher on the Graduate Management Admission Test (GMAT) or the Graduate Record Examination (GRE) Analytical Writing Assessment. If this score is not achieved, students must satisfy this requirement through additional course work in writing skills such as ENGL 202D or other work developed in consultation with the M.B.A. program. This requirement must be satisfied by the first semester or summer session of the student's matriculation. All courses taken must be completed with a grade of B or higher. The speech component of this requirement is satisfied through individual and group presentations in MNGMT 511 and other courses in the M.B.A. program.

Foundation Courses
The M.B.A. program is grounded in the academic disciplines of accounting, finance, economics, marketing, management, and information sciences, among others, in order to provide students with the conceptual foundation required for competent pursuit of more advanced studies in business administration as well as the ethical and legal management of profit and non-profit organizations. This background can be provided by course work taken at the graduate level or as part of a baccalaureate degree from a regionally accredited U.S. institution or a tertiary (post-secondary) degree that is deemed comparable to a four-year bachelor's degree from a regionally accredited U.S. institution. This degree must be from an officially recognized degree-granting institution in the country in which it operates. All courses must have been completed with a grade of B or higher, within seven years prior to admission to the M.B.A. program. Course work not meeting the tests of relevancy, quality, or currency must be taken at the graduate level prior to admission to the M.B.A. program. Course work not meeting the tests of relevancy, quality, or currency must be taken at the graduate level prior to the date of first degree registration at the Graduate School of the institution in the country in which it operates. All courses must have been completed within five years prior to the date of first degree registration at the Graduate School of the institution in the country in which it operates. Courses must have been completed within five years prior to the date of first degree registration at the Graduate School of Penn State, must be of at least B quality (grades of B- are not transferable), and must appear on an official transcript of a regionally accredited U.S. institution or recognized degree-granting international institution.

Transfer Credits
Penn State allows a maximum of 10 transfer credits of high-quality work to be applied toward the requirements for a graduate degree, subject to restrictions outlined in GCAC-309 Transfer Credit (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-309/transfer-credit).

Course Substitutions
Some students enter the program with advanced course work in one or more subject areas (e.g., a degree in accounting plus a CPA) making some prescribed course work redundant. Except for BUS 588 which must be taken at Penn State Harrisburg, students may petition or be advised by the program to replace up to 6 credits in Prescribed Courses with an equivalent number of credits of more advanced graduate courses in the same subject area. Courses must have been completed within five years prior to the date of first degree registration at the Graduate School of Penn State, must be of at least B quality (grades of B- are not transferable), and must appear on an official transcript of a regionally accredited U.S. institution or recognized degree-granting international institution.

M.B.A. Degree Requirements
The M.B.A. degree requires 30 credits of course work at the graduate level (500- or 800-level). These credits are distributed over two clusters of courses: Required Courses and Electives/Tracks.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>ACCT 501</td>
<td>Financial Statement Analysis</td>
<td>3</td>
</tr>
<tr>
<td>BUS 505</td>
<td>Data Analysis for Business Decisions</td>
<td>3</td>
</tr>
<tr>
<td>BUSEC 502</td>
<td>Economics for Managers</td>
<td>3</td>
</tr>
<tr>
<td>MNGMT 511</td>
<td>Organizational Behavior</td>
<td>3</td>
</tr>
<tr>
<td>MNGMT 522</td>
<td>Operations and Supply Chain Management</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>or MNGMT 523 Service Operations Management</td>
<td></td>
</tr>
<tr>
<td>MRKT 513</td>
<td>Marketing Management</td>
<td>3</td>
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M.B.A. Degree Requirements

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<tr>
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<tbody>
<tr>
<td>ACCT 540</td>
<td>Accounting for Managerial Decisions</td>
<td>3</td>
</tr>
<tr>
<td>BUS 510</td>
<td>Business Analytics and Decision Modeling</td>
<td>3</td>
</tr>
<tr>
<td>BUS 515</td>
<td>Business Ethics and Corporate Governance</td>
<td>3</td>
</tr>
<tr>
<td>FINAN 521</td>
<td>Corporate Finance</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>or FINAN 530 Corporate Finance II</td>
<td></td>
</tr>
<tr>
<td>INFSY 540</td>
<td>Information Technology and Knowledge Management</td>
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<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>MRKT 514</td>
<td>Strategic Mrkt</td>
<td>3</td>
</tr>
</tbody>
</table>

Electives
Select 9 credits

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<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BUS 588</td>
<td>Strategic Management</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits 30

The prescribed courses develop key competencies in functional areas of business and BUS 588, the required capstone course, integrates knowledge from all functional areas. The capstone project, completed while the student is enrolled in BUS 588, is a feasibility study incorporating firm-level business strategies leading to sustainable competitive advantage.

1 Students may elect courses in clusters of "Tracks" organized around a common theme designed to be integrative and cohesive. The Tracks provide competencies and skill sets for decision making in seven areas:

1. The Accounting Track is designed to offer additional courses for students having prior academic preparation in accounting to enable them to satisfy the educational requirements for Certified Public Accountant (CPA) licensure in Pennsylvania and most other states;
2. the Business Analytics Track is intended to enhance data analytical skills enabling managers to synthesize data to make strategic decisions;
3. the Finance Track provides advanced corporate finance and investment knowledge enabling managers to apply various financial tools in decision making;
4. the Information Systems Track is designed to provide competencies enabling managers to develop and implement information technology;
5. the Strategic Leadership and Innovation Track is intended to further sharpen leadership and management skills;
6. the Supply Chain Management Track provides competencies needed to develop improvement and innovation in organizational supply chains; and
7. the General Business Track is provided for students who wish to develop a broad generalist program, or who have a particular personal or professional goals not met by one of the other tracks.

The list of courses required for each track and additional approved elective courses is maintained by the graduate program office.
Integrated Undergrad-Grad Programs
Integrated B.S. in Accounting And M.B.A. in Business Administration

Requirements listed here are in addition to requirements listed in GCAC-210 Integrated Undergraduate-Graduate (IUG) Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/integrated-undergraduate-graduate-degree-programs).

The School of Business Administration offers a limited number of academically superior Bachelor of Science in Accounting candidates the opportunity to enroll in an integrated, continuous program of study leading to both the Bachelor of Science in Accounting and the Master of Business Administration. The ability to coordinate as well as concurrently pursue the two degree programs enables the students to earn both degrees in five years. Specifically, as many as twelve of the credits required for the master's degree may be applied to both undergraduate and graduate degree programs.

If for any reason students admitted to the IUG program are unable to complete the requirements for the Master of Business Administration degree, the students will be permitted to receive the Bachelor of Science in Accounting degree assuming all the undergraduate degree requirements have been satisfactorily completed.

Admission Requirements
Students apply to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply), and must meet the admission requirements of the Graduate School, as well as the admission requirements for the M.B.A., listed on the Admission Requirements tab. Students should mention in the notes section that the application is for the IUG program in Business Administration. Students must submit:

- a resume,
- a personal statement including career goals and how the M.B.A. will enhance their career goals,
- official transcripts of all post-secondary courses (http://gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission) taken outside Penn State,
- two letters of recommendation, with at least one from the School of Business Administration faculty,
- and a plan of study that integrates both undergraduate and graduate requirements.

The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser as the student advances through the program. A graduate faculty adviser in collaboration with the Director of M.B.A. Program will help undergraduate candidates determine a sequence of courses that will prepare them for acceptance into the Integrated Undergraduate-Graduate (IUG) degree program.

The Graduate Management Admission Test (GMAT) or Graduate Record Examination (GRE) is not required for admission into the program; however, if students are interested in a graduate assistantship, GMAT or GRE scores must be submitted by the end of the eighth semester.

The number of openings in the IUG program is limited. Applicants to the IUG program must have completed a minimum of 60 credits. Students must be admitted to an IUG program no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree. In addition, the applicants must earn a minimum of cumulative grade point average of 3.5 and complete the following Entry to Major courses or equivalent:

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<td>Financial and Managerial Accounting for Decision Making</td>
<td>4</td>
</tr>
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<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 15</td>
<td>Rhetoric and Composition</td>
<td>3</td>
</tr>
<tr>
<td>FIN 301</td>
<td>Corporation Finance</td>
<td>3</td>
</tr>
<tr>
<td>MATH 110</td>
<td>Techniques of Calculus I</td>
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<td>MGMT 301</td>
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<td>MKTG 301</td>
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<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
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</tr>
<tr>
<td>or SCM 200</td>
<td>Introduction to Statistics for Business</td>
<td></td>
</tr>
</tbody>
</table>

Student applications will be evaluated based on their overall portfolio, in addition to the above requirements. In all cases, admission to the program will be at the discretion of the Graduate Admissions Committee in Business Administration.

Degree Requirements
Students must fulfill all requirements for each degree in order to be awarded that degree, subject to the double-counting of credits as outlined below. Degree requirements for the B.S. in Accounting are listed in the Undergraduate Bulletin (http://bulletins.psu.edu/undergraduate). Degree requirements for the M.B.A. degree are listed on the Degree Requirements tab. Up to 12 credits may be double-counted towards the degree requirements for both the graduate and undergraduate degrees. All courses counted for both degrees must be at the 500- or 800-level. Credits associated with culminating experience for the graduate degree cannot be double-counted.

Courses Eligible to Double Count for Both Degrees

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<tr>
<td>ACCT 504</td>
<td>Auditing Theory and Practice</td>
<td>3</td>
</tr>
<tr>
<td>ACCT 510</td>
<td>Business Tax Planning Theory and Practice</td>
<td>3</td>
</tr>
<tr>
<td>ACCT 532</td>
<td>Accounting Information and Decision Systems</td>
<td>3</td>
</tr>
<tr>
<td>ACCT 545</td>
<td>Strategic Cost Management</td>
<td>3</td>
</tr>
<tr>
<td>ACCT 561</td>
<td>Financial Statement Analysis II</td>
<td>3</td>
</tr>
<tr>
<td>ACCT 571</td>
<td>Strategic Tax Planning</td>
<td>3</td>
</tr>
<tr>
<td>ACCT 572</td>
<td>Financial Reporting I</td>
<td>3</td>
</tr>
<tr>
<td>ACCT 573</td>
<td>Financial Reporting II</td>
<td>3</td>
</tr>
<tr>
<td>FINAN 521</td>
<td>Corporate Finance</td>
<td>3</td>
</tr>
</tbody>
</table>

Integrated B.S. in Finance and M.B.A. IN BUSINESS ADMINISTRATION

Requirements listed here are in addition to requirements listed in GCAC-210 Integrated Undergraduate-Graduate (IUG) Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/integrated-undergraduate-graduate-degree-programs).

The School of Business Administration offers a limited number of academically superior Bachelor of Science in Finance candidates the opportunity to enroll in an integrated, continuous program of study...
leading to both the Bachelor of Science in Finance and the Master of Business Administration. The ability to coordinate as well as concurrently pursue the two degree programs enables the students to earn both degrees in five years. Specifically, as many as twelve of the credits required for the master's degree may be applied to both undergraduate and graduate degree programs.

If for any reason students admitted to the IUG program are unable to complete the requirements for the Master of Business Administration degree, the students will be permitted to receive the Bachelor of Science in Finance degree assuming all the undergraduate degree requirements have been satisfactorily completed.

Admission Requirements

Students apply to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply), and must meet the admission requirements of the Graduate School, as well as the admission requirements for the M.B.A., listed on the Admission Requirements tab. Students should mention in the notes section that the application is for the IUG program in Business Administration. Students must submit:

- a resume,
- a personal statement including career goals and how the M.B.A. will enhance their career goals,
- official transcripts of all post-secondary courses (http://gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission) taken outside Penn State,
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The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser as the student advances through the program. A graduate faculty adviser in collaboration with the Director of M.B.A. Program will help undergraduate candidates determine a sequence of courses that will prepare them for acceptance into the Integrated Undergraduate-Graduate (IUG) degree program.

The Graduate Management Admission Test (GMAT) or Graduate Record Examination (GRE) is not required for admission into the program; however, if students are interested in a graduate assistantship, GMAT or GRE scores must be submitted by the end of the eighth semester.

The number of openings in the IUG program is limited. Applicants to the IUG program must have completed a minimum of 60 credits. Students must be admitted to an IUG program no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree. In addition, the applicants must earn a minimum of cumulative grade point average of 3.5 and complete the following Entry to Major courses or equivalent:

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<td>3</td>
</tr>
<tr>
<td>ENGL 15</td>
<td>Rhetoric and Composition</td>
<td>3</td>
</tr>
</tbody>
</table>

or ENGL 30 Honors Freshman Composition
FIN 301 Corporation Finance 3
MATH 110 Techniques of Calculus I 4
or MATH 140 Calculus With Analytic Geometry I
MGMT 301 Basic Management Concepts 3
MKTG 301 Principles of Marketing 3
STAT 200 Elementary Statistics 4
or SCM 200 Introduction to Statistics for Business

Student applications will be evaluated based on their overall portfolio, in addition to the above requirements. In all cases, admission to the program will be at the discretion of the Graduate Admissions Committee in Business Administration.

Degree Requirements

Students must fulfill all requirements for each degree in order to be awarded that degree, subject to the double-counting of credits as outlined below. Degree requirements for the B.S. in Finance are listed on the Undergraduate Bulletin (http://bulletins.psu.edu/undergraduate). Degree requirements for the M.B.A. degree are listed on the Degree Requirements tab. Up to 12 credits may be double-counted towards the degree requirements for both the graduate and undergraduate degrees. All courses counted for both degrees must be at the 500- or 800-level. Credits associated with culminating experience for the graduate degree cannot be double-counted.

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<td>ACCT 540</td>
<td>Accounting for Managerial Decisions</td>
<td>3</td>
</tr>
<tr>
<td>FIN 518</td>
<td>Financial Markets and the Economy</td>
<td>3</td>
</tr>
<tr>
<td>FIN 522</td>
<td>Investment and Portfolio Management</td>
<td>3</td>
</tr>
<tr>
<td>FIN 523</td>
<td>Risk Management of Modern Financial Institutions</td>
<td>3</td>
</tr>
<tr>
<td>FIN 526</td>
<td>International Finance</td>
<td>3</td>
</tr>
<tr>
<td>FIN 527</td>
<td>Derivative Securities</td>
<td>3</td>
</tr>
<tr>
<td>FIN 530</td>
<td>Corporate Finance II</td>
<td>3</td>
</tr>
<tr>
<td>FIN 531</td>
<td>Managing Financial Operations</td>
<td>3</td>
</tr>
<tr>
<td>INFSY 540</td>
<td>Information Technology and Knowledge Management</td>
<td>3</td>
</tr>
</tbody>
</table>

Courses Eligible to Double Count for Both Degrees

Integrated B.S. in Information Systems and M.B.A. IN BUSINESS ADMINISTRATION

Requirements listed here are in addition to requirements listed in GCAC-210 Integrated Undergraduate-Graduate (IUG) Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200-integrated-undergraduate-graduate-degree-programs).

The School of Business Administration offers a limited number of academically superior Bachelor of Science in Information Systems candidates the opportunity to enroll in an integrated, continuous program of study leading to both the Bachelor of Science in Information Systems and the Master of Business Administration. The ability to coordinate as well as concurrently pursue the two degree programs enables the students to earn both degrees in five years. Specifically, as many as twelve of the credits required for the master's degree may be applied to both undergraduate and graduate degree programs.

If for any reason students admitted to the IUG program are unable to complete the requirements for the Master of Business Administration degree, the students will be permitted to receive the Bachelor of Science
in Information Systems degree assuming all the undergraduate degree requirements have been satisfactorily completed.

Admission Requirements

Students apply to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply), and must meet the admission requirements of the Graduate School, as well as the admission requirements for the M.B.A., listed on the Admission Requirements tab. Students should mention in the notes section that the application is for the IUG program in Business Administration. Students must submit:

- a resume,
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The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser as the student advances through the program. A graduate faculty adviser in collaboration with the Director of M.B.A. Program will help undergraduate candidates determine a sequence of courses that will prepare them for acceptance into the Integrated Undergraduate-Graduate (IUG) degree program.

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The number of openings in the IUG program is limited. Applicants to the IUG program must have completed a minimum of 60 credits. Students must be admitted to an IUG program no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second semester of the semester preceding the semester of expected conferral of the undergraduate degree. In addition, the applicants must earn a minimum of cumulative grade point average of 3.5 and complete the following Entry to Major courses or equivalent:

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<td>FIN 301</td>
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Student applications will be evaluated based on their overall portfolio, in addition to the above requirements. In all cases, admission to the program will be at the discretion of the Graduate Admissions Committee in Business Administration.

Degree Requirements

Students must fulfill all requirements for each degree in order to be awarded that degree, subject to the double-counting of credits as outlined below. Degree requirements for the B.S. in Information Systems are listed in the Undergraduate Bulletin (http://bulletins.psu.edu/undergraduate). Degree requirements for the M.B.A. degree are listed on the Degree Requirements tab. Up to 12 credits may be double-counted towards the degree requirements for both the graduate and undergraduate degrees. All courses counted for both degrees must be at the 500- or 800-level. Credits associated with culminating experience for the graduate degree cannot be double-counted.

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<td>3</td>
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<tr>
<td>INFSY 540</td>
<td>Information Technology and Knowledge Management</td>
<td>3</td>
</tr>
<tr>
<td>INFSY 547</td>
<td>WEB Enabled Technologies</td>
<td>3</td>
</tr>
<tr>
<td>INFSY 555</td>
<td>Data Management Systems</td>
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<tr>
<td>INFSY 556</td>
<td>Intelligent Systems in Business</td>
<td>3</td>
</tr>
<tr>
<td>INFSY 566</td>
<td>Data Mining and Knowledge Discovery</td>
<td>3</td>
</tr>
<tr>
<td>INFSY 570</td>
<td>Software Engineering in the Analysis and Design of Information Systems</td>
<td>3</td>
</tr>
<tr>
<td>INFSY 860</td>
<td>Data Communications Systems and Networks</td>
<td>3</td>
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Integrated B.S. in Management and M.B.A. IN BUSINESS ADMINISTRATION

Requirements listed here are in addition to requirements listed in GCAC-210 Integrated Undergraduate-Graduate (IUG) Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/integrated-undergraduate-graduate-degree-programs).

The School of Business Administration offers a limited number of academically superior Bachelor of Science in Management candidates the opportunity to enroll in an integrated, continuous program of study leading to both the Bachelor of Science in Management and the Master of Business Administration. The ability to coordinate as well as concurrently pursue the two degree programs enables the students to earn both degrees in five years. Specifically, as many as twelve of the credits required for the master’s degree may be applied to both undergraduate and graduate degree programs.

If for any reason students admitted to the IUG program are unable to complete the requirements for the Master of Business Administration degree, the students will be permitted to receive the Bachelor of Science in Management degree assuming all the undergraduate degree requirements have been satisfactorily completed.

Admission Requirements

Students apply to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply), and must meet the admission requirements of the Graduate School, as well as the admission requirements for the M.B.A., listed on the Admission Requirements tab. Students should mention in the
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- a resume,
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The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser as the student advances through the program. A graduate faculty adviser in collaboration with the Director of M.B.A. Program will help undergraduate candidates determine a sequence of courses that will prepare them for acceptance into the Integrated Undergraduate-Graduate (IUG) degree program.

The Graduate Management Admission Test (GMAT) or Graduate Record Examination (GRE) is not required for admission into the program, unless students have not completed 24 or more credits at Penn State, in which case they must take the GMAT and earn a score of at least 450. If students are interested in a graduate assistantship, GMAT or GRE scores must be submitted by the end of the eighth semester.

The number of openings in the IUG program is limited. Applicants to the IUG program must have completed a minimum of 60 credits. Students must be admitted to an IUG program no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree. In addition, the applicants must earn a minimum of cumulative grade point average of 3.5 and complete the following Entry to Major courses or equivalent:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCTG 211</td>
<td>Financial and Managerial Accounting for Decision Making</td>
<td>4</td>
</tr>
<tr>
<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 15 or ENGL 30</td>
<td>Rhetoric and Composition</td>
<td>3</td>
</tr>
<tr>
<td>FIN 301</td>
<td>Corporation Finance</td>
<td>3</td>
</tr>
<tr>
<td>MATH 110 or MATH 140</td>
<td>Techniques of Calculus I</td>
<td>4</td>
</tr>
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<td>MGMT 301</td>
<td>Basic Management Concepts</td>
<td>3</td>
</tr>
<tr>
<td>MKTG 301</td>
<td>Principles of Marketing</td>
<td>3</td>
</tr>
<tr>
<td>STAT 200 or SCM 200</td>
<td>Elementary Statistics</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Introduction to Statistics for Business</td>
<td></td>
</tr>
</tbody>
</table>

Student applications will be evaluated based on their overall portfolio, in addition to the above requirements. In all cases, admission to the program will be at the discretion of the Graduate Admissions Committee in Business Administration.

**Degree Requirements**

Students must fulfill all requirements for each degree in order to be awarded that degree, subject to the double-counting of credits as outlined below. Degree requirements for the B.S. in Management are listed in the Undergraduate Bulletin (http://bulletins.psu.edu/undergraduate). Degree requirements for the M.B.A. degree are listed on the Degree Requirements tab. Up to 12 credits may be double-counted towards the degree requirements for both the graduate and undergraduate degrees. All courses counted for both degrees must be at the 500- or 800-level. Credits associated with culminating experience for the graduate degree cannot be double-counted.

**Courses Eligible to Double Count for Both Degrees**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>INFSY 540</td>
<td>Information Technology and Knowledge Management</td>
<td>3</td>
</tr>
<tr>
<td>MNGMT 505</td>
<td>Managing Human Resources</td>
<td>3</td>
</tr>
<tr>
<td>MNGMT 514</td>
<td>Organizational Innovation and New Venture Development</td>
<td>3</td>
</tr>
<tr>
<td>MNGMT 515</td>
<td>Labor Management Relations</td>
<td>3</td>
</tr>
<tr>
<td>MNGMT 520</td>
<td>Organizational Transformation</td>
<td>3</td>
</tr>
<tr>
<td>MNGMT 570</td>
<td>Leadership Development</td>
<td>3</td>
</tr>
<tr>
<td>MRKT 514</td>
<td>Strategic Mkrt</td>
<td>3</td>
</tr>
<tr>
<td>MRKT 570</td>
<td>Marketing Strategy and Planning</td>
<td>3</td>
</tr>
</tbody>
</table>

**Integrated B.S. in Marketing and M.B.A. IN BUSINESS ADMINISTRATION**

Requirements listed here are in addition to requirements listed in GCAC-210 Integrated Undergraduate-Graduate (IUG) Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/integrated-undergraduate-graduate-degree-programs).

The School of Business Administration offers a limited number of academically superior Bachelor of Science in Marketing candidates the opportunity to enroll in an integrated, continuous program of study leading to both the Bachelor of Science in Marketing and the Master of Business Administration. The ability to coordinate as well as concurrently pursue the two degree programs enables the students to earn both degrees in five years. Specifically, as many as twelve of the credits required for the master’s degree may be applied to both undergraduate and graduate degree programs.

If for any reason students admitted to the IUG program are unable to complete the requirements for the Master of Business Administration degree, the students will be permitted to receive the Bachelor of Science in Marketing degree assuming all the undergraduate degree requirements have been satisfactorily completed.

**Admission Requirements**

Students apply to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply), and must meet the admission requirements of the Graduate School, as well as the admission requirements for the M.B.A., listed on the Admission Requirement tab. Students should mention in the notes section that the application is for the IUG program in Business Administration. Students must submit:

- a resume,
- a personal statement including career goals and how the M.B.A. will enhance their career goals,
Degree Requirements

Students must fulfill all requirements for each degree in order to be awarded that degree, subject to the double-counting of credits as outlined below. Degree requirements for the B.S. in Marketing are listed in the Undergraduate Bulletin (http://bulletins.psu.edu/undergraduate). Degree requirements for the M.B.A. degree are listed on the Degree Requirements tab. Up to 12 credits may be double-counted towards the degree requirements for both the graduate and undergraduate degrees. All courses counted for both degrees must be at the 500- or 800-level.
The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser as the student advances through the program. A graduate faculty adviser in collaboration with the Director of M.B.A. Program will help undergraduate candidates determine a sequence of courses that will prepare them for acceptance into the Integrated Undergraduate-Graduate (IUG) degree program.

The Graduate Management Admission Test (GMAT) or Graduate Record Examination (GRE) is not required for admission into the program; however, if students are interested in a graduate assistantship, GMAT or GRE scores must be submitted by the end of the eighth semester.

The number of openings in the IUG program is limited. Applicants to the IUG program must have completed a minimum of 60 credits. Students must be admitted to an IUG program no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree. In addition, the applicants must earn a minimum of cumulative grade point average of 3.5 and complete the following Entry to Major courses or equivalent:

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<td>STAT 200</td>
<td>Elementary Statistics or SCM 200 Introduction to Statistics for Business</td>
<td>4</td>
</tr>
</tbody>
</table>

Student applications will be evaluated based on their overall portfolio, in addition to the above requirements. In all cases, admission to the program will be at the discretion of the Graduate Admissions Committee in Business Administration.

**Degree Requirements**

Students must fulfill all requirements for each degree in order to be awarded that degree, subject to the double-counting of credits as outlined below. Degree requirements for the B.S. in Project and Supply Chain Management are listed in the Undergraduate Bulletin (http://bulletins.psu.edu/undergraduate). Degree requirements for the M.B.A. degree are listed on the Degree Requirements tab. Up to 12 credits may be double-counted towards the degree requirements for both the graduate and undergraduate degrees. All courses counted for both degrees must be at the 500- or 800-level. Credits associated with culminating experience for the graduate degree cannot be double-counted.

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<td>ACCT 540</td>
<td>Accounting for Managerial Decisions</td>
<td>3</td>
</tr>
<tr>
<td>FINAN 530</td>
<td>Corporate Finance II</td>
<td>3</td>
</tr>
</tbody>
</table>

### Joint Degrees

**Joint J.D./M.B.A. with Dickinson Law**

Requirements listed here are in addition to requirements listed in GCAC-211 Joint Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/joint-degree-programs).

Dickinson Law and the School of Business Administration at Penn State Harrisburg offer cooperative programs leading to the degrees of Juris Doctor (J.D.) granted by Dickinson Law and the Master of Business Administration (M.B.A.) granted by Penn State Harrisburg, The Capital College. This joint degree opportunity facilitates the completion of both a law degree and a professional master's degree in business administration.

**Admission Requirements**

Applicants to the joint degree program must apply and be admitted first to Dickinson Law. Subsequently, the student is recommended for and applies for admission to the Graduate School for the Master of Business Administration graduate program. Admissions requirements and applications for admission for Dickinson Law are listed in the J.D. Admissions (https://dickinsonlaw.psu.edu/admissions-aid) section of the Dickinson Law website.

**Degree Requirements**

Students must fulfill all requirements for each degree in order to be awarded that degree, subject to the double-counting of credits as outlined below. Degree requirements for the J.D. program are listed on the Dickinson Law website (https://dickinsonlaw.psu.edu/academics/curriculum/jd-program). Degree requirements for the M.B.A. degree are listed in the Degree Requirements section. Nine credits of course work at Dickinson Law may be double-counted toward the M.B.A. degree, subject to program approval. Students must obtain a grade satisfactory to the M.B.A. program in order for the credits to be double-counted for credit toward the J.D. degree at the Dickinson Law subject to the approval of Dickinson Law.

**Advising of Students**

All students in the joint degree program have two advisers, one in the School of Business Administration and one from the faculty at Dickinson Law. Because the joint degree program is designed to be taken in synchrony with the objective that both degrees will be earned simultaneously, students who do not demonstrate progress toward completion of both degrees may be denied continuation in the joint degree program. Such a decision will rest jointly with the faculties of the M.B.A. program and the J.D. program. Students can graduate with one degree before the other as long as they have completed all of the requirements for the degree. If students accepted into the joint degree program are unable to complete the J.D. degree, they are still eligible to receive the M.B.A. degree if all the M.B.A. degree requirements have been satisfied.
Tuition
Penn State Dickinson Law and Penn State Harrisburg will each charge their own tuition to students in the joint degree program.

Additional Information
For more information and the latest updates on the joint degree program, contact Dickinson Law (https://dickinsonlaw.psu.edu) or the M.B.A. program at Penn State Harrisburg (https://harrisburg.psu.edu/business-administration/mba-and-business-administration/master-business-administration).

Student Aid
Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

Full-time graduate students who are interested in an assistantship should contact the program director. Students must be nominated for an assistantship by their program director. Students applying for an assistantship should submit scores from the Graduate Management Admissions test, or similar examinations by the deadline.

A limited number of scholarships, fellowships, and research grants are available, as well as several graduate assistantships. For more information on these, contact the School of Business Administration.

Many students work full-time and take classes part-time. In many cases, employers have a tuition-reimbursement plan paying for partial or full tuition. To find other options available to you, contact the Office of Student Aid (https://harrisburg.psu.edu/financial-aid), 717-948-6307.

Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not be used to meet some graduate degree requirements when taken by graduate students. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact
Graduate Program Head: Stephen Schappe
Director of Graduate Studies/Professor-in-Charge: Rhoda Joseph
Primary Program Contact: Amy Atkins
Email: akj11@psu.edu
Mailing Address: Graduate Admissions, 777 West Harrisburg Pike, Middletown, PA 17057
Telephone: (717) 948-6140
Program Website: Business Administration at Harrisburg (https://harrisburg.psu.edu/business-administration/mba-and-business-administration/master-business-administration)

Business Administration (Executive)

Graduate Program Head: Brian Cameron
Program Code: EXMBA
Campus(es): University Park (M.B.A.)
Degrees Conferred: Master of Business Administration (M.B.A.)
The Graduate Faculty
View (https://secure.gradsch.psu.edu/gmps/index.cfm?searchType=fac&prog=EXMBA)

The Smeal Executive MBA program provides a concentration in Strategic Leadership and can be completed in as little as 17 months on alternating Friday afternoons and Saturdays at The Chubb Conference Center in Lafayette Hill, PA, complemented with two residence weeks on the University Park campus. In addition, every graduate has the option to complete one of Penn State Smeal’s online graduate certificates following commencement. This allows all students to receive the Strategic Leadership concentration through the EMBA curriculum while allowing each individual to choose an area of specialization. Students must formally apply and be admitted into the certificate program, and online graduate certificates must be completed within three years of graduation.

Admission Requirements
Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Criteria for evaluating applicants include professional and academic accomplishments, recommendations, and personal data from application forms that provide indications of future academic and professional accomplishment. Applications for the Executive M.B.A. degree are only accepted for Fall semester admission.

Degree Requirements
Master of Business Administration (M.B.A.)
Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

The EMBA program consists of two distinct portions:
1. preprogram competency expectations, including accounting, mathematics, and statistics; and
2. a minimum of 40 credits at the 400, 500, or 800 levels, and a minimum of 18 credits at the 500 or 800 level, with at least 6 credits at the 500 level.

Of the minimum 40 credits, 28 credits are required core courses:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BA 512</td>
<td>Quantitative Analysis for Managerial Decision Making</td>
<td>2</td>
</tr>
<tr>
<td>BA 533</td>
<td>Economics for Managers</td>
<td>2</td>
</tr>
<tr>
<td>BA 800</td>
<td>Marketing Management</td>
<td>2</td>
</tr>
</tbody>
</table>
Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact
Graduate Program Head: Brian Cameron
Director of Graduate Studies/Professor-in-Charge: Louis Gattis
Primary Program Contact: Teresa Avery
Email: tja162@psu.edu
Mailing Address: 220 Business Building, University Park, PA 16802
Telephone: (814) 863-0476
Program Website: Smeal Executive M.B.A. Program (https://emba-experience.smeal.psu.edu)

Business Administration (Great Valley)

Graduate Program Head: James A. Nemes
Program Code: BUSAD
Campus(es): Great Valley (M.B.A.)
Degrees Conferred: Master of Business Administration (M.B.A.)

The Graduate Faculty View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=BUSD)

Student Aid
Refer to the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School's website. Students in this program are not eligible for graduate assistantships.

Admission Requirements
Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).
Scores from the Graduate Management Admission Test (GMAT) are required for admission. Applicants should have had at least one year of quantitative analysis or statistics.

Admission decisions are based on the quality of the applicant’s credentials in relation to those of other applicants. Evaluation criteria include:

- professional and academic accomplishments
- GMAT scores
- two recommendations
- a personal statement that provides indications of future academic and professional potential.

Application filing dates: Penn State Great Valley’s M.B.A. program has a rolling admission policy. New students may start classes in fall, spring, or summer sessions.

Degree Requirements

Master of Business Administration (M.B.A.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

Prior to enrolling in M.B.A. program requirements, students entering the program are expected to meet preprogram requirements that build a foundation for quantitative analysis as described below.

Quantitative Skills Requirement: Prior to enrolling in their M.B.A. course work, students must demonstrate competence in quantitative skills. This requirement must be satisfied in one of two ways:

1. Completion of two sequential undergraduate courses in applied statistics or one graduate introductory course in applied statistics at a regionally accredited institution of higher education with a minimum grade of B, within the seven years prior to being enrolled at Penn State Great Valley. Syllabi for the courses must be provided.

OR

1. Satisfactory completion of BUSAD 501 at Penn State Great Valley. This requirement must be satisfied by the first semester or summer session of the student’s matriculation prior to enrolling in M.B.A. degree courses, and completed with a grade of B or higher. Successful completion of this course will result in 3 graduate credits, but these credits will not count toward the degree requirements for the M.B.A. degree.

Students who need to take BUSAD 501 to fulfill the Quantitative Skills Requirements will be admitted on a one-year provisional basis (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/provisional-admission).

A minimum of 45 credits of course work at the 400, 500, and 800 level is required, including 18 credits of Foundation Courses, 15 Credits of Essential Courses, 9 credits of Elective Courses, and a 3-credit Capstone Course. Students may petition to have up to 15 credits of the required Foundation Courses waived in accordance with the course exemption guidelines for the M.B.A. program, in which case the total credits required for the degree may be reduced in an equivalent manner, down to the base minimum of 30 credits. To be eligible for exemption from a single foundation course, students must have completed at least two equivalent undergraduate courses with a grade of B or higher, no more than seven years prior to admission to the M.B.A. program. At the Management Division Head’s discretion, a competency exam may be required to receive certain course exemptions. Time limits may be waived by the M.B.A. program on the basis of post-graduate training or current and relevant work experience. If a waiver is not granted, students must complete all Foundation Courses prior to starting advanced course work.

All entering students are required to take MGMT 501; exemptions will not be granted.

<table>
<thead>
<tr>
<th>Code</th>
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</thead>
<tbody>
<tr>
<td>MGMT 501</td>
<td>Behavioral Science in Business</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 800</td>
<td>Financial and Managerial Accounting</td>
<td>3</td>
</tr>
<tr>
<td>FIN 531</td>
<td>Financial Management</td>
<td>3</td>
</tr>
<tr>
<td>BUSAD 523</td>
<td>Prices and Markets</td>
<td>3</td>
</tr>
<tr>
<td>MKTG 500</td>
<td>Marketing Management</td>
<td>3</td>
</tr>
<tr>
<td>OPMGT 510</td>
<td>Operations Management</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 871</td>
<td>Strategic Management</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits 45

1 Required courses provide an overview of key business processes and functional areas of organizations.
2 Essential courses build necessary competencies for effective managerial practice, knowledge of key elements of contemporary business, and ethical decision making.
3 Electives provide an opportunity for students to pursue their interests and develop distinctive competencies by pursuing advanced courses offered or approved by the Management Division. A list of approved elective courses is maintained by the program office.
4 All students must complete a Capstone course that provides students with an opportunity to strategically integrate and apply what they have learned in their course work.

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

There are a limited number of scholarships, fellowships, and graduate assistantships available. For more information on these, contact the Office of Tuition and Financial Aid (https://greatvalley.psu.edu/ tuition-and-financial-aid) at Penn State Great Valley.

Most students work full-time and take classes part-time. In many cases, employers have a tuition-reimbursement plan paying for partial or full tuition. To find other options that may be available to you, contact the:
Office of Tuition and Financial Aid (https://greatvalley.psu.edu/financial-aid/)
Penn State Great Valley
610-648-3311

Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Learning Outcomes
Upon completion of the MBA program, our graduates will:

- Learning Goal 1: Integrate theory, research, and practice from all functional areas – accounting, economics, finance, marketing, operations research, management, and organization – to solve business problems within dynamic environments.
  - Demonstrate ability to integrate the various business functions to good effect.
  - Demonstrate appreciation of the role of contexts when developing and executing strategy.
- Learning Goal 2: Critically evaluate and make ethical decisions with consideration for multiple stakeholders.
  - Evaluate and analyze the ethical dimension of decision-making.
- Learning Goal 3: Demonstrate communication behaviors that reflect an awareness of context, relationships, others’ perspectives, and individual as well as organizational goals.
  - Communicate their intended message clearly and professionally to individuals, teams, and external stakeholders.
  - Demonstrate an ability to engage in perspective taking and conflict management
  - Demonstrate an ability to adapt communication behaviors to dynamic, multicultural, and/or complex contexts.
- Learning Goal 4: Demonstrate an appreciation of technology as a strategic tool.
  - Identify and evaluate the functional, financial, operational, and social impact of technology.
- Learning Goal 5: Demonstrate knowledge of business in multicultural contexts and the opportunities and challenges of globalization.
  - Demonstrate an understanding of the impact of global markets and finance on business decisions.

Contact
Graduate Program Head: James Nemes
Director of Graduate Studies/Professor-in-Charge: Sagnika Sen
Primary Program Contact: Leanne Wallace
Email: lxw31@psu.edu
Mailing Address: Penn State Great Valley, 30 E. Swedesford Road, Malvern, PA 19355
Telephone: (610)648-3336

Program Website: Business Administration at Great Valley (http://greatvalley.psu.edu/academics/masters-degrees/business-administration)

Business Administration (Intercollege)
Graduate Program Head: Brian Cameron
Program Code: MBADM
Campus(es): World Campus (M.B.A.)
Degrees Conferred: Master of Business Administration (M.B.A.)
The Graduate Faculty: View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=MBADM)

The Penn State Online Master of Business Administration, led by the Smeal College of Business, is an online degree program of:

- Penn State Erie, The Behrend College;
- Penn State Great Valley, The School of Graduate Professional Studies;
- Penn State Harrisburg, the Capital College;
- and Penn State University Park, the Smeal College of Business.

The online M.B.A. curriculum emphasizes cross-functional organizational thinking; focuses on solving business problems; closely follows the quality guidelines for accreditation of AACSB (American Assembly of Collegiate Schools of Business), the accrediting body affiliated with The International Association for Management Education; and uses cutting-edge instructional technology to transcend issues of time and space to support effective teaching and learning.

Within the context of these goals, the online M.B.A. curriculum was developed around core business skills. The skills the program helps to develop include "soft skills" such as managing and leading people and teams, analytical skills such as data analytic decision making, and integrative skills that allow students to understand, analyze, and suggest solutions to significant business problems that cross functional areas of business.

These different skills are integrated at the course level. Students apply knowledge developed in these areas to multidimensional problems and issues throughout the program. The program is offered online but includes a required one-week residential experience at the start of the program.

Admission Requirements
Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Admission is granted only to candidates who demonstrate high promise of success for graduate work. Applicants are required to submit scores from the Graduate Management Admission Test (GMAT) or Graduate Record Exam (GRE); the test may be waived for students with extensive experience or advanced degrees at the discretion of the program.
Admissions decisions are based on a review of a complete admission portfolio, including an application, a statement of intent, a current resume, official transcripts from all post-secondary institutions attended (http://gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission), two letters of recommendation, and GMAT or GRE scores.

No specific prior course of study is required to be admitted. Applicants come from a wide range of backgrounds. Students entering the program are required to have a working knowledge of the Microsoft Office suite.

Degree Requirements
Master of Business Administration (M.B.A.)
Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

The online M.B.A. degree requires a minimum of 48 credits. At least 6 credits must be earned at the 500 level.

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<tbody>
<tr>
<td>MBADM 810</td>
<td>Team Performance</td>
<td>3</td>
</tr>
<tr>
<td>MBADM 811</td>
<td>Financial Accounting ¹</td>
<td>3</td>
</tr>
<tr>
<td>MBADM 812</td>
<td>Economics for Business Strategy ¹</td>
<td>3</td>
</tr>
<tr>
<td>MBADM 813</td>
<td>Data Analysis for Decision Making ¹</td>
<td>3</td>
</tr>
<tr>
<td>MBADM 814</td>
<td>Leadership Communications and Change Management</td>
<td>3</td>
</tr>
<tr>
<td>MBADM 815</td>
<td>Ethical and Responsible Business Leadership</td>
<td>3</td>
</tr>
<tr>
<td>MBADM 816</td>
<td>Managing and Leading People in Organizations</td>
<td>3</td>
</tr>
<tr>
<td>MBADM 820</td>
<td>Financial Management</td>
<td>3</td>
</tr>
<tr>
<td>MBADM 821</td>
<td>Marketing in a Global Environment</td>
<td>3</td>
</tr>
<tr>
<td>MBADM 822</td>
<td>Managing Supply Chains in Global Markets</td>
<td>3</td>
</tr>
<tr>
<td>MBADM 531</td>
<td>Corporate Innovation and Entrepreneurship</td>
<td>3</td>
</tr>
<tr>
<td>MBADM 830</td>
<td>Managing in the Digital Economy</td>
<td>3</td>
</tr>
</tbody>
</table>

| Electives | Select 9 elective credits                      | 9       |

<table>
<thead>
<tr>
<th>Culminating Experience</th>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MBADM 571</td>
<td></td>
<td>Global Strategic Management ²</td>
<td>3</td>
</tr>
</tbody>
</table>

| Total Credits | 48 |

¹ For students with exceptional credentials, MBADM 811, MBADM 812, and MBADM 813 may be waived. Students must petition the head of the graduate program to obtain a waiver for these courses, and students’ credentials will be reviewed to assess their eligibility for a waiver. Obtaining a waiver for MBADM 811, MBADM 812, and MBADM 813 will not reduce the minimum 48 credits required for the degree. Alternate courses may be substituted for the courses waived.

² The culminating experience for the Online MBA is MBADM 571. As the course title implies, MBADM 571 gives students a view of the whole firm and helps them understand how finance, marketing, and operations collectively support the strategy and mission of the firm. Students in this course will typically analyze their own firm to give them a comprehensive understanding of how the firm intends to achieve its goals.

Attendance at a one-week Residency Experience at the start of the program is mandatory. Following the online MBA course schedule, which involves completing credits in six consecutive semesters, a student can complete the program in two years.

Other Relevant Information
The online MBA is an online graduate degree program delivered via World Campus (http://www.worldcampus.psu.edu). Students must be computer literate and have immediate, ready, and reliable access to a computer and the Internet. Although not all aspects of the course are delivered via electronic media, Internet access is required to successfully complete the course of instruction, as well as participate in online discussion groups. See World Campus Technical Requirements (http://www.worldcampus.psu.edu/general-technical-requirements) for the most current technical requirements.

Students are required to complete the one-week residency experience. No alternatives and substitutions are possible.

Student Aid
World Campus students in graduate degree programs may be eligible for financial aid. Refer to the Tuition and Financial Aid section (http://www.worldcampus.psu.edu/tuition-and-financial-aid) of the World Campus website for more information.

Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact
Graduate Program Head: Brian Cameron
Director of Graduate Studies/Professor-in-Charge: Glen Kreiner
Primary Program Contact: Stacey Peeler
Email: sld138@psu.edu
Mailing Address: 220 Business Building, University Park, PA 16802
Telephone: (814) 863-0474
Program Website: Business Administration at World Campus (http://www.worldcampus.psu.edu/degrees-and-certificates/penn-state-online-mba-degree-program/apply)
The Master of Business Administration program is a professional degree designed to prepare individuals for managerial positions in business, government, and nonprofit institutions. The M.B.A. curriculum blends technical rigor, managerial theory, and integrative learning experiences through case studies and other teaching methods. A managerial communications course is fully integrated into the program.

The Master of Science in Business Administration program is highly flexible and designed for advanced study in a specialized field. The M.S. program is directed toward the development of competency within a defined area of management. Fields such as accounting and management science are examples of career opportunities requiring specialized knowledge and skill, including research.

The Doctor of Philosophy degree in the Business Administration program offers advanced graduate education for students focused on research careers at leading business schools. The faculty of the college views the Ph.D. as evidencing scholarship at the highest level.

**Admission Requirements**

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Applicants to the M.B.A. program are required to take the Graduate Management Admission Test (GMAT) (http://www.mba.com); whereas applications to the doctoral program are required to take either the GMAT or the Graduate Record Examination (GRE) (http://www.ets.org/gre). The program does not admit applicants for the terminal Master of Science (M.S.) degree.

**Degree Requirements**

**Master of Business Administration (M.B.A.)**

Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

The M.B.A. program consists of two distinct portions:
1. preprogram competency expectations, including accounting, economics, mathematics, and statistics; and
2. a minimum of 54 credits at the 400, 500, or 800 levels, with a minimum of 18 at the 500 or 800 level and at least 6 credits at the 500 level.

**Code** | **Title** | **Credits**
--- | --- | ---
BA 512 | Quantitative Analysis for Managerial Decision Making | 2
BA 533 | Economics for Managers | 2
BA 800 | Marketing Management | 2
BA 801 | Management | 2
BA 802 | Team Process and Performance | 1
BA 804 | Ethical Leadership | 2
BA 805 | Negotiation Theory and Skills | 1
BA 810 | Supply Chain and Operations Management | 2
BA 811 | Financial Accounting | 2
BA 815 | Business Statistics for Contemporary Decision Making | 2
BA 817 | Communication Skills for Management | 4
BA 821 | Foundation in Managerial Accounting | 2
BA 831 | Foundations in Finance | 2
BA 832 | Global Business Environment | 1
BA 835 | Global Perspectives | 2
BA 836 | Global Immersion | 1

**Electives**

The remaining 22 elective credits must be chosen from a list of approved elective courses maintained by the graduate program office.

**Culminating Experience**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
</table>
| BA 571 | Strategic Management | 2

1. The culminating experience for the M.B.A. is BA 571. This course is designed to bring together the many functional areas previously studied and integrate them into a strategic analysis of the entire firm.
**Master of Science (M.S.)**
Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

Admission to the M.S. program is only available to students previously admitted to the Ph.D. program, with the approval of the Director of the Ph.D. program. The M.S. degree requires a minimum of 30 credits at the 400, 500, 600, or 800 level in business administration or related areas, including a thesis or scholarly paper. Students who complete a thesis must take at least 18 credits at the 500 or 600 level, with a minimum of 6 credits in thesis research (BA 600 or BA 610). The thesis must be accepted by the committee members, the head of the graduate program, and the Graduate School. Students who choose the non-thesis option must take at least 18 credits at the 500 level, and complete a satisfactory scholarly paper while enrolled in BA 596.

**Doctor of Philosophy (Ph.D.)**
Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

**Competency Expectations**
Entrance into the doctoral program in business administration does not require the completion of an undergraduate degree specifically in business. While almost any major at the undergraduate level may be acceptable, graduate study in business administration does presume a minimum level of competency in mathematics, statistics, and computing. No transcript credit is required for entering doctoral students in these areas, except where specified by particular fields of specialization. However, it must be emphasized that lack of minimum competency in mathematics, statistics and computing could be a significant disadvantage to the student.

**Breadth Requirement**
All students are expected to develop a broad understanding of the functions of the business organization. To achieve breadth, all Ph.D. students must show competency by completing 12 credits at the 400, 500, or 800 level in a minimum of two of the approved fields of study within the Smeal College of Business and/or in Economics in the College of the Liberal Arts. The 12 credits in the breadth requirement must be taken in fields outside or separate from a student’s primary, supporting, and research competency fields.

**Primary Field Requirements**
All students are required to achieve competency in a primary field of business administration. The primary field is the sphere of scholarship that commands the most extensive and intensive portion of a program and is the area in which the student’s dissertation research is conducted and the dissertation committee chair is selected. Primary fields may be selected from the following:

- accounting;
- finance;
- insurance and real estate;
- management and organization;
- marketing;
- supply chain and information systems.

Graduate work in a selected primary field may require competency in prerequisite areas, including undergraduate work in the field itself as well as prior work in mathematics, statistics, computer science, economics, and social and behavioral sciences. The prerequisite work will be specified by each primary field.

**Supporting Field Requirements**
All students must select a supporting field of study from business administration or related outside areas. Those spheres of scholarship complement the student’s primary field. Supporting fields from business administration include all the primary fields. Outside supporting fields include, but are not limited to,

- anthropology,
- civil engineering,
- computer science,
- economics,
- industrial engineering,
- mathematics,
- political science,
- psychology,
- sociology,
- statistics.

**Research Methods Field**
All students must develop a broad understanding of the scientific research process and in-depth competency in the research methods used in the primary field. Each student’s dissertation committee shall specify a minimum of 4 courses/12 credits at the 400, 500, or 800 level (beyond the M.B.A. core courses) to constitute a supporting field in research methods. These courses should cover specific methods and tools relevant for research in the primary fields. A member of the dissertation committee shall be designated to represent the research methods field and shall be responsible for evaluating the student’s competence in the field.

**Research Paper and Presentation Requirement**
To introduce students early to the research process, each Ph.D. student must complete a written research paper within two years after admission to the Ph.D. program. The student must then present the paper at an open departmental workshop or seminar within one semester after the paper is approved by the department committee and chair. The student must work under the guidance of a Research Paper Supervisor (who may or may not later be the dissertation adviser). The research paper supervisor mentors the student, possibly suggesting the research topic, monitoring progress, providing ideas and feedback, and helping the student develop appropriate research, writing, and presentation skills. The paper must substantially represent the student’s work, and must be written by the student. The paper must clearly define and motivate the problem being addressed, contain a comprehensive literature review, and present the research contributions and conclusions. Approval of written paper and presentation can be used as a means to satisfy the Graduate Council English competence and communication requirement (to be completed before the comprehensive examination).

**Dissertation**
To earn the Ph.D. degree, doctoral candidates must write a dissertation that is accepted by the dissertation committee, the head of the graduate program, and the Graduate School, and the student must pass a final oral examination (the dissertation defense).
Dual-Titles

Dual-Title M.S. and Ph.D. in Business Administration and Operations Research

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-208/dual-title-graduate-degree-programs).

M.S. and Ph.D. students in Smeal College of Business can elect to participate in the Operations Research dual-title graduate program. Operations Research is the use of scientific methodology in the formulation, analysis, and solution of problems of decision making.

Admissions Requirements

Students must apply and be admitted to the graduate program in Business Administration and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Operations Research dual-title program. Refer to the Admission Requirements section of the Operations Research Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/operations-research). Doctoral students must be admitted into the dual-title degree program in Operations Research prior to taking the qualifying exam in their home department.

Degree Requirements

To qualify for the dual-title degree, students must satisfy the degree requirements for the degree they are enrolled in Business Administration, listed on the Degree Requirements tab. In addition, students must complete the degree requirements for the dual-title in Operations Research, listed on the Operations Research Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/operations-research).

For the dual-title M.S. degree in Business Administration and Operations Management, the thesis or scholarly paper must reflect the student's education and interest in both Business Administration and Operations Research. The master's committee must include at least one Graduate Faculty member from Operations Research. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role.

The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Business Administration and must include at least one Graduate Faculty member from the Operations Research program. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. There will be a single qualifying examination, containing elements of both Business Administration and Operations Management. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of a Business Administration and Operations Research dual-title Ph.D. student must include at least one member of the Operations Research Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in Operations Research, the member of the committee representing Operations Research must be appointed as co-chair.

The Operations Research representative on the student's dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their dissertation committee and reflects their original research and education in Business Administration and Operations Research. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

Integrated Undergrad-Grad Programs

Integrated B.S. in Science and M.B.A. in Business Administration

Requirements listed here are in addition to requirements listed in GCAC-210 Integrated Undergraduate-Graduate (IUG) Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-208/integrated-undergraduate-graduate-degree-programs).

This program is the result of collaboration between the Eberly College of Science and Smeal College of Business. With the accelerated nature of the program, students can earn a B.S. degree in science and an M.B.A. degree in five calendar years after graduation from high school. For the first three and one-half years, including the first semester of the M.B.A. curriculum, students are enrolled as undergraduates in the Eberly College of Science. For the remaining three semesters, participants are graduate students formally enrolled in the Smeal College of Business M.B.A. program. Successful completion of this program results in a B.S. degree in Science awarded by the Eberly College of Science during year four and an M.B.A. from the Smeal College of Business at the end of year five.

Students must apply to the program via the Graduate School application for admission (http://www.gradschool.psu.edu/prospective-students/how-to-apply), and must meet all the admission requirements of the Graduate School and the Business Administration graduate program for the Master of Business Administration degree. Students shall be admitted to an IUG program no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree, as specified in the proposed IUG plan of study. Students must be admitted to the program prior to taking the first course they intend to count towards the graduate degree.

In consultation with an adviser, students must prepare a plan of study appropriate to this integrated program, and must present their plan of study in person to the head of the graduate program or the appropriate committee overseeing the integrated program prior to being admitted to the program. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser as the student advances through the program.

Students must fulfill all requirements for each degree in order to be awarded that degree. Degree requirements for the B.S. degrees can be found in the Undergraduate Degree Program Bulletin (http://bulletins.psu.edu/undergraduate). Degree requirements for the M.B.A. degree are listed on the Degree Requirements tab.

Up to 12 credits may be double-counted towards the degree requirements for both the graduate and undergraduate degrees; a minimum of 50%
of the double-counted courses must be at the 500 or 800 level. Credits associated with the culminating experience for the graduate degree cannot be double-counted.

<table>
<thead>
<tr>
<th>Code</th>
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<th>Credits</th>
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<tbody>
<tr>
<td>BA 512</td>
<td>Quantitative Analysis for Managerial Decision Making</td>
<td>2</td>
</tr>
<tr>
<td>BA 800</td>
<td>Marketing Management</td>
<td>2</td>
</tr>
<tr>
<td>BA 801</td>
<td>Management</td>
<td>2</td>
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<tr>
<td>BA 811</td>
<td>Financial Accounting</td>
<td>2</td>
</tr>
<tr>
<td>BA 815</td>
<td>Business Statistics for Contemporary Decision Making</td>
<td>2</td>
</tr>
<tr>
<td>BA 831</td>
<td>Foundations in Finance</td>
<td>2</td>
</tr>
</tbody>
</table>

If students accepted into the IUG program are unable to complete the M.B.A. degree, they are still eligible to receive their undergraduate degree if all the undergraduate degree requirements have been satisfied.

**Joint Degrees**

**Joint J.D./M.B.A. with Penn State Law**

Requirements listed here are in addition to requirements listed in GCAC-211 Joint Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/joint-degree-programs).

Smeal College of Business and the Penn State Law offer a joint degree program leading to the degrees of Juris Doctor (J.D.) and Master of Business Administration (M.B.A.). We live in a global society where complex legal structures interact with dynamic and powerful market forces. Individuals with backgrounds in both business and law have a distinct advantage in understanding this interaction and are uniquely positioned for success in our modern society. The Juris Doctor/Master of Business Administration (J.D./M.B.A.) joint degree program provides outstanding, highly motivated students the opportunity to combine a Juris Doctor degree from Penn State Law with an M.B.A. degree from Penn State’s internationally ranked Smeal MBA Program (Smeal). Participants in this program earn both a Juris Doctor degree and a Master of Business Administration in four years compared to the five years required to earn the two degrees separately.

In order to be admitted to the program, students may:

1. first be admitted and enrolled in either Smeal College or Penn State Law and subsequently admitted to the other program; or
2. be admitted to the joint program prior to commencing studies at Penn State. Each program will make a separate admission decision. Students admitted to both programs will be admitted as joint degree candidates.

**Admission Requirements**

Candidates must apply to Penn State Law and Smeal separately and must meet each school’s requirements. The admission requirements for the Master of Business Administration degree are listed on the Admission Requirements tab. Admissions requirements and applications for admission to Penn State Law are available at the J.D. Admissions (https://www.pennstatelaw.psu.edu/penn-state-law-jd-admissions) section of the Penn State Law website. Students must be admitted to the program prior to taking the first course they intend to count towards the M.B.A. degree.

**Degree Requirements**

**Credit Requirements**: Students must fulfill all requirements for each degree in order to be awarded that degree, subject to the double-counting of credits as outlined below. Degree requirements for the J.D. program are listed on the Penn State Law website (https://www.pennstatelaw.psu.edu/jd-degree-requirements). Degree requirements for the M.B.A. degree are listed on the Degree Requirements tab.

**Double Counting of Credits: M.B.A.** A maximum of 16 credits from Penn State Law course work may be double counted toward the M.B.A. degree at Smeal. Courses for which such credit may be applied shall be subject to approval by Smeal based on relevance to the M.B.A. program. Students must obtain a grade satisfactory to Smeal for any J.D. course work to be credited toward the M.B.A. degree.

**Double Counting of Credits: J.D.** A maximum of 12 credits for M.B.A. course work may be double counted for credit toward the J.D. degree at Penn State Law. Courses for which such credit may be applied shall be subject to approval by the Penn State Law faculty. Students must obtain a grade satisfactory to Penn State Law for any M.B.A. course work to be credited toward the J.D. degree.

**Advising of Students**: All students in the program shall have two advisers, one from Smeal and one from Penn State Law. Periodic interaction between the two advisers is encouraged.

**Graduation**: If students accepted into the joint degree program are unable to complete the J.D. degree, they are still eligible to receive the M.B.A. degree if all the M.B.A. degree requirements have been satisfied.

**Joint M.D./M.B.A. with the College of Medicine**

Requirements listed here are in addition to requirements listed in GCAC-211 Joint Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/joint-degree-programs).

Smeal College of Business and the Penn State Hershey College of Medicine offer a joint degree program leading to the degrees of Medical Doctor (M.D.) and Master of Business Administration (M.B.A.). The objective of the program is to produce highly qualified clinicians who also understand the challenges of running a business. The Medical Doctor/Master of Business Administration (M.D./M.B.A.) joint degree program provides outstanding students the opportunity to combine a Medical Doctor degree from the College of Medicine, a highly respected medical college and medical center, with an M.B.A. degree from Penn State’s internationally ranked Smeal MBA Program (Smeal). Participants in this program earn both a Medical Doctor degree and a Master of Business Administration in five years compared to the six years required to earn the two degrees separately.

In order to be admitted to the program, students must first be admitted and enrolled in the COM as a medical student and subsequently admitted to Smeal. Each program will make a separate admission decision. Students admitted to both programs will be admitted as joint degree candidates.

Students currently enrolled at the College of Medicine in the M.D. program may apply to the M.D./M.B.A. program during their first three years at the College of Medicine by applying to the M.B.A. program, as described on the Admission Requirements tab.

**Admission Requirements**

The admission requirements for the Master of Business Administration degree are listed on the Admission Requirements tab. Admissions
requirements and applications for admission for Penn State College of Medicine are available at the M.D. Program (http://www.med.psu.edu/md) section of the Penn State College of Medicine website. Students must be admitted to the program prior to taking the first course they intend to count towards the M.B.A. degree.

**Degree Requirements**

**Credit Requirements:** Students must fulfill all requirements for each degree in order to be awarded that degree, subject to the double-counting of credits as outlined below. Degree requirements for the M.D. program are listed on the College of Medicine website (http://www.med.psu.edu/md). Degree requirements for the M.B.A. degree are listed on the Degree Requirements tab.

**Sequence:** Students may choose to conduct their study in either of the two sequences shown below. Each "Year" refers to the traditional academic year beginning in late August and concluding in May. The College of Medicine students can expect to take courses during the summer. The Smeal College of Business does not offer any classes over the summer term.

- **Years 1-3:** M.D. foundation and advanced course work at the College of Medicine.
- **Year 4:** M.B.A. foundation course work at the University Park location.
- **Year 5:** Combination of M.D. and M.B.A. course work at the University Park location.

**Double Counting of Credits:**

- **M.B.A.:** 15 credits from the College of Medicine course work may be double counted toward the M.B.A. degree at Smeal. Courses for which such credit may be applied shall be subject to approval by Smeal based on relevance to the M.B.A. program. Students must obtain a grade satisfactory to Smeal (High Pass or Low Pass) for any M.D. course work to be credited toward the M.B.A. degree.

- **M.D.:** A maximum of 45 credits for M.B.A. course work may be double counted for credit toward the M.D. degree at the COM. Courses for which such credit may be applied shall be subject to approval by the College of Medicine faculty. Students must obtain a grade satisfactory to the College of Medicine (a grade of "C" or higher) for any M.B.A. course work to be credited toward the M.D. degree.

**Advising of Students:** All students in the program shall have two advisers, one from the Smeal College of Business and one from the College of Medicine. Periodic interaction between the two advisers is encouraged.

**Graduation:** If students accepted into the joint degree program are unable to complete the M.D. degree, they are still eligible to receive the M.B.A. degree if all the M.B.A. degree requirements have been satisfied.

**Student Aid**

Graduate assistantships available to students in this program and other forms of student aid are described in the Student Aid (http://www.bulletins.psu.edu/bulletins/whitebook/general_information.cfm?section=tuition2) section of the Graduate Bulletin, other awards are available to graduate students in Smeal College of Business.

**Courses**

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**Contact**

**Master of Science (M.S.) and Doctor of Philosophy (Ph.D.)**

- **Graduate Program Head:** Brent Ambrose
- **Primary Program Contact:** Dana Campolongo
- **Email:** drc21@psu.edu
- **Mailing Address:** 351 Business Building, University Park, PA 16802
- **Telephone:** (814) 865-7669
- **Program Website:**
  - Smeal Ph.D. Program (https://www.smeal.psu.edu/phd)
  - Smeal M.S. Program (http://www.smeal.psu.edu/ms)

**Master of Business Administration (M.B.A.)**

- **Graduate Program Head:** Brian Cameron
- **Director of Graduate Studies/Professor-in-Charge:** Louis Gattis
- **Primary Program Contact:** Susan Winarchick
- **Email:** skf10@psu.edu
- **Mailing Address:** 220 Business Building, University Park, PA 16802
- **Telephone:** (814) 863-0474
- **Program Website:** Smeal M.B.A. Program (http://www.smeal.psu.edu/mba)
Chemical Engineering

Graduate Program Head: Phillip Savage

Program Code: CHE

Campus(es): University Park (Ph.D., M.S.)

Degrees Confirmed:
- Master of Science (M.S.)
- Doctor of Philosophy (Ph.D.)

Dual-Titles

Dual-title M.S. and Ph.D. and in Chemical Engineering and Operations Research

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Scores from the Graduate Record Examination (GRE) are required for admission. At the discretion of the graduate program, a student may be admitted provisionally (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/provisional-admission) for graduate study without these scores.

Students should be a graduate of an accredited program in chemical engineering. Graduates with other accredited engineering, mathematics, or physical science majors may be admitted, though alternative program schedules may be required as students will be required to demonstrate graduate level competency in the core chemical engineering disciplines of thermodynamics, reaction and reactor kinetics, and transport. This may include making up of undergraduate deficiencies without graduate credit. Students with a 3.00 grade-point average or above (on a 4.00 scale) and with appropriate course backgrounds will be considered for admission.

Degree Requirements

Master of Science (M.S.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

Course offerings and research facilities are available in:
- bioprocessing,
- protein engineering,
- energy and alternative energy,
- catalysis and kinetics,
- fluid mechanics,
- nanotechnology,
- polymer science and engineering,
- process control,
- molecular simulation,
- systems biology,
- optimization.

Two tracks are available in the Chemical Engineering M.S. program, a thesis and a non-thesis track. A minimum of 18 course credits (30 credits total) is required of the thesis track, which must also include completion of a research thesis and oral defense of the thesis. A minimum of 21 course credits (30 credits total) is required of the non-thesis track. This track also includes a 7-credit research project during the spring and summer that includes a culminating written paper and presentation.

All M.S. students complete a set of core courses in the fundamental chemical engineering disciplines of thermodynamics, reaction and reactor kinetics, and transport. There is no communication or language requirement. Continuous registration is required for all graduate students until the thesis or final paper is approved.

Doctor of Philosophy (Ph.D.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

A minimum of 30 graduate course credits is required and must include a minimum of 15 credits of 500-series Chemical Engineering courses taken at the University. There is no communication or language requirement. The comprehensive examination consists of a written research proposal or project defended orally after it has been accepted.

Continuous registration is required for all graduate students until the dissertation is approved.

Dual-Titles

Dual-title M.S. and Ph.D. and in Chemical Engineering and Operations Research

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

Admissions Requirements

Students must apply and be admitted to the graduate program in Chemical Engineering and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Operations Research dual-title program. Refer to the Admission Requirements section of the Operations Research Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/operations-research). Doctoral students must be admitted into the dual-title degree program in Operations Research prior to taking the qualifying examination in their primary graduate program.

Degree Requirements

To qualify for the dual-title degree, students must satisfy the degree requirements for the degree they are enrolled in Chemical Engineering, listed on the Degree Requirements tab. In addition, students must complete the degree requirements for the dual-title in Operations Research, listed on the Operations Research Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/operations-research).

The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Chemical Engineering and must include at least one Graduate Faculty member from the Operations Research program. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. There will be a single qualifying examination, containing elements of both Chemical
Engineering and Operations Research. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of a Chemical Engineering and Operations Research dual-title Ph.D. student must include at least one member of the Operations Research Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in Operations Research, the member of the committee representing Operations Research must be appointed as co-chair. The Operations Research representative on the student’s dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their dissertation committee and reflects their original research and education in Chemical Engineering and Operations Research. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact

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Director of Graduate Studies/Professor-in-Charge: Kristen Fichthorn
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Mailing Address: 114 Greenberg (Hastings), University Park, PA 16802
Telephone: (814) 865-2575
Program Website: Chemical Engineering (http://www.che.psu.edu)

Chemistry

Graduate Program Head: Philip Bevilacqua
Program Code: CHEM
Campus(es): University Park (Ph.D., M.S.)
Degrees Conferred
- Doctor of Philosophy (Ph.D.)
- Master of Science (M.S.)
- Dual-title Ph.D. in Chemistry and Biogeochemistry

The Graduate Faculty

The Ph.D. program in Chemistry provides students with a broad background in chemistry and intensive research experience culminating in the preparation of a formal thesis. The goal of the program is to prepare students for a variety of careers in academia, government, or industry. The exceptionally high quality of our laboratory and computer facilities enables us to provide students with outstanding research opportunities. Distinguished visiting scholars conduct informal discussions each week at a departmental colloquium.

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Scores from the Graduate Record Examination (GRE) are required for admission. In extenuating circumstances, a student may be admitted at the discretion of the program for graduate study without these scores.

For admission, at least integral calculus plus one year’s work in general physics, organic chemistry, physical chemistry, and either analytical or inorganic chemistry are normally required. Students who have appropriate course backgrounds and who present a 2.50 average (on a 4.00 scale) in all undergraduate courses in chemistry, physics, and mathematics will be considered for admission. The best-qualified applicants will be accepted up to the number of spaces that are available for new students. Exceptions to the minimum 2.50 grade-point average may be made for students with special backgrounds, abilities, and interests.

Degree Requirements

Master of Science (M.S.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

A minimum of 30 credits at the 400, 500, or 800 level is required, with at least 18 credits at the 500 and 600 level, combined. CHEM 431W, CHEM 450, CHEM 452, CHEM 457, CHEM 494, and CHEM 500 cannot be applied towards the M.S. degree requirements. Students who choose to complete a scholarly paper as the culminating experience must complete 18 credits at the 500 level. All candidates for advanced degrees must schedule CHEM 602, Supervised Experience in College Teaching, for at
least 1 credit for at least one semester; however, this 1 credit cannot be counted towards the minimum credits required for the degree.

M.S. students must complete either a thesis or a scholarly paper as the culminating experience for the degree. Students who choose to write a thesis must defend the thesis at an oral examination. The thesis will be accomplished under the sponsorship of a faculty member, and the candidate must take 12 credits of CHEM 600 in conjunction with the thesis. A maximum of 6 credits of CHEM 600 may be awarded a quality grade. The thesis must be approved by a committee of at least three faculty members, one of whom will be the candidate's sponsor. The thesis must also be accepted by the head of the graduate program and the Graduate School, and the student must pass the thesis defense. A final oral examination will be administered by a committee consisting of the student's research preceptor and two other faculty members. This examination is scheduled after the M.S. thesis has been completed. Students who choose to complete a scholarly paper enroll in CHEM 589 (12 credits).

Examinations in analytical, biological, inorganic, organic, and physical chemistry will be given to all new students upon entrance in the fall semester. These exams cover subject matter at the level of the basic courses offered for the B.S. degree in Chemistry at Penn State. For certification as an M.S. student, proficiency in two areas is required. Such proficiency may be demonstrated either by (1) passing the area examination upon entrance, or (2) obtaining a grade-point equivalent of 3.0 in at least 3 credits of 500-level course work in the area. The courses used to fulfill this latter option will be designated by the graduate counseling committee. This course work must be completed successfully during the student's first two semesters of residence.

Doctor of Philosophy (Ph.D.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

Candidates for the Ph.D. degree in Chemistry must meet the following requirements established by the department faculty.

A Ph.D. student must take a minimum of five 3-credit courses in chemistry at the 400 or 500 level. The student's dissertation committee may require additional specific courses.

All candidates for advanced degrees must schedule CHEM 602, Supervised Experience in College Teaching, for at least 1 credit for at least one semester; however, this 1 credit cannot be counted towards the minimum credits required for the degree.

Examinations in analytical, biological, inorganic, organic, and physical chemistry will be given to all new students upon entrance in the fall semester. These exams cover subject matter at the level of the basic courses offered for the B.S. degree in Chemistry at Penn State. As a part of the requirements for certification as a Ph.D. student, each student will be expected to demonstrate proficiency in three areas of chemistry. Such proficiency may be demonstrated either by (a) passing the area examination upon entrance, or (b) obtaining a grade-point equivalent of 3.0 in at least 3 credits of 500-level course work in the area. The courses used to fulfill this latter option will be designated by the graduate counseling committee. This course work must be completed successfully during the student's first two semesters of residence.

In order to qualify for the oral comprehensive examination, a Ph.D. student must first obtain a grade of 3.0 or better on 4 credits of CHEM 500 (by writing the requisite number of seminar reports, proposals, and presenting in an area seminar).

A Ph.D. student must pass the oral comprehensive examination during his or her first two and one-half years of residency.

Every Ph.D. student shall present at least one area or department seminar during the course of residency.

A final oral examination based on a defense of the doctoral dissertation is required of all candidates. This exam is given as a formal public seminar with a subsequent closed meeting with the dissertation committee. To earn the Ph.D. degree, doctoral students must write a dissertation that is accepted by the dissertation committee, the head of the graduate program, and the Graduate School, and the student must pass the final oral examination (the dissertation defense).

Dual-Titles

Dual-Title Ph.D. in Chemistry and Biogeochemistry

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

Graduate students with research and educational interests in biogeochemistry may apply to the Biogeochemistry Dual-Title Degree Program. Students in the Biogeochemistry Dual Title program are required to have two advisers from separate disciplines: one individual serving as a primary adviser in their major degree program and a secondary adviser in an area within a field covered by the dual-title program and a member of the Biogeochemistry faculty.

Students must apply and be admitted to the graduate program in Chemistry and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Biogeochemistry dual-title program. Refer to the Admission Requirements section of the Biogeochemistry Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/biogeochemistry). Doctoral students must be admitted into the dual-title degree program in Biogeochemistry prior to taking the qualifying examination in their primary graduate program.

The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Chemistry and must include at least one Graduate Faculty member from the Biogeochemistry program. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. There will be a single qualifying examination, containing elements of both Chemistry and Biogeochemistry. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of a Chemistry and Biogeochemistry dual-title Ph.D. student must include at least one member of the Biogeochemistry Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in Biogeochemistry, the member of the committee representing
Biogeochemistry must be appointed as co-chair. The Biogeochemistry representative on the student's dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their dissertation committee and reflects their original research and education in Chemistry and Biogeochemistry. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

**Student Aid**

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School's website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

It is important to note that department policy limits financial support from department funds to the first two years of graduate study of an M.S. candidate and to the first five years of graduate study of a Ph.D. candidate. Financial support beyond these periods is permitted from other than department funds, e.g., a research assistantship funded from an individual faculty member’s research grant(s).

**Courses**

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**Learning Outcomes**

1. Know: Graduates will exhibit appropriate depth and breadth of chemistry knowledge, both of core principles as well as theories and methods in their chosen sub-discipline(s).
2. Apply/Create: Graduates will use chemistry-based methods and techniques to create new knowledge, and to apply that knowledge to problem solving tasks.
3. Communicate: Graduates will be able to convey their chemical knowledge via effective written and verbal communication skills.
4. Think: Graduates will employ satisfactory analytical and critical thinking and creativity, within Chemistry.
5. Professional Practice- ethical and professional behavior: Graduates will demonstrate ethical best practices for chemistry research, interact collegially with peers, and seek to promote productive collaborations as part of their graduate and professional work.

**Contact**

Graduate Program Head: Philip Bevilacqua

Director of Graduate Studies/Professor-in-Charge: Scott Schowalter

Primary Program Contact: Crista Spratt

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Mailing Address: 104 Chemistry Building, University Park, PA, 16802

Telephone: (814) 865-1383

Program Website: Chemistry (http://www.chem.psu.edu)

**Civil Engineering (Capital)**

Graduate Program Head: Rafic Bachnak

Program Code: CENG

Campus(es): Harrisburg (M.S.)

Degrees Conferred: Master of Science (M.S.)

The Graduate Faculty: View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=CENG)

Penn State Harrisburg (PSH) is located within a short commute from York, Lancaster, Carlisle, Reading, and Harrisburg, where many large civil engineering firms are located. These firms focus on structural design, construction management, transportation design, treatment plant design, and water-resources engineering. The Master of Science in Civil Engineering degree program is designed to provide support for these firms and their employees who want to enhance their design skills and update their knowledge above the level taught at the undergraduate level. This program also will support changes in the professional licensure for civil engineers, if they occur.

The program is accessible to engineering professionals who wish to pursue advanced studies without giving up current employment. The program may be completed on a full-time or part-time basis. Classes are scheduled weekly in three-hour evening sessions, offering a convenient format for career professionals seeking to enroll on part-time basis. Whenever possible, the program will take advantage of the specialized equipment and facilities available in the local firms to enhance the training of M.S. CE program students.

**Admission Requirements**

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Admission into the Master of Science (M.S.) Civil Engineering program will be granted only to candidates who demonstrate high potential for success in graduate studies. Applicants should have undergraduate degrees in engineering or technology-related fields from an accredited university and must meet the admission requirements as set by Penn State's Graduate School. An undergraduate cumulative grade-point average of 3.0 or better on a 4.0 scale, and scores from the GRE are required for admission.

Applicants should submit the following:

- a completed Graduate School online application with the application fee;
• official transcripts from all post-secondary institutions attended (http://www.gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission);
• three (3) letters of professional recommendations from individuals who can evaluate the applicant’s potential;
• a personal statement of professional interest, goals, and experience;
• test scores from the Graduate Record Examination (GRE); and
• a statement of interest in a graduate assistantship, if desired (full-time study required).

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. See GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

**Degree Requirements**

**Master of Science (M.S.)**

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

All graduate students in Civil Engineering are required to adhere to the requirements of the Graduate School, as found in the Graduate Degree Programs Bulletin. The requirements of the Graduate School, however, are minimum requirements and the policies, procedures, and regulations listed below are additional and more specific for graduate students pursuing the M.S. in Civil Engineering degree. Advisers will call pertinent regulations to the attention of their advisees, but it should be understood that it is the student’s personal responsibility to see that all requirements are satisfied.

The M.S. CE program at PSH is structured to take full advantage of the specialty areas of expertise of the CE Graduate Faculty. The program requires 31 credits at the 400, 500, 600, or 800 level, including 24 course credits with at least 12 credits at the 500 level, one colloquium credit (CE 590), and six thesis credits (CE 600 or CE 610). M.S. CE students are required to take an advanced math or statistics course (EMCH 524A or STAT 500). Then students will take 12 credits of civil engineering courses, selected from offerings in structural, transportation, and water resources, with nine (9) credit hours required at the 500-level. Students will take nine (9) additional elective credits at either the 400- or 500-level. These electives may be taken from civil engineering courses or courses offered by other departments that meet the objective of the M.S. CE degree. Students can work with their adviser to select courses that either focus on a specific area of civil engineering or that provide a robust in-depth background of multiple areas of civil engineering. A maximum of four 400-level courses (12 credits) may be taken for the M.S. CE degree.

Original research, usually requiring at least two semesters of work (up to 6 credits), is expected for a thesis. The work should be an in-depth investigation intended to extend the state of knowledge in a specialty area. The thesis must be accepted by the advisers and/or committee members, the head of the graduate program, and the Graduate School, and the student must pass a thesis defense. A maximum of three credits of independent study (CE 596) may be applied towards the M.S. CE degree program, but the undergraduate individual study course (CE 496) will not count towards program credit requirements.

During the first year of enrollment, graduate students will be required to complete an online Responsible Conduct of Research (RCR) training program. This is part of the SARI (Scholarship and Research Integrity) program at Penn State which is designed to offer graduate students comprehensive, multilevel training in the responsible conduct of research. The Office for Research Protections (ORP) will provide the conduit to this training via the SARI Resource Portal on the ORP website (http://bulletins.psu.edu/graduate/programs/majors/civil-engineering-capital/www.research.psu.edu/orp/sani).

Graduate students will also be required to engage in an additional 5 hours of discussion-based RCR education prior to degree completion. This may be set up as an integral part of the graduate colloquium.

All students are expected to complete one credit of colloquium (CE 590) during the first two semesters of study. Degree requirements must be completed during a six-year period.

Penn State Harrisburg’s M.S. CE program is distinct and independent of the M.S. CE program offered at the University Park campus.

**Student Aid**

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

**Courses**

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**Contact**

**Graduate Program Head:** Rafic Bachnak

**Director of Graduate Studies/Professor-in-Charge:** Shirley Clark

**Primary Program Contact:** Justine Yelk

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**Program Website:** Civil Engineering at Harrisburg (https://harrisburg.psu.edu/science-engineering-technology/civil-structural-construction/masters-science-civil-engineering)
Civil Engineering (Engineering)

Graduate Program Head
Patrick J. Fox

Program Code
CE

Campus(es)
University Park (Ph.D., M.S., M.Eng.)

Degrees Conferred
Doctor of Philosophy (Ph.D.)
Master of Science (M.S.)
Master of Engineering (M.Eng.)
Dual-Title Ph.D., M.S., and M.Eng. in Operations Research

The Graduate Faculty
View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=ac&prog=CE)

Students may specialize in:
- Environmental engineering
- Geotechnical and materials engineering
- Structural engineering
- Transportation engineering
- Water resources engineering

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Candidates should possess a baccalaureate degree from a regionally accredited institution. Students in engineering, physical sciences, or mathematics with a 3.00 grade-point average (on a 4.00 scale) may be considered for admission. Exceptions to the minimum 3.00 grade-point average may be made for students with special backgrounds, abilities, and interests. Students without a baccalaureate degree in engineering would be admitted on a provisional basis with a degree from the College of Engineering at The Pennsylvania State University with a cumulative grade-point average of greater than 3.30.

U.S. applicants will upload official transcripts from all post-secondary institutions attended (http://gradschool.psu.edu/apply/new-applicants/requirements-for-graduate-admission), a statement of objectives, and three references for letters of recommendation when applying to the program. In addition, all applicants must submit scores from the General Graduate Record Examinations Aptitude Test (verbal, quantitative, and analytical). For the M.Eng. degree, the GRE requirement will be waived for students who have graduated with a degree from the College of Engineering at The Pennsylvania State University with a cumulative grade-point average of greater than 3.30.

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. See GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-305/admission-requirements-international-students) for more information.

Application Deadlines

M.Eng.: Complete applications including required supplementary materials (e.g., official transcripts, reference letters) should be submitted by March 15th of the calendar year for admission in Fall semester. International students are strongly encouraged to submit complete applications early to allow sufficient time for visa processing.

M.S. and Ph.D.: Complete applications including required supplementary materials (e.g., official transcripts, reference letters) should be submitted by September 15th for admission in Spring semester and by December 15th for admission in Fall semester. International students are strongly encouraged to submit complete applications early to allow sufficient time for visa processing.

Degree Requirements

Master of Engineering (M.Eng.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

The M.Eng. degree is a non-thesis professional master’s degree. The program provides training for advanced professional practice. A minimum of 31 credits (400, 500, or 800) of course work are required. At least 18 credits must be earned in graduate courses (500 level). At least 12 credits must be earned in courses with the CE prefix. At least 20 credits must be earned at an established graduate campus of the University. All students are required to take CE 535 to fulfill the requirement for a culminating experience. All students are required to take the 1-credit CE 590 and complete all requirements for Scholarship and Research Integrity (SARI) training. The M.Eng. degree is designed as a one-year master’s degree program and students are required to start their degree in the Fall semester. The preferred plan of study is as follows:

- Fall semester: Fifteen credits of course work plus one credit of CE 590
- Spring semester: Fifteen credits of course work, including CE 535

Students entering the M.Eng. degree must select and declare an area of specialization, where each area has specific core course requirements. The three areas of specialization are:

1. Infrastructure
2. Transportation Systems
3. Water and Environment

Continuous registration is required for all M.Eng. students until the course requirements have been satisfied.

Master of Science (M.S.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

The M.S. degree program is strongly oriented toward research. A thesis is required, and at least 6 credits of thesis research (CE 600 or CE 610) must be included in the candidate’s academic course plan. A minimum of 31 credits at the 400, 500, 600, or 800 level are required, of which 20 must be earned at an established graduate campus of the University. A minimum of 24 credits of course work are required. A minimum of 12 credits of course work (400 and 500 level) must be completed in the major (courses prefixed CE). At least 18 credits in the 500 and 600 levels, combined, must be included in the program. Specific core courses are required depending on the specialization within the department. Students are not permitted...
to count audited credits toward the minimum credits required for the
degree. All students are required to take the 1-credit CE 590 and complete
all requirements for Scholarship and Research Integrity (SARI) training.

Continuous registration is required for all M.S. students until the thesis
has been approved.

**Doctor of Philosophy (Ph.D.)**

Requirements listed here are in addition to Graduate Council policies
listed under GCAC-600 Research Degree Requirements. (http://
gradschool.psu.edu/graduate-education-policies)

All students are required to take the 1-credit CE 590 Colloquium and
complete all requirements for Scholarship and Research Integrity (SARI)
training.

Ph.D. students must pass the English proficiency and qualifying
examinations, prepare and defend the dissertation proposal as part of
the oral comprehensive examination, and pass the final oral examination
dissertation defense. Prior to completion of the Ph.D. program, the
student must spend at least two consecutive semesters as a registered
full-time student.

Continuous registration is required for all Ph.D. students until the
dissertation has been approved.

**Dual-Titles**

**Dual-Title M.Eng., M.S., and Ph.D. in Civil Engineering
and Operations Research**

Requirements listed here are in addition to requirements listed
in GCAC-208 Dual-Title Graduate Degree Programs (http://
gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-
title-graduate-degree-programs).

**Admission Requirements**

Students must apply and be admitted to the graduate program in
Civil Engineering and The Graduate School before they can apply for
admission to the dual-title degree program. After admission to their
primary program, students must apply for admission to and meet the
admissions requirements of the Operations Research dual-title program.
Refer to the Admission Requirements section of the Operations Research
Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/
operations-research). Doctoral students must be admitted into the dual-
title degree program in Operations Research prior to taking the qualifying
examination in their primary graduate program.

**Degree Requirements**

To qualify for the dual-title degree, students must satisfy the degree
requirements for the degree they are enrolled in Civil Engineering, listed
on the Degree Requirements tab. In addition, students must complete
the degree requirements for the dual-title in Operations Research, listed
on the Operations Research Bulletin page (http://bulletins.psu.edu/
graduate/programs/majors/operations-research).

The qualifying examination committee for the dual-title Ph.D. degree
will be composed of Graduate Faculty from Civil Engineering and must
include at least one Graduate Faculty member from the Operations
Research program. Faculty members who hold appointments in both
programs’ Graduate Faculty may serve in a combined role. There will
be a single qualifying examination, containing elements of both Civil
Engineering and Operations Research. Dual-title graduate degree
students may require an additional semester to fulfill requirements for
both areas of study and, therefore, the qualifying examination may be
delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for dissertation
committees (http://gradschool.psu.edu/graduate-education-policies/
gcac/gcac-600/phd-dissertation-committee-formation), the dissertation
committee of a Civil Engineering and Operations Research dual-title
Ph.D. student must include at least one member of the Operations
Research Graduate Faculty. Faculty members who hold appointments
in both programs’ Graduate Faculty may serve in a combined role. If
the chair of the dissertation committee is not also a member of the
Graduate Faculty in Operations Research, the member of the committee
representing Operations Research must be appointed as co-chair.
The Operations Research representative on the student’s dissertation
committee will develop questions for and participate in the evaluation
of the comprehensive examination.

Students in the dual-title program are required to write and orally defend
a dissertation on a topic that is approved in advance by their dissertation
committee and reflects their original research and education in Civil
Engineering and Operations Research. Upon completion of the doctoral
dissertation, the candidate must pass a final oral examination (the
dissertation defense) to earn the Ph.D. degree. The dissertation must
be accepted by the dissertation committee, the head of the graduate
program, and the Graduate School.

**Student Aid**

Graduate assistantships available to students in this program and other
forms of student aid are described in the Tuition & Funding (http://
gradschool.psu.edu/graduate-funding) section of The Graduate School’s
website. Students on graduate assistantships must adhere to the course
load limits (http://gradschool.psu.edu/graduate-education-policies/hsad/
credit-loads-graduate-assistants) set by The Graduate School.

International applicants who wish to be considered for a teaching
assistantship must present an acceptable score (250-300 or 55-60)
on the Test of Spoken English (TSE). The TSE can be taken in many
countries, or at Penn State after arrival. The Department offers a number
of graduate fellowships.

**Courses**

Graduate courses carry numbers from 500 to 699 and 800 to 899.
Advanced undergraduate courses numbered between 400 and 499 may
be used to meet some graduate degree requirements when taken by
graduate students. Courses below the 400 level may not. A graduate
student may register for or audit these courses in order to make up
deficiencies or to fill in gaps in previous education but not to meet
requirements for an advanced degree.

**Contact**

**Graduate Program Head:** Patrick Fox

**Director of Graduate Studies/Professor-in-Charge:** William Burgos

**Primary Program Contact:** Judy Heltman

**Email:** jeh5@psu.edu

**Mailing Address:** Civil & Environmental Engineering, 216 Sackett Bldg.,
University Park, PA 16802

**Telephone:** (814) 863-3085
Program Website: Civil Engineering at University Park (https://www.cee.psu.edu/academics/graduate/degrees-and-requirements.aspx)

Classics and Ancient Mediterranean Studies

Gradient Program Head: Mark Munn
Program Code: CAMS
Campus(es): University Park
Degrees Conferred: Dual-Title
The Graduate Faculty: View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=CAMS)

Students electing this program through participating departments will earn a degree with a dual-title at the Ph.D. level, i.e., Ph.D. in (graduate program name) and Classics and Ancient Mediterranean Studies.

The following graduate program offers a dual-title degree in Classics and Mediterranean Studies: Philosophy.

Dual-title degrees grounded both in CAMS and a given discipline will acknowledge and foster interdisciplinary scholarship. This dual-title degree program will increase the intellectual rigor, breadth, and depth of graduate work in a participating program through immersion in the disciplinary fields covered by the Department of Classics and Ancient Mediterranean Studies: the literatures and languages of ancient Mediterranean societies; their history, social and material cultures, and their reception by other cultures.

This dual-title program will thus provide a context in which students will learn how to synthesize knowledge within and across traditional disciplinary boundaries. In addition, this dual-title degree program will provide qualified students opportunities for instructional training encouraging an interdisciplinary approach to teaching.

The primary advantages of this dual-title program include the intellectual and academic advantages and benefits of interdisciplinary study, as well as the enhancement of the reputation of the departments concerned through an innovative program, leading to recruitment of highly qualified graduate students, and an improved placement of doctoral graduates in highly-competitive humanities fields.

Admission Requirements

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

Students must apply and be admitted to their primary graduate program and The Graduate School before they can apply for admission to the CAMS dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the CAMS dual-title program. Doctoral students must apply for enrollment into the dual-title degree program in CAMS prior to taking the qualifying exam in their home department.

Applicants to this dual-title degree program should have a junior/senior cumulative average of at least 3.30 (on a 4.00 scale) and appropriate academic preparation. Preference will be given to those students who have an academic record that demonstrates expertise in a field relevant to ancient Mediterranean studies and proficiency at an intermediate level (e.g., 3 semesters of study) in one or more ancient languages. Where applicable, a minimum GPA of 3.5 (on a 4.00 scale) is requisite for graduate work previously undertaken. Prospective students seeking admission to this dual-title degree program are required to write a statement of purpose that addresses the ways in which their research and professional goals will reflect an interest in interdisciplinary research in the participating program and the disciplines and fields included in CAMS.

Degree Requirements

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

To qualify for a dual-title degree, students must satisfy the requirements of the primary graduate program in which they are enrolled. In addition, they must satisfy the degree requirements for the dual-title in CAMS, listed below.

This dual-title degree will require CAMS-related course work, normally including additional course work in ancient languages, additional components to the comprehensive examinations, and the completion of a CAMS-related doctoral dissertation. A CAMS graduate supervisory committee, chaired by a CAMS faculty member closely related to the student’s field of interest, will supervise the graduate study of each student accepted into this dual-title program until all CAMS-related coursework is completed. Students will be expected to attend and participate actively in the CAMS regularly scheduled colloquia.

Course work

• 15 credits of CAMS-related coursework at the 400 or 500 level or above.
• 3 of these credits will come from CAMS 592.
• At least 3 credits will come from CAMS 593.

The remainder may come from CAMS courses or courses relevant to the student’s research interests, as approved by the student’s doctoral adviser and the CAMS program director of graduate studies. Unless exempted by the student’s dissertation committee, at least 6 of these credits should be in an ancient language. No more than 6 credits can come from 400-level courses.

Qualifying Examination

Students must meet the Ph.D. qualifying exam requirements specified by the cooperating department. In addition, the student will be required to present a portfolio of work in CAMS to their committee. Such a portfolio would include a statement of the student’s interdisciplinary research interests, a program plan, and samples of writing that indicate the student’s work in CAMS.

The qualifying examination committee for the dual-title Ph.D. degree must include at least one Graduate Faculty member from the CAMS program. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.
**Dissertation Committee Composition**

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of a CAMS dual-title Ph.D. student must include at least one member of the CAMS Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in CAMS, the member of the committee representing CAMS must be appointed as co-chair. The CAMS representative on the student’s dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.

**English Competency Requirements**

The student will fulfill the English Competency requirements specified by the participating program.

**Modern Language Reading Proficiency Requirements**

Students will be expected to acquire and demonstrate reading proficiency in those modern foreign languages (e.g., but not exclusively, French, German, Italian) appropriate to their research interests, as identified in consultation with the student’s dissertation committee.

**Dissertation**

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their dissertation committee and reflects their original research and education in both their primary graduate program and CAMS. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

**Student Aid**

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School's website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

**Courses**

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**Contact**

Graduate Program Head: Mark Munn

Primary Program Contact: Alesha Drapcho-Gavlock

Email: amd353@psu.edu

Mailing Address: 108 Weaver Building, University Park, PA 16802

**Climate Science**

**Graduate Program Head** Michael Mann

**Program Code** CLSCI

**Campus(es)** University Park

**Degrees Conferred** Dual-Title

**The Graduate Faculty** View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fa&prog=CLSCI)

Students electing this degree program through participating programs earn a degree with a dual title in the Ph.D., i.e., Ph.D. in (graduate program name) and Climate Science.

The following graduate program offers the dual-title degree in Climate Science: Meteorology and Atmospheric Science.

The Climate Science dual-title degree program is administered by the Department of Meteorology and Atmospheric Science for the participating graduate programs. A program committee with representatives from each participating department maintains program definition, defines the nature of the candidacy examination and assigns the examining committee, identifies courses appropriate to the program, and recommends policy and procedures for the program’s operation to the dean of the Graduate School and to the deans of the participating colleges. The dual-title degree program is offered through participating programs in the College of Earth and Mineral Sciences and, where appropriate, other graduate programs in the University. The program enables students from several graduate programs to gain the perspectives, techniques, and methodologies of Climate Science, while maintaining a close association with major program areas of application. Climate Science is a field devoted to the study of Earth’s climate in the past, present, and future. A particular focus is understanding the effects of human activities (anthropogenic impacts) and natural forcing on climate.

**Admission Requirements**

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

Students must be admitted to their primary graduate program and The Graduate School before they can apply for admission to the dual-title degree program. Students must be admitted into the dual-title degree program in Climate Science prior to taking the qualifying examination in their primary graduate program.

Graduate students with research and educational interests in climate science may apply to the Climate Science Dual-Title Degree Program. Students must submit transcripts of their undergraduate and graduate course work, a written personal statement indicating the career goals they hope to serve by attaining a Climate Science dual-title, and a statement of support from their dissertation adviser. A strong preparation
in the basic sciences is expected, with evidence of an interest in multiple disciplines.

**Degree Requirements**

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

To qualify for a dual-title degree, students must satisfy the requirements of the primary graduate program in which they are enrolled. In addition, they must satisfy the degree requirements for the dual-title in Climate Science, listed below.

The minimum course requirements for the dual-title in Climate Science are as follows:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Required Courses</td>
<td></td>
</tr>
<tr>
<td></td>
<td>At least 3 credits of approved 400-, 500-, or 800-level courses in each of two specific areas:</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Climate dynamics seminar</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Climate dynamics and observations</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3 credits of approved 400-, 500-, or 800-level courses in each of three of the four remaining areas:</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>Physical climate system</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Biogeochemistry of the climate system</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Numerical methods and data analysis</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Human dimensions of climate change</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total Credits</td>
<td>15</td>
</tr>
</tbody>
</table>

Students are not eligible to take a 400-level course in any one of the areas if the course is offered by their primary graduate program. All students must take at least one 500-level course, and at least one course must be from outside of their core disciplinary expertise. Finally, all of the courses offered in Climate Dynamics and Observations will include sufficient material in radiative transfer and the greenhouse effect to ensure that the students clearly understand the underlying physics of climate and climate change. A list of the approved courses that will satisfy each of the area requirements is maintained by the graduate program office. Students or faculty may request that the Climate Science Committee consider approval of elective designations for any course, including temporary approvals for experimental or variable-title courses.

The qualifying examination committee for the dual-title Ph.D. degree must include at least one Graduate Faculty member from the Climate Science program. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. There will be a single qualifying examination, containing elements of both the primary graduate degree program and Climate Science. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of a Climate Science dual-title doctoral degree student must include at least one member of the Climate Science Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in Climate Science, the member of the committee representing Climate Science must be appointed as co-chair. The Climate Science representative on the student’s dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their dissertation committee and reflects their original research and education in both their primary graduate program and Climate Science. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**Contact**

**Graduate Program Head:** Michael Mann

**Clinical and Translational Sciences**

**Graduate Program Head**

Gail D. Thomas

James Pawelczyk

**Program Code**

CTS

**Campus(es)**

Hershey

University Park

**Degrees Conferred**

Dual-Title

**The Graduate Faculty**

View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=CTS)

Students electing to pursue this program through participating departments will earn a degree with a dual-title at the Ph.D. level, i.e., Ph.D. in (major program name) and Clinical and Translational Sciences.

The following graduate programs offers a dual-title degree in Clinical and Translational Sciences: Anatomy, Biobehavioral Health, Biomedical Sciences, Food Science, Kinesiology, Neuroscience, Nursing, Nutritional Sciences, Pathobiology.

The College of Medicine provides academic leadership of the CTS dual-title graduate degree program. It is administered jointly on the University Park and Hershey campuses through the College of Health and Human Development and the College of Medicine, respectively, in conjunction with Penn State’s Clinical and Translational Science Institute (CTSI) and in coordination with the student’s primary graduate program. The CTSI Education and Training Internal Advisory Committee, which includes
representatives from colleges and departments participating in the CTSI, maintains the program’s definition and goals, identifies faculty and courses relevant to the CTS dual-title graduate degree program, and recommends policies and procedures for the program’s operation.

The dual-title graduate degree program in CTS is designed to provide students with the aptitudes and skills necessary to expand research in their major field of study to impact clinical medicine and public health. The dual-title graduate degree program will provide opportunities to synthesize expertise across disciplinary boundaries and to evaluate the effectiveness of research to create improved clinical and/or health outcomes. This program enhances the training in the major field of study by providing value-added skill sets in patient-oriented, epidemiological, behavioral, outcomes and health services research that transitions scientific findings from the laboratory to the clinical setting to best practices in the community. Clinical and translational sciences are expanding, with career paths in academic, medical and industrial settings.

Because the dual-title Ph.D. complements the primary program of study, CTS program representation must be included at all phases of graduate study, including the qualifying exam, comprehensive exam, and final oral examination (dissertation defense).

**Admission Requirements**

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

Students must apply and be admitted to their primary graduate program and The Graduate School before they can apply for admission to the CTS dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the CTS dual-title program. Doctoral students must be admitted into the dual-title degree program in CTS prior to taking the qualifying examination in their primary graduate program.

An admissions committee comprised of faculty affiliated with the CTS dual-title graduate degree program will evaluate students. Applicants must have a graduate GPA of at least 3.5 in an area that relates to clinical and translational sciences. Applicants will be required to provide a statement of purpose that addresses the ways their research and professional goals will be enhanced by interdisciplinary research.

**Degree Requirements**

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

To qualify for a dual-title degree, students must satisfy the requirements of the primary graduate program in which they are enrolled. In addition, they must satisfy the degree requirements for the dual-title in CTS listed below.

General requirements for the dual-title Ph.D. in [major program name] and Clinical and Translational Sciences are listed below:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CTS 590</td>
<td>Colloquium (two semesters)</td>
<td>2</td>
</tr>
</tbody>
</table>

Select 6 credits from the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CTS 595A</td>
<td>Clinical Science Internship</td>
<td></td>
</tr>
<tr>
<td>CTS 595B</td>
<td>Translational Science Internship</td>
<td></td>
</tr>
<tr>
<td>BMS 571</td>
<td>Graduate Clinical Rotation</td>
<td></td>
</tr>
</tbody>
</table>

**Electives**

18 additional credits from a list of approved electives in the following areas: 1

<table>
<thead>
<tr>
<th>Area</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Statistics</td>
<td>3</td>
</tr>
<tr>
<td>Epidemiology</td>
<td>3</td>
</tr>
<tr>
<td>Bioinformatics</td>
<td>3</td>
</tr>
<tr>
<td>Experimental design and interpretation</td>
<td>3</td>
</tr>
<tr>
<td>The regulatory environment</td>
<td>3</td>
</tr>
<tr>
<td>Scientific communication</td>
<td>3</td>
</tr>
</tbody>
</table>

**Total Credits** 26

1 The choice of CTS electives may be proposed by the student, subject to approval by the student’s academic advisers from the primary and CTS programs. They should complement the student’s work in the primary program. A list of approved electives (https://sites.psu.edu/ctsprogram/current-students/elective-course-list) is available on the CTS program home page.

- Successful completion of qualifying and comprehensive examinations in clinical and translational sciences and the related field. The specific format and content is determined in consultation with the primary program.
- Successful defense of a dissertation in the major field with a substantial component that is clinical or translational in nature.
- Scholarship and Research Integrity (SARI) training (required of all Penn State graduate students)
- Institutional Review Board and/or Institutional Animal Care and Use Committee training (as appropriate)

**Qualifying Examination**

Typically, students will be accepted to the dual-title during their first year of study. In some circumstances students may be considered during the second year. To be admitted to the CTS dual-title graduate degree program students must meet the Ph.D. qualifying examination requirements in both their major area of study and the dual-title area. The qualifying exam will include both elements. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

The qualifying examination committee for the dual-title Ph.D. degree must include at least one Graduate Faculty member from the CTS program. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role.

**Dissertation Committee Composition**

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of a CTS dual-title doctoral degree student must include at least one member of the CTS Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in CTS, the member of the committee representing CTS must be appointed as co-chair.
Comprehensive Exam
The CTS representative on the student’s dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination. The comprehensive exam will require the student to demonstrate an understanding of the methods of translational sciences and an ability to apply them to problems in the student’s major field of study. When appropriate, the student will be expected to demonstrate a working knowledge of methods to evaluate and compare the outcomes of his/her research to related approaches already in existence.

Dissertation
Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their dissertation committee and reflects their original research and education in both their primary graduate program and CTS. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

Student Aid
Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits set by The Graduate School.

Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact
Graduate Program Head: Gail D. Thomas
Graduate Program Head: James Pawelczyc
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Mailing Address: Clinical and Translational Science Institute, 500 University Drive, P. O. Box 850, H147, Hershey, PA 17033
Telephone: (717) 531-0003
Program Website: Clinical and Translational Sciences (http://sites.psu.edu/ctsprogram)

Communication Arts and Sciences
Graduate Program Head
Denise Solomon
Program Code
CAS
Campus(es)
University Park (Ph.D., M.A.)
Degrees Confirmed
Doctor of Philosophy (Ph.D.)
Master of Arts (M.A.)
Dual-Title Ph.D. in Communication Arts and Sciences and Bioethics

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits set by The Graduate School.

Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact
Graduate Program Head: Gail D. Thomas
Graduate Program Head: James Pawelczyc
Primary Program Contact: Karen Shields
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Telephone: (717) 531-0003
Program Website: Clinical and Translational Sciences (http://sites.psu.edu/ctsprogram)

Communication Arts and Sciences
Graduate Program Head
Denise Solomon
Program Code
CAS
Campus(es)
University Park (Ph.D., M.A.)
Degrees Confirmed
Doctor of Philosophy (Ph.D.)
Master of Arts (M.A.)
Dual-Title Ph.D. in Communication Arts and Sciences and Bioethics

The Graduate Faculty
View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=ac&prog=CAS)

Students may specialize in communication theory (communication sciences) or rhetoric (communication arts).

Admission Requirements
Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

The Graduate Faculty
View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=ac&prog=CAS)

Students may specialize in communication theory (communication sciences) or rhetoric (communication arts).

Admission Requirements
Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Scores from the Graduate Record Examinations (GRE) are required for admission.

The minimum undergraduate preparation is 12 credits in communication studies/speech communication. Students who cannot meet this requirement in full may be admitted but must make up their deficiencies without credit toward the graduate degree.

Additionally, students with a 3.00 junior/senior grade-point average (on a 4.00 scale) and appropriate course backgrounds will be considered for admission. The best-qualified applicants will be accepted up to the number of spaces that are available for new students. Exceptions to the minimum 3.00 grade-point average may be made for students with special backgrounds, abilities, and interests. A student must have completed the master’s degree before being admitted as a doctoral student.

Degree Requirements
Master of Arts (M.A.)
Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

Students pursuing the M.A. degree in Communication Arts and Sciences must schedule a review of their program of courses during the first year of residence and receive approval by a duly constituted advisory committee.

A total of 30 credits, including 6 for the master’s thesis and at least 12 other 500-level credits, is required. Candidates must schedule a proposal meeting in which their research plan for their thesis is approved by their committee. They are also required to present an oral defense before their committee.

Although typically discouraged, students in unique circumstances may apply to complete a nonthesis track. Students must apply in advance for
acceptance in the nonthesis track and additional course credits will be required, among other differences from the thesis track.

**Doctor of Philosophy (Ph.D.)**

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

The communication and foreign language requirement for the Ph.D. degree may be satisfied by options selected from designated areas including, but not restricted to, foreign languages. Doctoral students must schedule a qualifying examination during their first year. Following completion of the language requirement and all courses from the program of study, doctoral students must take a comprehensive examination to determine their mastery and competence in the discipline of communication. After successful completion of the written and oral component of the comprehensive exam, doctoral candidates must schedule a proposal meeting at which the research plan for their dissertation is approved by their committee. Doctoral candidates must present a final oral defense of their dissertation before their committee.

**Dual-Titles**

**Dual-Title Ph.D. in Communication Arts and Sciences and Bioethics**

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

**Admission Requirements**

Dual-title bioethics graduate students will first be admitted to their primary programs in accordance with the requirements stipulated by the Graduate School and the primary program. They will then be admitted to graduate study in the Bioethics program by an admissions committee consisting of faculty affiliated with the Bioethics program. Applicants should have a junior/senior cumulative average of at least 3.0 (on a 4.0 scale) and an appropriate background in undergraduate coursework. Prospective dual-title students will write a statement of purpose that addresses the ways in which their research and professional goals reflect an interest in interdisciplinary bioethics research. Refer to the Admission Requirements section of the Bioethics Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/bioethics). Doctoral students must be admitted into the dual-title degree program in Bioethics prior to taking the qualifying examination in their primary graduate program.

**Degree Requirements**

To qualify for a dual-title degree, students must satisfy the requirements of the CAS program in which they are primarily enrolled. In addition, students must complete the degree requirements for the dual-title Ph.D. in Bioethics, listed on the Bioethics Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/bioethics). Within this framework, final course selection is determined by the student, their CAS and Bioethics advisers.

**Qualifying Examination**

Students must meet the Ph.D. qualifying examination requirements specified by the CAS program. During the qualifying examination, the student will also be assessed for the Bioethics program, and at least one member of the qualifying examination committee must come from the Bioethics program. Faculty members who hold appointments in both programs may serve in a combined role.

**Dissertation Committee Composition**

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of a CAS and Bioethics dual-title Ph.D. student must include at least one member of the Bioethics Graduate Faculty. Graduate students are encouraged to have a second committee member so qualified. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in Bioethics, the member of the committee representing Bioethics must be appointed as co-chair. The Bioethics representative on the student's dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.

**Comprehensive Exam**

The faculty member (or members) affiliated with the Bioethics Program will be responsible for administering a portion of the comprehensive exam that will require the student to demonstrate an understanding of various theoretical and methodological approaches to bioethics, and an ability to apply them to issues and problems (including, where appropriate, practical problems) in their primary field.

**Dissertation and Final Oral Examination**

A dissertation on a bioethics-related topic or with a substantial bioethics component is required of students in the dual-title Ph.D. program. The bioethics-related topic of the dissertation or the bioethics component will be approved by the student's committee. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

**Student Aid**

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School's website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

In addition to the fellowships, traineeships, graduate assistantships, and other forms of financial aid described in the Student Aid (http://bulletins.psu.edu/graduate/programs/majors/communication-arts-sciences/general_information.cfm?section=tuition2) section of the Graduate Bulletin, the following awards typically have been available to graduate students in this program:

Edwin Erle Sparks Fellowships in the Humanities

Available to beginning and continuing graduate students in one of the following graduate programs:

- Communication Arts and Sciences
- Comparative Literature
- English
- French
- German
- History
- Linguistics
Apply to department before February 1.

Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Learning outcomes
1. Graduates will demonstrate command of the history of and current developments in rhetorical or communication science theory and methods.
2. Graduates will demonstrate the capacity to organize, synthesize, and critique the theoretical and methodological literature relevant to their area of disciplinary specialization.
3. Graduates will formulate and execute an independent research project that significantly furthers knowledge and theory in rhetoric or communication science.
4. Graduates will articulate ideas, arguments, and evidence with clarity, creativity, and compatibility with the conventions of the discipline in oral and visual presentations and written formats.
5. Graduates will develop professional practices through department service, conference participation, and disciplinary engagement.
6. Graduates will display capacity to deliver effective undergraduate and graduate instruction, including course design and delivery.

Contact
Graduate Program Head: Denise Solomon
Director of Graduate Studies/Professor-in-Charge: Kirtley Wilson
Primary Program Contact: Robin Kowa
Email: rlk5025@psu.edu
Mailing Address: 234 Sparks Building, University Park, PA 16802
Telephone: (814) 865-5558
Program Website: Communication Arts and Sciences (http://cas.la.psu.edu)
Degree Requirements

Master of Science (M.S.)
Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

The master's degree requires a minimum of 50 graduate credits beyond admission standards. Students usually earn 55 to 65 credits to complete a degree, over four semesters and a summer of study.

There is a nonthesis option for the Master of Science degree, requiring a paper and additional course credits in lieu of a thesis. The master's program of study provides course work and practicum for advanced and/or professional-level licensure.

Doctor of Philosophy (Ph.D.)
Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

The Doctor of Philosophy degree normally requires a master's degree in communication sciences and disorders or a related field, plus a minimum of two years of advanced study, and presentation and oral defense of a research-based dissertation.

The communication and foreign language requirement is a minimum of 6 credits of statistics beyond the first course, plus 9 credits selected from among:

- Statistics
- Technical writing
- Computer science
- Research design
- Foreign language

Two research exercises, one of which is used for doctoral qualifying examination early in the doctoral program, are required prior to the dissertation. Comprehensive written examinations in the areas of a student's interest and an optional minor field examination, plus an oral examination prior to dissertation, are required.

Details of a student's doctoral program are determined by the dissertation committee.

Dual-Titles

Dual-Title Ph.D. in Communication Sciences and Disorders and Language Science
Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduatedegree-programs).

Graduate students with research and educational interests in language science may apply to the Communication Sciences and Disorders and Language Science Degree Program. The goal of the dual-title degree in Communication Sciences and Disorders and Language Science is to enable graduate students from Communication Sciences and Disorders to acquire the knowledge and skills of their major area of specialization in Communication Sciences and Disorders, while at the same time gaining the perspective of the various disciplines contributing to the study of language science.

Admission Requirements
For admission to the dual-title degree under this program, a student must first apply and be admitted to the Communication Sciences and Disorders graduate program and the Graduate School. Students considered for admission to the doctoral program have a Master's program GPA above 3.0/4.0, outstanding letters of recommendation, a written statement of scholarly interests and goals, and have completed the GRE. New graduate students in Communication Sciences and Disorders will receive information about the Language Science dual-title program, and may discuss their interest with one or more Language Science faculty in the Department of Communication Sciences and Disorders, in order to obtain a recommendation for admission to the Language Science program. Once accepted into the Communication Sciences and Disorders program, and with a recommendation from a Language Science program faculty member in that department, the student may apply to the dual-title Ph.D. program in Communication Sciences and Disorders and Language Science by submitting a letter describing the student's interest in the program. The student's letter will be forwarded to a committee that will include the Director of the Linguistics Program, one of the Co-Directors of the Center for Language Science, and a third faculty member within the Center for Language Science. All three committee members will be affiliated with the Program in Linguistics. Upon the recommendation of this committee, the student will be admitted to the dual-title degree program in Language Science. The admission requirements of the Language Science dual-title Ph.D. program are that the student must meet the admission requirements of the Graduate School and the major department. Refer to the Admission Requirements section of the Language Science Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/language-science). Doctoral students must be admitted into the dual-title degree program in Language Science prior to taking the qualifying examination in their primary graduate program.

Degree Requirements
To qualify for a dual-title degree, students must satisfy the requirements of the Communication Sciences and Disorders program in which they are primarily enrolled. In addition, students must complete the degree requirements for the dual-title Ph.D. in Language Science, listed on the Language Science Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/language-science). Within this framework, final course selection is determined by the student and their Communication Sciences and Disorders program adviser.

Particular courses may satisfy both the Communication Sciences and Disorders requirements and those in the Language Science dual-title program. Final course selection is determined by the student in consultation with their doctoral adviser and committee. In most cases, the number of total credits earned by a dual-title student will be from 6-12 more than those normally earned by a student in Communication Sciences and Disorders. Some courses which meet Language Science requirements (e.g., theoretical linguistics, neuroscience, psycholinguistics) may also fulfill the Communication Sciences and Disorders requirements for a related area outside the department; however, dual-title students are not required to count any particular Language Science requirement as their outside area. Dual-title students who choose an outside content area not related to Language Science will require more time to complete their program.

Students are expected to participate in weekly Language Science Research meeting each semester in residence.
The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Communication Sciences and Disorders and must include at least one Graduate Faculty member from the Language Science program. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. There will be a single qualifying examination, containing elements of both Communication Sciences and Disorders and Language Science. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of a Communication Sciences and Disorders and Language Science dual-title Ph.D. student must include at least one member of the Language Science Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in Language Science, the member of the committee representing Language Science must be appointed as co-chair. The Language Science representative on the student’s dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their dissertation committee and reflects their original research and education in Communication Sciences and Disorders and Language Science. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Learning Outcomes

Master of science (M.S.)

1. KNOW. Graduates will be able to demonstrate deep conceptual understanding and proficiency in theories related to the field of communication sciences and disorders.

2. KNOW. Graduates will be able to demonstrate applied clinical principles and practices required to provide competent clinical services.

Doctor of Philosophy (Ph.D.)

1. KNOW, APPLY/CREATE. Graduates will demonstrate command of the history and current developments in theory and methods relevant to their specific area of study within the field of communication sciences and disorders.

2. KNOW. Graduates will master the current literature relevant to their specific area of study within the field of communication sciences and disorders.

3. APPLY/CREATE, COMMUNICATE. Graduates will formulate and execute at least two independent research projects that significantly contribute to the knowledge base and theory in their specific area of study within the field of communication sciences and disorders.

4. COMMUNICATE. Graduates will articulate arguments and ideas with clarity in oral presentations and written formats and use the conventions of the discipline specific area of study within the field of communication sciences and disorders.

5. PROFESSIONAL PRACTICE. Graduates will demonstrate knowledge of the professional standards of scholarly and professional work in their specific area of study within the field of communication sciences and disorders through their written and oral works, and interactions with colleagues.

Contact

Graduate Program Head: Diane Williams

Director of Graduate Studies/Professor-in-Charge: Carol Miller

Primary Program Contact: Lindsay Moist

Email: lnm3@psu.edu

Mailing Address: 308 Ford Building, University Park, PA 16802

Telephone: (814)865-0971

Program Website: Communication Sciences and Disorders (http://csd.hhdev.psu.edu)
Communications

Graduate Program Head
Jeffrey Beck

Program Code
COMMS

Campus(es)
Harrisburg (M.A.)

Degrees Conferred
Master of Arts (M.A.)

The Graduate Faculty
View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=COMMS)

The Master of Arts in Communications prepares students for doctoral study and leadership positions in areas of public information such as journalism, education, public relations and advertising. The program places an emphasis on cultivating an interdisciplinary and intercultural perspective for media educators and practitioners who may serve publics in a variety of fields, including business, government agencies, non-profit organizations, and community and political action groups. Because our program is broad-based and research-oriented, students will work with their academic advisers to develop their thesis projects to address critical issues in the above areas, rather than acquiring a specific and narrowly defined skill set.

The program balances research and creative production by integrating national and international perspectives on history, culture, and society in all instruction in theory and production practice.

Because of the program's location in the Pennsylvania state capital region and its close proximity to prominent public and private institutions and other resources, students in the program will have opportunities for internships and field experiences that provide valuable context for the development of their thesis projects. This integrated approach between theory and practice positions the program to provide a strong foundation for the pursuit of doctoral studies in communications.

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Applicants must hold either (1) a bachelor's degree from a U.S. regionally accredited institution or (2) a postsecondary degree that is equivalent to a U.S. baccalaureate degree earned from an officially recognized degree-granting international institution and have earned at least a 3.0 grade-point average in their junior and senior years.

Exceptions may be made for those with special backgrounds or abilities who are committed to advanced interdisciplinary study in communications. All application materials should be submitted before February 15 for the fall semester and November 1 for the spring semester.

Applicants must submit the following:

- an online Graduate School application (http://gradschool.psu.edu/prospective-students/how-to-apply) with the application fee;
- official transcripts from all post-secondary institutions attended (http://www.gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission) (with the exception of Penn State University);
- a personal statement of 500 to 1000 words outlining educational goals and career objectives;
- two letters of reference attesting to the applicant's suitability for the program (preferably from previous professors or others who are familiar with the applicant's intellectual/creative work or interests);
- a writing sample or other creative production (e.g. short film, photo essay, advertisement or PR campaign sample, multimedia art, etc).

International applicants must hold the equivalent of an American four-year baccalaureate degree. They must submit official or attested university records, with certified translations if the records are not in English. Notarized copies are not sufficient.

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. See GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

Degree Requirements

Master of Arts (M.A.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

Students admitted to the Master of Arts in Communications Program at Penn State Harrisburg must complete 36 credits, 21 of which must be at the 500 level in order to be granted the degree. Each student must complete and submit either a master's project or thesis. The master's project option (COMMS 580) consists of a creative production with an accompanying scholarly essay. The thesis option (COMMS 600 or COMMS 610) consists of an original research paper that follows the guidelines established by the Graduate School's Office of Theses and Dissertations (http://gradschool.psu.edu/current-students/etd). The subject of the master's project or thesis must be defined in conjunction with a faculty member, and evaluated by a committee of at least two faculty members, supplemented by outside consultants where appropriate. To register for the master's thesis or project, a student must have completed COMMS 500 and COMMS 503 and must have earned at least 27 credits towards the Master of Arts in Communications.

The 36-credit program is distributed over two groups of courses:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td><strong>Required Courses</strong></td>
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<td></td>
</tr>
<tr>
<td>COMMS 500</td>
<td>Communications and Cultural Theory 1</td>
<td></td>
</tr>
<tr>
<td>COMMS 503</td>
<td>Research Methods in Communications 1</td>
<td></td>
</tr>
<tr>
<td>COMMS 580</td>
<td>Communications Master's Project 2</td>
<td></td>
</tr>
<tr>
<td>COMMS 600</td>
<td>Thesis Research 2</td>
<td></td>
</tr>
<tr>
<td>or COMMS 610</td>
<td>Thesis Research</td>
<td></td>
</tr>
<tr>
<td>Choose 6 credits from ONE of the following:</td>
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<tr>
<td>COMMS 525</td>
<td>Advanced Writer's Seminar</td>
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<tr>
<td>or COMMS 550</td>
<td>Media Production Workshop</td>
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<tr>
<td>Choose 6 credits of the following:</td>
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<tr>
<td>COMMS 519</td>
<td>Communication Technology and Culture in History</td>
<td></td>
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<tr>
<td>COMMS 555</td>
<td>Media Discourse Analysis</td>
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<tr>
<td>COMMS 560</td>
<td>Seminar on Global Culture and Communication</td>
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</tbody>
</table>

**Electives**
Take 15 credits in additional courses at the 400- and 500-levels, from a list of approved courses maintained by the graduate program office. Elective courses can come from either Communications or other fields, including: American Studies, Business Administration, Community Psychology and Social Change, Criminal Justice, Education, Health Administration, Health Education, Humanities, Information Systems, Management, Marketing, Public Administration, Training and Development.  

| Total Credits | 36-39 |

Grade-Point Average and Time Limit  
A 3.00 grade-point average will be required for successful completion of the degree.

A full-time student can expect to complete the program in four semesters, a part-time student in six or more semesters. All requirements for a master’s degree for the Master of Arts in Communications (including acceptance of the master’s thesis or project) must be met within eight years of admission to degree status. Extensions may be granted by the Graduate School in appropriate circumstances.

Transfer of Credits  
Transfer credits are limited to 9 equivalent graduate Communications credits with a grade of B or better taken within the last 5 years from an accredited institution, subject to restrictions outlined in GCAC-309. Transfer Credit (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-309/transfer-credit). It must be the opinion of the reviewing faculty that these courses are equivalent in quality to those offered at Penn State Harrisburg. Credit will not be given for any course used to complete a previous degree.

Student Aid  
Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding section of The Graduate School's website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

Courses  
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Learning Outcomes  
1. **KNOW**: Graduates demonstrate knowledge and proficiency in the major theories and methods used in the study of Communications and their applications in intellectual inquiry and creative activity.
2. **APPLY/CREATE**: Graduates design and execute strategies to answer significant questions in Communications and produce or create highest quality media content – such as films, videos, photography, graphic design, Web-based platforms, screenwriting, journalism, memoirs, drama, copywriting and social media. – according to the highest professional and ethical standards.
3. **COMMUNICATE**: Graduates convey ideas or arguments in clear, concise, well-organized written proposals, research papers, exhibitions and oral presentations in professional and academic settings, and communicate to diverse audiences by audio, visual and written media such as video, film, journalism, graphic design, photography, copyrighting and social media.
4. **CRITICAL THINKING**: Graduates utilize analytical skills to evaluate ideas, theories and academic and cultural works in the Communications field, and to conceptualize solutions to communications problems and challenges in different social/cultural contexts.
5. **PROFESSIONAL PRACTICE**: Graduates observe the highest ethical standards in both scholarship and professional practice.

Contact  
**Graduate Program Head**: Jeffrey Beck  
**Director of Graduate Studies/Professor-in-Charge**: Peter Kareithi  
**Primary Program Contact**: Cynthia Leach  
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**Mailing Address**: W-356, 777 W. Harrisburg Pike, Middletown, PA 17057-4998  
**Telephone**: (717)948-6189  
**Program Website**: Communications (http://harrisburg.psu.edu/programs/master-arts-communications)
interaction. Individuals who currently work with, or are interested in working with communities, community organizations and stakeholders, or on a range of community and economic development issues at the state or national levels would benefit from this program.

Instruction in the MPS CEDEV program emphasizes key themes that include:

- economic planning and development,
- municipal finance, land use and population change,
- community structure, organization and process,
- leadership,
- tools and techniques in community development, and
- community decision-making and capacity building

Students in Community and Economic Development gain a broad understanding of the dynamics of communities and their social, economic, and political systems. The program emphasizes teaching the theory, skills, and tools that allow practitioners to address the important issues in development practice.

Graduates of the Community and Economic Development program have a wide range of career opportunities, including:

- local and state government,
- planning commissions,
- major corporations,
- non-governmental organizations, and
- consulting firms.

**Admission Requirements**

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Students with a 3.00 average (on a 4.00 scale) for the most recent two years of college/university education, or with an advanced degree, and with appropriate course and experiential backgrounds will be considered for admission. Exceptions to the minimum 3.00 grade-point average may be made for students with special backgrounds, experience, abilities, and interests. The best-qualified applicants will be accepted to the graduate program.

Admission requirements include the following:

- Either (1) a baccalaureate degree from a regionally accredited U.S. institution or (2) a tertiary (postsecondary) degree that is deemed comparable to a four-year bachelor's degree from a regionally accredited U.S. institution. This degree must be from an officially recognized degree-granting institution in the country in which it operates.
- Statement of purpose describing professional experiences and education, career goals, and how the MPS program will enable the applicant to meet their objectives
- Current resume
- Three letters of recommendation
- Official transcripts from all post-secondary institutions attended (http://gradschool.psu.edu/prospective-students/applicantsrequirements-for-graduate-admission)
- Non-refundable application fee

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. See GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

Scores from the Graduate Record Examinations (GRE) are not required for admission to the M.P.S. CEDEV program.

Prerequisites for the master’s program include 12 credits in rural sociology, sociology, agricultural economics, or other social and behavioral sciences at the discretion of the graduate program. If the entering student does not have these prerequisites, they must be made up at the University during the early part of the master’s program.

To begin your application, access the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). On the "Campus, Major, Degree & Semester" page select "World Campus" as the campus and "Community and Economic Development" as the major.

**Degree Requirements**

**Master of Professional Studies (M.P.S.)**

Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

The M.P.S. CEDEV program requires the completion of eight core courses (24 credits) in which students learn and apply sociological and economic concepts to issues in community and economic development. The courses offer examples and opportunities to apply theses concepts to real issues facing communities and rural regions. Three of the core courses (9 credits) emphasize statistical methods and tools and techniques useful to practitioners in community and economic development, or to work toward additional certifications. All students are required to complete a Master’s paper (at least 3 credits) that integrates theory and practice.

A total of 18 credits must be 500-level or higher, with at least 6 credits of 500-level course work. This Graduate Council requirement is met through the required courses and the Master’s paper credits. The professional Master's degree requires 30 credits including a final integrative assessment/experience, referred to by the program as a Master’s paper. All students complete the required MPS CEDEV core program of community and economic development courses, statistics, and methods. The MPS CEDEV courses consist of:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CEDEV 430</td>
<td>Principles of Local Economic Development</td>
<td>3</td>
</tr>
<tr>
<td>CEDEV 452</td>
<td>Community Structure, Processes and Capacity</td>
<td>3</td>
</tr>
<tr>
<td>CEDEV 500</td>
<td>Community and Economic Development: Theory and Practice</td>
<td>3</td>
</tr>
<tr>
<td>CEDEV 505</td>
<td>Leadership Development</td>
<td>3</td>
</tr>
<tr>
<td>CEDEV 509</td>
<td>Population, Land Use, and Municipal Finance</td>
<td>3</td>
</tr>
<tr>
<td>STAT 500</td>
<td>Applied Statistics (or equivalent)</td>
<td>3</td>
</tr>
</tbody>
</table>
**Methods and Techniques for Community and Economic Development**

**Community and Economic Development Research Application and Practice**

<table>
<thead>
<tr>
<th>Electives</th>
<th>3</th>
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<tbody>
<tr>
<td>Culminating Experience</td>
<td>3</td>
</tr>
<tr>
<td>Total Credits</td>
<td>30</td>
</tr>
</tbody>
</table>

1. Choice of electives will be based on a plan of study worked out between the student and faculty adviser.

2. A Master’s paper, such as an integrative paper, project, or internship is required where the student demonstrates the capability to integrate and apply concepts, principles, analytical techniques and interpretation skills learned in the program to a real problem faced by a community or community organization.

There is no foreign language requirement for the degree; however, students planning to work in multi-cultural or international settings are encouraged to gain competency in an appropriate language(s).

**Student Aid**

World Campus students in graduate degree programs may be eligible for financial aid. Refer to the Tuition and Financial Aid section (http://www.worldcampus.psu.edu/tuition-and-financial-aid) of the World Campus website for more information.

**Courses**

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**Learning Outcomes**

1. **KNOW:** Graduates will demonstrate an understanding of basic economic and sociological theory, data collection and analytical techniques, and research methodologies at a level sufficient to work to solve problems and issues in their region or local community. They will also demonstrate an understanding of the systems and processes that define a region and community.

2. **APPLY/CREATE:** Graduates will be able to develop a research methodology and study in detail a problem or issue experienced by their region or local community. They will be able to make recommendations for specific programs and policies to address both economic and social issues and in an effort to improve the quality of life in their region or community.

3. **COMMUNICATE:** Graduates will be able to effectively convey to others the basic theories and research in community and economic development and related fields through oral and written communications.

4. **THINK:** Graduates will be able to review and critically analyze studies and work from multiple disciplines and apply this work to problems and issues in their region or local community. They will be able to differentiate between economic and social systems within their regions and communities.

5. **PROF. PRACTICE:** Nearly all of our students already have jobs in a profession directly related to community and economic development.

Our graduates will demonstrate that they have developed sufficient skills to continue to contribute to their profession. They will be able to interact productively in an ethical manner with other professionals and community leaders and demonstrate a commitment to active citizenship within their community.

**Contact**

**Graduate Program Head:** John Shingler

**Primary Program Contact:** Julie Stringfellow

**Email:** jls1007@psu.edu

**Mailing Address:** 305 Armsby Building, University Park, PA 16802

**Telephone:** (814)865-6223

**Program Website:** Community and Economic Development (http://aese.psu.edu/graduateprograms/cedev)

**Community Psychology and Social Change**

**Graduate Program Head:** Holly Angelique

**Program Code:** CPSC

**Campus(es):** Harrisburg (M.A.)

**Degrees Conferred:** Master of Arts (M.A.)

**The Graduate Faculty**

The graduate program in Community Psychology emphasizes planned social change, and is based on both sociology and psychology. The program equips students with skills useful in coping with the multifaceted problems facing communities. Students learn:

a. to assess problems at the level of communities or organizations,
b. to plan and implement possible solutions to these problems, and
c. to evaluate the effectiveness of the solutions.

Learning takes place both in courses and in a master’s project that entails fieldwork and the writing of a master’s paper.

To act as a change agent, the student must be aware of contemporary community needs, along with the impact of the community structure upon its individual members and the techniques best suited to initiate productive changes. After completing this interdisciplinary program, the graduate should be able to approach problems with a more integrated point of view and work cooperatively with community individuals and agencies toward practical solutions. Problems related to crime, education, child and family development, employment, the lack of effective social power, and other factors affecting psychological well being are approached from bases in community service agencies or informal community groups. The majority of students work full-time in agencies or governmental units. To accommodate these working students, 500-level graduate courses are scheduled in the evening.

**Admission Requirements**

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-
students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

For admission to the program, a student must have a baccalaureate degree from an accredited academic institution, earned under residence and credit conditions equivalent to those required by Penn State. The minimum grade-point average (GPA) in the junior and senior years must be 3.00 or higher (on a 4.00 scale). Students with experience in carrying out planned social change are particularly encouraged to apply. Most applicants hold degrees in psychology, sociology, or related disciplines. Ideally, applicants will have taken courses in developmental, personality, and social psychology, along with work in social change, social problems, and social conflict. Students from diverse other backgrounds are welcome to apply, particularly if they have had work or other experience effecting change in community settings. Applicants will be asked to take additional course work without graduate credit, chosen after consultation with an adviser, if they have had no psychology or sociology courses beyond the introductory level. Applicants must have received a C or better in an introductory statistics course covering parametric and non-parametric inferential statistics; they will be requested to make up any deficiency without graduate credit.

Off-campus and transfer credits from accredited institutions will be evaluated by the Professor in Charge for recentness and appropriateness to the student's course of study, subject to restrictions outlined in GCAC-309 Transfer Credit (http://gradschool.psu.edu/graduate-education-policies/gcac-300/transfer-credit). Documented applications for credit for work experience will be evaluated by students' masters committees, made up of members of the graduate faculty. Approval for up to 6 credits may be given. If granted, approval for this credit can take the place of the fieldwork usually undertaken in CMPSY 522, Practicum. The student must register for the number of credits approved, either in CMPSY 522, or, if the student prefers, after having asked for a waiver of the CMPSY 522 requirement, in additional elective course work, chosen with help from an adviser.

Courses in the program are sequenced on the assumption that students will be entering in the fall semester. Students may apply for admission for the spring (but not the summer) semester, but they may not start taking 500-level required courses until the following fall.

Admission to the Community Psychology program is based on clear suitability for the program as evidenced by the application as a whole; it is limited to the number of spaces available for master's project supervision.

Applicants must submit the following:

1. A completed Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply) and nonrefundable application fee.
2. Official transcripts from all post-secondary institutions attended (http://www.gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission)

Degree Requirements

Master of Arts (M.A.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

An important part of this degree is a master's project, made up a total of 9 credits, comprising from 3 to 6 credits of Practicum CMPSY 522, and from 3 to 6 credits of Research CMPSY 594. The project is planned in the context of the course CMPSY 521; it is supervised by a master's committee of Graduate Faculty. The particular mix of practicum and research is worked out by the student in consultation with the faculty. The variable mix of practicum and of research credits results in the student's being able to choose course work that emphasizes study in the area in which she or he needs most skill-development. In the usual case, a student with a strong background in fieldwork would be asked to emphasize research in her or his master's project, and a student with a strong research background, but with limited fieldwork, would be asked to emphasize the practicum. The output of CMPSY 522 is a practicum; the output of the research course CMPSY 594 is a required master's paper of at least 3 credits. The master's paper may be based on the field experience. Students often choose to structure their master's paper around a specific community research problem.

Part-time students who are able to take two courses at a time can complete the degree in seven to eight semesters. Since the processes of designing a master's project and of writing a master's paper are labor-intensive and frequently take more time than the student expects, even full-time students will often take six or more semesters to complete the degree.

To qualify for the degree, 36 credits are needed, 24 of which must be at the 500 level. There is a sequence of substantive courses, starting with CMPSY 500.

<table>
<thead>
<tr>
<th>Code</th>
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<th>Credits</th>
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<tbody>
<tr>
<td>CMPSY 500</td>
<td>Theories and Issues in Community Psychology</td>
<td>3</td>
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<td>CMPSY 510</td>
<td>Change Processes</td>
<td>3</td>
</tr>
<tr>
<td>CMPSY 511</td>
<td>Social Impacts on Psychological Functioning</td>
<td>3</td>
</tr>
<tr>
<td>CMPSY 519</td>
<td>Research Methods I</td>
<td>3</td>
</tr>
<tr>
<td>CMPSY 520</td>
<td>Research Methods II</td>
<td>3</td>
</tr>
<tr>
<td>CMPSY 521</td>
<td>Roles and Methods in Community Psychology</td>
<td>3</td>
</tr>
<tr>
<td>Electives</td>
<td>Select 9 elective credits</td>
<td>9</td>
</tr>
</tbody>
</table>

Culminating Experience

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<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMPSY 522</td>
<td>Practicum</td>
<td>3-6</td>
</tr>
<tr>
<td>CMPSY 594</td>
<td>Research</td>
<td>3-6</td>
</tr>
</tbody>
</table>

Total Credits: 36

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School's website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up
deficiencies or to fill in gaps in previous education but not to meet
requirements for an advanced degree.

Learning Outcomes
1. KNOW: Graduates will be able to demonstrate conceptual
understanding and proficiency in community psychology and social
change at the level required to contribute to the discipline.
2. APPLY/CREATE: Graduates will be able to use disciplinary methods
and techniques to apply knowledge or create new knowledge in order
to answer significant questions having real-world applications to
community psychology and social change.
3. COMMUNICATE: Graduates will be able to effectively communicate
research and practice applicable to the field in formal presentations
and in written works to scholars in the field.
4. CRITICAL THINKING: Graduates will be able to critically conceptualize
and define the ecological aspects of a social problem.
5. PROFESSIONAL PRACTICE: Graduates will demonstrate a
commitment to active citizenship including engagement in
professional service and society at large.

Contact
Graduate Program Head: Holly Angelique
Director of Graduate Studies/Professor-in-Charge: Kamini Grahame
Primary Program Contact: Deborah Klugh
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Mailing Address: Penn State Harrisburg - Swatara Building, 777 W.
Harrisburg Pike, Middletown, PA 17057-489
Telephone: (717) 948-6059
Program Website: Community Psychology and Social Change (https://
harrisburg.psu.edu/behavioral-sciences-and-education/social-sciences-
and-psychology/master-arts-community-psychology-and-social-change)

Comparative and International Education
Graduate Program Head: Kevin Kinser
Program Code: CIED
Campus(es): University Park
Degrees Conferred: Dual-Title
The Graduate Faculty: View (https://secure.gradsch.psu.edu/
gpms/index.cfm?searchType=fac&prog=CIED)

Students earn a dual-title degree in this option through participating
programs at either the Ph.D. (or D.Ed.) or the M.A., M.S., M.Ed. level.
Students receive a degree which lists their major program and
Comparative and International Education.

The following graduate programs offer dual-title degrees in Comparative
and International Education:
• Agricultural and Extension Education
• Curriculum and Instruction
• Counselor Education
• Educational Leadership
• Educational Psychology
• Educational Theory and Policy
• Entomology
• Higher Education
• Learning, Design, and Technology
• Lifelong Learning and Adult Education
• School Psychology
• Special Education
• Workforce Education and Development

The Comparative and International Education dual-title degree program
is administered by the Committee on Comparative and International
Education. The committee maintains program definition, identifies
courses appropriate to the dual-title, develops and administers the
program’s comprehensive examination, and recommends policy and
procedures for the program’s operation to the dean of the College
of Education and to the dean of the Graduate School. Members of
the committee also chair or co-chair the dissertation committees for
students electing the dual-title doctoral degree.

The dual-title degree program is offered through participating programs
in the College of Education and, where appropriate, other graduate
programs in the University. The dual-title program enables students
from several graduate programs to gain the perspectives, techniques,
and methodologies of comparative and international education, while
maintaining a close association with program areas of application.
Comparative and international education is a field devoted to the
systematic analysis of the operation and effects of the world’s education
systems.

Admission Requirements
Requirements listed here are in addition to requirements listed
in GCAC-208 Dual-Title Graduate Degree Programs (http://
gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-
title-graduate-degree-programs).

For admission to pursue a dual-title degree under this program, a student
must apply to:
1. the Graduate School;
2. one of the participating graduate major programs; and
3. the Committee on Comparative and International Education.

Students must apply and be admitted to their primary graduate
program and The Graduate School before they can apply for admission
to the Comparative and International Education dual-title degree
program. After admission to their primary program, students must
apply for admission to and meet the admissions requirements of the
Comparative and International Education dual-title program.
Doctoral students must be admitted into the dual-title degree program
in Comparative and International Education prior to taking the qualifying
examination in their primary graduate program.

In addition to materials submitted for admission to the major program,
candidates to the dual-title degree program will be required to provide a
writing sample, and to submit a written personal statement indicating
the career goals they hope to serve by attaining a Comparative and
International Education degree.
**Degree Requirements**

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

**Master's Degrees**

To qualify for a dual-title degree, students must satisfy the requirements of the graduate major programs in which they are enrolled, in addition to the minimum requirements of the Comparative and International Education program.

For the M.A., M.S., or M.Ed. dual-title degree in Comparative and International Education, the minimum course requirements are:

- 3 credits in the required Proseminar in Comparative and International Education CIED 500;
- 6 credits in advanced Comparative and International Education courses;
- and 3 credits in Comparative and International Education content courses.

A master's thesis or master's paper, if required by the student's graduate major program, must include one reader who is a member of the Committee on Comparative and International Education.

**Doctoral Degrees**

To qualify for a dual-title degree, students must satisfy the requirements of the graduate major programs in which they are enrolled, in addition to the minimum requirements of the Comparative and International Education program.

The minimum course requirements for the Ph.D. or D.Ed. dual-title degree in Comparative and International Education are:

- 3 credits in the Proseminar in Comparative and International Education CIED 500;
- 6 credits in advanced Comparative and International Education courses;
- 12 credits in Comparative and International Education content courses or courses with comparative or international content;
- and 6 credits in research methods.

Students are expected to be fluent in reading, writing, and speaking English, and must demonstrate competency in reading a language other than English, preferably a language relevant to a country or geographic area they propose to study. (This foreign language requirement can be satisfied by passing the appropriate ETS Language Achievement Test, or by passing the appropriate Penn State foreign language course.) A minimum of 18 credits must be 500-level course, and particular courses may satisfy both the graduate major program requirements and those in the Comparative and International Education program.

The qualifying examination committee for the dual-title Ph.D. degree must include at least one Graduate Faculty member from the Comparative and International Education program. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. There will be a single qualifying examination, containing elements of both the primary graduate degree program and Comparative and International Education. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of a Comparative and International Education dual-title doctoral degree student must include at least one member of the Comparative and International Education Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in Comparative and International Education, the member of the committee representing Comparative and International Education must be appointed as co-chair. The Comparative and International Education representative on the student’s dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their dissertation committee and reflects their original research and education in both their primary graduate program and Comparative and International Education. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

**Minor**

Requirements listed here are in addition to requirements for minors in Graduate Council policies listed under GCAC-600 Research Degree Requirements (http://gradschool.psu.edu/graduate-education-policies) and GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

A doctoral minor program in Comparative and International Education is available to doctoral students who find it desirable to include the perspectives and methodologies of Comparative and International Education in their programs and have been approved to do so by their dissertation committees. To qualify for a minor in Comparative and International Education, students must satisfy the requirements of their graduate major programs, and meet the following minimum requirements:

- 3 credits in the Proseminar in Comparative and International Education CIED 500;
- 3 credits in a Comparative and International Education course;
- and 9 credits in Comparative and International Education content courses (or advanced courses) or in courses with comparative or international content offered outside the College of Education.

**Student Aid**

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.
Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Learning Outcomes

Master's Degrees

1. Demonstrate mastery of the student's specific program emphasis area, which includes knowledge of primary and secondary literature related to research methodologies, programmatic research priorities, and implications of that research for professional practice. Assessed through methods and theory coursework.

2. Students will design and carry out a research project that includes articulating an important and original question, analyzing appropriate literature, demonstrating conceptual and methodological creativity, and carrying out an original inquiry. Assessed through master's thesis/paper.

3. Demonstrate critical thinking about selected recent research in the program emphasis area through the description of an emerging scholarly theme/area, identification of specific publications that reflect it, and assessment of its strengths and weaknesses. Assessed through coursework and master's thesis/paper.

4. Demonstrate standards of field in written and oral communication by requiring research presentations in several courses. In addition, presentations at CIES are strongly encouraged.

5. Demonstrate knowledge and comprehension of research ethics issues including knowledge of ethical principles related to authorship, research reporting, data fabrication, plagiarism, conflicts of interest, peer review, data sharing and other areas of misconduct. Assessed through SARI examinations and participation in CIED 500.

6. Participate in conducting research with faculty, working on the boards of professional journals, teaching an undergraduate or graduate course, or other significant professional engagement as identified by the doctoral adviser. Assessed through faculty written evaluation, standardized assessment instruments, and/or other appropriate and clearly defined means.

Contact

Graduate Program Head: Kevin Kinser
Director of Graduate Studies/Professor-in-Charge: Gerald LeTendre
Primary Program Contact: Linda Grant-Oishi
Email: CIED@psu.edu (CIED@psu.edu)
Mailing Address: 300 Rackley Building, University Park, PA 16082
Telephone: (814)865-1488
Program Website: Comparative and International Education (http://www.ed.psu.edu/educ/eps/cied)

Comparative Literature

Graduate Program Head: Robert R. Edwards
Program Code: CMLIT
Campus(es): University Park (Ph.D., M.A.)
Degrees Conferred: Doctor of Philosophy (Ph.D.)
Master of Arts (M.A.)
Dual-Title Ph.D. in Comparative Literature and African Studies
Dual-Title Ph.D. in Comparative Literature and Asian Studies
Dual-Title Ph.D. in Comparative Literature and Visual Studies
Integrated B.A. in Comparative Literature and M.A. in Comparative Literature

The Graduate Faculty

View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=ac&prog=CMLIT)

Graduate programs in Comparative Literature combine a core of comparative literature requirements with courses in selected literatures and further comparative courses, according to each student's interests. For example, programs of study can concentrate on such topics as genres, themes, periods, movements, folklore and oral literature, criticism, and the links between literature and related fields such as theatre or women's studies.
The M.A. is a general humanistic degree that helps prepare students for a variety of situations, including teaching in private high schools or community colleges, or further graduate work. The Ph.D. is a more specialized degree. The Ph.D. in Comparative Literature can be combined with a minor in a professional field such as teaching English as a second language. Other potential combinations include our dual-title Ph.D. programs in:

- Comparative Literature and African Studies
- Comparative Literature and Asian Studies
- Comparative Literature and Visual Studies
- Comparative Literature and Women's Studies

Only the faculty members and courses officially associated with the Department of Comparative Literature are listed here. Faculty members and courses in other departments are also available to comparative literature students according to their preparation.

**Admission Requirements**

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Students with appropriate course backgrounds and at least a 3.00 junior/senior average (on a 4.00 scale) will be considered for admission. The admission process is highly competitive and the best qualified students will be admitted subject to space availability.

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. See GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-305/admission-requirements-international-students) for more information.

Students with a degree from a U.S. institution must submit GRE scores, all others must supply TOEFL/IELTS. Those international students who provide TOEFL/IELTS scores do not need to provide the GRE, but are encouraged to submit their scores, if feasible, as GRE scores are required to be eligible for many graduate fellowship opportunities.

Most students who do graduate work in comparative literature hold a B.A. or M.A. degree in comparative literature or in a particular language and literature. Students completing degrees in such fields are welcome to apply—as are students in other humanistic fields, such as philosophy or history, if they have studied literature.

For admission to the M.A. program, students should be prepared to study at least one foreign literature in its own language. For admission to the Ph.D. program, students should be prepared to study at least two foreign literatures in their own language. Doctorate-seeking students usually complete the M.A. before being formally admitted to the Ph.D. program, but exceptional students may be admitted from the B.A. level directly to complete the M.A. before being formally admitted to the Ph.D. program, with at least 6 credits in non-Anglophone literature. For admission to the M.A. program, students should be prepared to study literature. Students completing degrees in such fields are welcome to add a written dissertation and passing a final oral examination (the dissertation defense). The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

1 The foreign languages are to be prepared at a level that permits thorough literary analysis of texts and related material in those languages.

Students pursuing a graduate degree in comparative literature have individualized programs of study within the requirements specified above. For example, one student may emphasize film and new media; another, the novel. One student may concentrate on earlier literatures; another, on international modernism. One student may be interested primarily in the European tradition; another, in literatures. In such a program, the relationship between student and adviser is important. Each graduate student works with faculty advisers familiar with comparative studies as a whole and with the student's particular area of interest.

**Doctor of Philosophy (Ph.D.)**

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

Requirements for the Ph.D. in comparative literature include:

- 9 credits total in 3 required courses: CMLIT 501, CMLIT 502, and CMLIT 503—with substitute courses if these have been used in the M.A. program;
- at least an additional 24 credits in literature courses, including course work in the three languages that the student selects, with emphasis on the student's primary literature—students should organize their course work, as much as possible, around a unifying principle, such as genre, period, or theme;
- passing a qualifying examination;
- proficiency in two foreign languages;
- passing a comprehensive examination; and
- a written dissertation and passing a final oral examination (the dissertation defense). The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

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**Degree Requirements**

**Master of Arts (M.A.)**

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

A minimum of 30 credits at the 400, 500, or 800 level is required, with at least 18 credits at the 500 level. There are 9 credits required in the following core courses: CMLIT 501, CMLIT 502, and CMLIT 503. In addition, 18 credits in comparative literature courses and other literature courses are required, with at least 6 credits in non-Anglophone literature. The culminating experience for the degree is a satisfactory master's paper completed while the student is enrolled in CMLIT 596. Students must demonstrate advanced proficiency in at least two languages (one may be English).

Students pursuing a graduate degree in comparative literature have individualized programs of study within the requirements specified above. For example, one student may emphasize film and new media; another, the novel. One student may concentrate on earlier literatures; another, on international modernism. One student may be interested primarily in the European tradition; another, in literatures. In such a program, the relationship between student and adviser is important. Each graduate student works with faculty advisers familiar with comparative studies as a whole and with the student's particular area of interest.

**Doctor of Philosophy (Ph.D.)**

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

Requirements for the Ph.D. in comparative literature include:

- 9 credits total in 3 required courses: CMLIT 501, CMLIT 502, and CMLIT 503—with substitute courses if these have been used in the M.A. program;
- at least an additional 24 credits in literature courses, including course work in the three languages that the student selects, with emphasis on the student's primary literature—students should organize their course work, as much as possible, around a unifying principle, such as genre, period, or theme;
- passing a qualifying examination;
- proficiency in two foreign languages;
- passing a comprehensive examination; and
- a written dissertation and passing a final oral examination (the dissertation defense). The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

1 The foreign languages are to be prepared at a level that permits thorough literary analysis of texts and related material in those languages.

Students pursuing a graduate degree in comparative literature have individualized programs of study within the requirements specified above. For example, one student may emphasize film and new media; another, the novel. One student may concentrate on earlier literatures; another, on international modernism. One student may be interested primarily in the European tradition; another, in literatures. In such a program, the relationship between student and adviser is important. Each graduate student works with faculty advisers familiar with comparative studies as a whole and with the student's particular area of interest.
student works with faculty advisers familiar with comparative studies as a whole and with the student’s particular area of interest.

**Dual-Titles**

**Dual-Title Ph.D. in Comparative Literature and African Studies**

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

Comparative Literature doctoral students who have research and educational interests in African Studies may apply to the Dual-Title Doctoral Degree Program in African Studies. The goal of the program is to enable doctoral students from Comparative Literature to complement their knowledge and skills in their primary discipline with in-depth knowledge of prevailing theories on and problem-solving approaches to thematic, regional, or national issues pertaining to African development and change.

The Dual-Title Doctoral Degree Program will provide interested Comparative Literature doctoral students with a multidisciplinary approach that will enhance their analytical capabilities for addressing key issues in African Studies. It will, thereby, add value to their Comparative Literature degree and should increase their competitiveness in the job market. The well-rounded specialist who graduates from the program may be employed in an international setting and have enhanced opportunities for U.S. academic and non-academic positions as well.

**Admission Requirements**

Students must apply and be admitted to the graduate program in Comparative Literature and The Graduate School before they can apply for admission to the dual-title degree program. Applicants interested in the dual-title degree program may make their interest in the program known clearly on their applications to Comparative Literature and include remarks in their statement of purpose that address the ways in which their research and professional goals in the primary department reflect an interest in African Studies-related research.

To be enrolled in the Dual Title Doctoral Degree Program in African Studies, a student must have the approval of the Comparative Literature department and then submit a letter of application and transcript, which will be reviewed by an African Studies Admissions Committee. Refer to the Admission Requirements section of the African Studies (http://bulletins.psu.edu/graduate/programs/majors/african-studies) Bulletin page. An applicant must have a minimum grade point average of 3.0 (on a 4 point scale) to be considered for enrollment in the dual-title degree program. Students must apply for enrollment into the dual-title degree program in African Studies prior to taking the qualifying examination in Comparative Literature.

**Degree Requirements**

To qualify for the dual-title degree, students must satisfy the requirements of the Comparative Literature doctoral program in which they are primarily enrolled. In addition, they must satisfy the requirements described below, as established by the African Studies Program. Within this framework, course selection is determined by the student with the approval of the Comparative Literature and African Studies academic advisers.

Upon acceptance by the African Studies admissions committee, the African Studies director will assign the student an African Studies academic adviser in consultation with the African Studies admissions committee.

As a student develops specific scholarly interests, s/he may request a different African Studies adviser from the one assigned by the African Studies admissions committee. The student and the Comparative Literature and African Studies academic advisers will establish a program of study that is appropriate for the student’s professional objectives and that is in accordance with the policies of the Graduate Council, the Comparative Literature graduate program, and the African Studies Program.

**Course work**

The Ph.D. in Comparative Literature and African Studies is awarded to students who are admitted to the Comparative Literature doctoral program and admitted subsequently into the dual-title degree in African Studies. The minimum course requirements for the dual-title Ph.D. degree in Comparative Literature and African Studies are as follows:

- A minimum of 60 postbaccalaureate credits. Course work accepted for the M.A. in Comparative Literature will count toward the 60-credit requirement. At least 45 credits, exclusive of dissertation research credits, must be in Comparative Literature.
  - AFR 501
  - 15 credits of African-related coursework at the 400- or 500-level; a minimum of 6 of these credits must be taken from a list of courses maintained by the African Studies program chair.
  - Up to 6 of the 15 credits may come from Comparative Literature, as approved by the student’s Comparative Literature and African Studies Program academic advisors.
  - The remaining credits can be taken in AFR or in any department other than Comparative Literature.
  - Of the 15 credits, no more than 6 credits may be taken at the 400-level and no more than 3 combined credits may come from AFR 596 and AFR 599 listings.

The choice of courses in African Studies is to be proposed by the student subject to approval by the Comparative Literature and African Studies academic advisers. The suite of selected courses should have an integrated, intellectual thrust that probes thematic, national, or regional issues and that is complementary to the student’s specialty in Comparative Literature.

**Language Requirement**

Fulfillment of communication and foreign language requirements will be determined by the student with approval of the Comparative Literature and African Studies program advisers and will meet the existing Comparative Literature requirements. The Ph.D. in Comparative Literature requires proficiency in two foreign languages. The foreign languages are to be prepared at a level that permits thorough literary analysis of texts and related material in those languages.

**Qualifying Exam**

The dual-title degree will be guided by the Qualifying Exam procedure of the Comparative Literature graduate program. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable. There will be a single qualifying examination, containing elements of both the major discipline and African Studies.

The qualifying examination committee for the dual-title degree will be composed of Graduate Faculty from Comparative Literature and
must include a Graduate Faculty member from the African Studies Program. The designated dual-title faculty member may be appointed from Comparative Literature if that person holds a formal affiliation with the African Studies program.

**Doctoral Committee Composition**

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of a Comparative Literature and African Studies dual-title Ph.D. student must include at least one member of the African Studies Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in African Studies, the member of the committee representing African Studies must be appointed as co-chair.

**Comprehensive Exam**

After completing most course work, students in the dual-title doctoral degree program in Comparative Literature and African Studies must pass a comprehensive examination that includes written and oral components. Written components will be administered on a student’s examination fields according to the current Comparative Literature exam structure, and on African Studies. The African Studies representative on the student’s dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination. The African Studies component of the exam will be based on the student’s thematic, national, or regional area(s) of interest and specialization in African Studies.

**Dissertation and Dissertation Defense**

Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. Students enrolled in the dual-title program are required to write and orally defend a dissertation on a topic that reflects their original research and education in Comparative Literature and African Studies. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

**Dual-Title Ph.D. in Comparative Literature and Asian Studies**

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

Graduate students with research and educational interests in Asian Studies may apply to the Comparative Literature/Asian Studies Degree Program. The goal of the dual-title degree in Comparative Literature and Asian Studies is to enable graduate students from Comparative Literature to acquire the knowledge and skills of their major area of specialization in Comparative Literature while at the same time gaining the perspective of Asian Studies.

In order to prepare graduate students for the competitive job market, this program provides them with a solid disciplinary foundation that will allow them to compete for the best jobs in their field. For such students the dual-title Ph.D. in Asian Studies will add value to their degree and their status as candidates. It will produce excellent scholars of literature who are experts in Asian Studies as well. The dual-title degree Comparative Literature and Asian Studies will build curricular bridges beyond the student’s major field so as to provide a unique training regime for the global scholar.

**Admission Requirements**

Students must apply and be admitted to the graduate program in Comparative Literature and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admission requirements of the Asian Studies dual-title program. Refer to the Admission Requirements section of the Asian Studies (http://bulletins.psu.edu/graduate/programs/majors/asian-studies) Bulletin page. The Asian Studies admissions committee reviews applications forwarded by Comparative Literature, and recommends students for admission to the Asian Studies program to the Graduate School. Students already in their first and second years of the Comparative Literature graduate program may also apply to the dual-title program if their applications are forwarded by Comparative Literature. Doctoral students must be admitted into the dual-title degree program in Asian Studies prior to taking the qualifying examination in their primary graduate program.

Students with appropriate course backgrounds and a 3.00 junior/senior average (on a 4.00 scale) will be considered for admission. The admission process is highly competitive and the best qualified students will be admitted subject to space availability. Scores from the Graduate Record Examination (GRE) are required for admission.

There are no specific requirements for admissions into the dual-title program beyond the requirements of the Graduate School and Comparative Literature, though applicants interested in the program should also make their interest in the dual-title program known clearly on their application for admission to the Comparative Literature program and include remarks in their essays that explain their training, interests, and career goals in an area of Asian Studies.

**Degree Requirements**

To qualify for an Asian Studies degree, students must satisfy the requirements of the Comparative Literature program in which they are primarily enrolled. In addition, they must satisfy the requirements described below, as established by the Asian Studies Program (http://bulletins.psu.edu/graduate/programs/majors/asian-studies). Within this framework, final course selection is determined by the students, their Asian Studies adviser, and their Comparative Literature program adviser.

Upon a student’s acceptance by the Asian Studies admissions committee, the student will be assigned an Asian Studies academic adviser in consultation with the Asian Studies chair. As students develop specific scholarly interests, they may request that a different Asian Studies faculty member serve as their adviser. The student and adviser will discuss a program of study that is appropriate for the student’s professional objectives and that is in accord with the policies of The Graduate School, the Comparative Literature department and the Asian Studies program.

**Course work**

The dual-title Ph.D. degree in Comparative Literature and Asian Studies is awarded only to students who are admitted to the Comparative Literature doctoral program and admitted to the dual-title degree in Asian Studies. The minimum course requirements for the dual-title Ph.D. degree in Comparative Literature and Asian Studies are as follows:

- CMLIT 501, CMLIT 502, and CMLIT 503
- 15 credits of Asia-related coursework at the 400 or 500 level. At least 6 of these 15 credits will be from ASIA 501 and ASIA 502. As many
as 6 may come from Comparative Literature, as approved by the student’s doctoral adviser and the ASP director of graduate studies. The remaining credits can be taken in ASIA or in any department other than Comparative Literature.

- An additional 21 credits in literature or theory-related courses, including graduate course work in the three languages that the student selects, with emphasis on the student’s primary language

Particular courses may satisfy both the Comparative Literature requirements and those of the Asian Studies program. Within this framework, final course selection is determined by the students, their Asian Studies adviser, and their Comparative Literature program adviser.

Qualifying Examination
The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Comparative Literature and must include at least one Graduate Faculty member from the Asian Studies program. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. There will be a single qualifying examination, containing elements of both Comparative Literature and Asian Studies. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

Doctoral Committee Composition
In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of a Comparative Literature and Asian Studies dual-title Ph.D. student must include at least one member of the Asian Studies Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in Asian Studies, the member of the committee representing Asian Studies must be appointed as co-chair. The Asian Studies representative on the student’s dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.

Dissertation and Dissertation Defense
Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their dissertation committee and reflects their original research and education in Comparative Literature and Asian Studies. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

Dual-Title Ph.D. in Comparative Literature and Visual Studies
Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

Comparative Literature graduate students who have research and educational interests in global visual culture may apply to the Dual-Title Doctoral Program in Visual Studies. The program aims to (a) provide students with the conceptual and methodological tools they will use to interpret literature and its history in global contexts; (b) help them develop a comprehensive understanding of literary systems, processes, and networks across languages, cultures, and media; and (c) guide them in using their specialized knowledge and skills to produce research of publishable quality. The program prepares graduates for college and university teaching, and careers in other related fields.

The dual-title Ph.D. in Visual Studies comprises two core components:

1. historical and theoretical analysis of various forms of visual culture, their diverse sources, and their current manifestations;
2. historical and theoretical analysis of visual media in the information age, including the visual aspects of the digital humanities and the presentation of scholarship and teaching in visual media.

A program-specific required course in each of these areas will ensure breadth of training for participating students. Together these components will offer students a sophisticated understanding of and ability to intervene in debates about visual culture and visuality in the world today.

Admission Requirements
Students must apply and be admitted to the doctoral program in Comparative Literature and The Graduate School before they can apply for admission to the dual-title degree program. Applicants interested in the dual-title degree program may make their interest in the program known clearly in their applications to Comparative Literature and include remarks in their statement of purpose that address the ways in which their research and professional goals in the primary department reflect an interest in Visual Studies-related research. After admission to the doctoral program, students must apply for admission to and meet the admissions requirements of the Visual Studies dual-title program, as described in the Admission Requirements section of the Visual Studies Bulletin (http://bulletins.psu.edu/graduate/programs/majors/visual-studies). Doctoral students must be admitted into the dual-title degree program in Visual Studies prior to taking the qualifying examination in the Comparative Literature program.

Degree Requirements
To qualify for the dual-title degree, students must satisfy the degree requirements for the Ph.D. in Comparative Literature, listed on the Degree Requirements tab. In addition, students must complete the degree requirements for the dual-title in Visual Studies, listed on the Visual Studies Bulletin page.

Coursework
The program will consist of a total of fifteen credits, including two required courses – Visual Culture Theory and History (VSTUD 501) and Visual Digitality (VSTUD 502) – and three elective courses dealing with questions of visuality, chosen in consultation with the Director of Graduate Studies for Comparative Literature. Up to six credits may be double-counted by both the primary graduate program (CMLIT) and the dual-title.

Language Requirements
There are no additional language requirements for the dual-title degree (the usual doctoral requirements of the Department of Comparative Literature are to be followed).

Qualifying Examination
The dual-title field will be fully integrated into the qualifying exam for the doctoral program. The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Comparative Literature and must include at least one Graduate Faculty member from the Visual Studies program. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. In
addition, student in the dual-title Ph.D. in Visual Studies will be required to present to their committee a portfolio of work in Visual Studies, consisting of a statement of the student’s interdisciplinary research interests, a program plan, and samples of writing that indicate the student’s interest in questions related to Visual Studies.

Because students must first be admitted to a graduate major program of study before they may apply to and be considered for admission into a dual-title graduate degree program, dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

**Doctoral Committee Composition**

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of a Comparative Literature and Visual Studies dual-title Ph.D. student must include at least one member of the Visual Studies Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. If the committee chair does not represent Visual Studies, a committee member representing Visual Studies must be appointed as co-chair.

**Comprehensive Exam**

After completing most course work, doctoral students in the dual-title doctoral degree program in Comparative Literature and Visual Studies must pass a comprehensive examination that includes written and oral components. Written components will be administered on a student’s examination fields according to the current Comparative Literature exam structure. The faculty member representing Visual Studies on the student’s committee will participate in developing, administering, and evaluating the student’s comprehensive exams.

**Dissertation and Dissertation Defense**

Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. Students enrolled in the dual-title program are required to write and orally defend a dissertation on a topic that reflects their original research and education in Comparative Literature and Visual Studies. The dissertation must be accepted by the dissertation committee, the head of the Comparative Literature program, and the Graduate School.

**Dual-Title Ph.D. in Comparative Literature and Women’s Studies**

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

Comparative Literature graduate students who have research and educational interests in women’s, gender, and sexuality studies may apply to the Dual-Title Doctoral Program in Women’s Studies. The program creates a formal structure for training graduate students to describe, analyze, and evaluate the practices, phenomena, and policies that both issue from and structure the experiences and possibilities of women, as well as training for students to analyze how gender and sexuality intersect with literary production in multiple societies. This training cultivates breadth by pushing students to think across disciplines, geographic regions, geopolitical boundaries, domains of practice, aesthetic fields, literary genres, and historical eras. It also balances this breadth with rigor: it combines systematic training in comparative literary research, including working with primary sources in languages other than English, with a thorough grounding in the techniques and intellectual resources of state of the art scholarship on women, gender, and sexuality.

The Dual-Title Doctoral Degree Program in Comparative Literature and Women’s Studies has three broad learning objectives at its core (in addition to the objectives that animate the regular doctoral program in Comparative Literature). Students will leave the program with expert awareness of responsibly produced knowledge and ethical research techniques for producing new knowledge, about:

1. the forces that constitute, shape, distinguish, and link the lives of women in a variety of historical and geographic locations;
2. ways to understand the history of women, of gender, and of sexuality in global perspectives and specific local and linguistic contexts, with emphases on the relation of these fields to the history of the aesthetic, as well as to a variety of other economic, social, or philosophical structures that help determine the natures of gender and the lives of women; and
3. the history, content, conceptual options, and ethical stakes of the theoretical debates about the best ways to engage in the field of Women’s Studies.

**Admission Requirements**

Students must apply and be admitted to the graduate program in Comparative Literature and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission and meet the admissions requirements of the Women’s Studies dual-title program. Refer to the Admission Requirements section of the Women’s Studies Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/womens-studies). Students must have the approval of the Comparative Literature graduate director to apply for the dual-title. The application must include a statement of purpose that addresses how the student’s research and professional goals intersect with the objectives of the dual-title graduate degree program in Comparative Literature and Women’s Studies. The Women’s Studies Admissions Committee reviews applications and recommends students for admission to the dual-title Ph.D. program. Doctoral students must be admitted into the dual-title degree program in Women’s Studies prior to passing the qualifying examination in their primary graduate program.

Students may apply to the dual-title program when they request admission to the Comparative Literature Department, or at any time prior to taking the qualifying exam in Comparative Literature, provided that they

1. secure the approval of the graduate director in Comparative Literature, and
2. have sufficient funding and time to complete the dual-title requirements.

Practically speaking, this will likely mean applying to the dual-title program before completing the second year of study in Comparative Literature.

**Degree Requirements**

The doctoral degree in Comparative Literature and Women’s Studies is awarded only to students who are admitted to the Comparative Literature doctoral program and admitted to the dual-title degree in Women’s Studies. To qualify for a degree in Comparative Literature and Women’s Studies, students must satisfy the requirements of the Comparative Literature program, in which they are primarily enrolled, and of the Women’s Studies (http://bulletins.psu.edu/graduate/programs/
majors/womens-studies) dual-title program. Except where noted otherwise, students must complete the requirements listed below in addition to completing the general requirements for doctoral study in the Department of Comparative Literature.

Course work
The minimum course requirements for this dual-title Ph.D. degree are 18 credits of coursework related to Women's Studies. Of these 18 credits, 9 consist of the required core course sequence in Women's Studies:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>WMNST 501</td>
<td>Feminist Perspectives on Research and Teaching Across the Disciplines</td>
<td>3</td>
</tr>
<tr>
<td>WMNST 507</td>
<td>Feminist Theory</td>
<td>3</td>
</tr>
<tr>
<td>WMNST 502</td>
<td>Global Perspectives on Feminism</td>
<td>3</td>
</tr>
</tbody>
</table>

Students also must complete 9 additional credits of Women's Studies course work chosen in consultation with the Graduate Director in Women's Studies. Most of these courses (at least 5 credits) should be at the 500 level, but a student may count some 400-level credits, with the approval of the Graduate Director in Women's Studies. Particular courses may simultaneously satisfy degree requirements in Comparative Literature and in the Women's Studies dual-title. Students who already hold a master's degree or other graduate credits from another institution may petition the Graduate Director in Women's Studies to have equivalent course credits accepted.

Language Requirements
There are no additional language requirements for the dual-title degree (the usual doctoral requirements of the Department of Comparative Literature are to be followed).

Qualifying Examination
The dual-title field must be fully integrated into the qualifying exam for the doctoral program. In addition, students in the dual-title Ph.D. in Comparative Literature and Women's Studies program will be required to present to their committee a portfolio of work in Women's Studies which includes:

- a statement of the student's interdisciplinary research interests,
- a program plan,
- and samples of writing that indicate the student's interest in questions taken up by scholars of Women's Studies.

The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Comparative Literature and must include at least one Graduate Faculty member from the Women's Studies program. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

Doctoral Committee Composition
In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of a Comparative Literature and Women's Studies dual-title Ph.D. student must include at least two members of the Comparative Literature Graduate Faculty and two members of the Women's Studies Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in Women's Studies, the member of the committee representing Women's Studies must be appointed as co-chair.

Comprehensive Exams
The faculty member representing Women's Studies on the student's committee will participate in developing, administering, and evaluating the student's comprehensive exams. The exam will incorporate written and oral components based on the student's thematic or regional areas of interest and specialization and may include questions on queer theory, feminist methodology, global women's studies and sexuality studies in Comparative Literature.

Dissertation and Final Oral Examination (Dissertation Defense)
Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their dissertation committee and reflects their original research and education in Comparative Literature and Women's Studies. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

Integrated Undergrad-Grad Programs

Integrated B.A. in Comparative Literature and M.A. in Comparative Literature
Requirements listed here are in addition to requirements listed in GCAC-210 Integrated Undergraduate-Graduate (IUG) Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/integrated-undergraduate-graduate-degree-programs).

The Department of Comparative Literature offers an integrated B.A./M.A. program that is designed to allow academically superior baccalaureate students to obtain both the B.A. and the M.A. degrees in Comparative Literature within five years of study. The first two years of undergraduate course work include the University General Education and Liberal Arts requirements in addition to language and literature study in the major. In the third year, students are expected to define areas of interest in two primary literatures in different languages. In addition, students in the B.A./M.A. program should begin to undertake work in a second foreign language. The fourth year includes graduate-level work in methodology and the student's selection of primary literatures, which replaces comparable 400-level senior year courses. The fifth and final year of the program typically consists of graduate work in Comparative Literature courses as well as the chosen literatures. The program culminates with an M.A. paper.

By encouraging greater depth and focus in the course of study beginning in the third undergraduate year, this program helps students more clearly define their area of interest and expertise in the otherwise vast field of international literatures. As a result, long-range academic planning for exceptional students pursuing doctoral degrees after leaving Penn State, or other professional goals, will be greatly enhanced. The student may also be more competitive in applying for admission to Ph.D. programs as well as for institutional and national grant monies and scholarships.

Admission Requirements
The number of openings in the integrated B.A./M.A. program is limited. Admission is selective based on specific criteria and the unqualified recommendation of faculty. Applicants to the integrated program:
1. Must be enrolled in the Comparative Literature B.A. program.
2. Must have completed 60 credits of the undergraduate degree program. (It is strongly suggested that students apply to the program prior to completing 100 credits.) Students shall be admitted to an IUG program no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree, as specified in the proposed IUG plan of study.
3. Must be accepted without reservation into the M.A. program in Comparative Literature. Students must apply to the program via the Graduate School application for admission (http://www.gradschool.psu.edu/prospective-students/how-to-apply), and must meet all the admission requirements of the Graduate School and the Comparative Literature graduate program for the Master of Arts degree, listed on the Admission Requirements tab.
4. Should have a recommended overall GPA of 3.2 (on a 4.0 scale) in undergraduate coursework and a minimum GPA of 3.5 in all coursework completed for the major.
5. Must present a departmentally approved plan of study in the application process. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser as the student advances through the program.
6. Must be recommended by the chairs of the Department’s undergraduate and graduate committees.

Degree Requirements
A typical sequence of course work for the integrated program would appear as follows:

• Students must fulfill all requirements for each degree in order to be awarded that degree, subject to the double-counting of credits as outlined below. Degree requirements for the B.A. in Comparative Literature are listed in the Undergraduate Bulletin (http://bulletins.psu.edu/undergraduate). Degree requirements for the M.A. degree are listed on the Degree Requirements tab. Up to 9 credits may be double-counted towards the degree requirements for both the graduate and undergraduate degrees; a minimum of 50% of the double-counted courses must be at the 500 or 800 level. Credits associated with the culminating experience for the graduate degree cannot be double-counted. Because the B.A./M.A. is an integrated (rather than a sequential) degree program students are encouraged to gradually increase the number of graduate courses taken for credit. (See chart of suggested progress below.) Still, students should satisfy all of the B.A. requirements (including double-counted classes), before taking courses that count only toward the M.A. If students accepted into the IUG program are unable to complete the M.A. degree, they are still eligible to receive their undergraduate degree if all the undergraduate degree requirements have been satisfied.

• CMLIT 501 will double-count for both degrees, and will replace CMLIT 400 (a core requirement of the B.A.-only program). Students enrolled in the Integrated B.A./M.A. program can also double-count two further 500-level courses (CMLIT 502 and CMLIT 503) toward both the B.A. and the M.A. degrees.

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<tr>
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<td>CMLIT 10</td>
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<tr>
<td>CMLIT 100</td>
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<th>Second Year</th>
<th>Credits</th>
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<tr>
<td>Foreign Language (beyond the 12-credit level)</td>
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<tr>
<td>Courses in Literature</td>
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<th>Third Year</th>
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<td>400-level courses in Literature</td>
<td>6</td>
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<tr>
<td>CMLIT 501</td>
<td>3</td>
</tr>
<tr>
<td>Work in foreign language (credits do not count towards the major, but reading proficiency is required for the M.A. degree)</td>
<td>9</td>
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<tr>
<th>Fourth Year</th>
<th>Credits</th>
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<tbody>
<tr>
<td>CMLIT 502 or 503</td>
<td>3</td>
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<tr>
<td>Comparative Literature courses</td>
<td>6</td>
</tr>
<tr>
<td>500-level courses in Literatures (at least 3 credits in non-Anglophone literature)</td>
<td>6-9</td>
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<td></td>
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<tr>
<td>500-level courses in Literatures (at least 3 credits in non-Anglophone literature)</td>
<td>9-12</td>
</tr>
<tr>
<td>500-level Comparative Literature Courses M.A. paper</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>18-21</td>
</tr>
</tbody>
</table>

Total Credits 60-66

Student Aid
Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

Teaching assistantships in the Department of Comparative Literature, as well as in related language and literature departments, typically have been available to students taking comparative literature degrees. In recent years, Comparative Literature students have held assistantships in Arabic, Chinese, English, French, German, Hebrew, Italian, Japanese, Russian, Spanish, Swahili, and Women’s Studies, as well as in Comparative Literature courses. There also is a graduate assistantship position for an editorial assistant to the journal Comparative Literature Studies, which is edited in the department. In addition, the following awards typically have been available to graduate students in this program.

Samuel P. Bayard Award
Available annually to a graduate student in comparative literature, selected by the graduate committee of the Department of Comparative Literature. Amount varies.

Edwin Erle Sparks Fellowships in the Humanities
Available to beginning and continuing graduate students in the following graduate programs:

- Comparative Literature
- English
- French
• German
• History
• Philosophy
• Spanish
• Communication Arts and Sciences

Folger Institute Fellowships
Penn State is a member of the Folger Institute of Renaissance and Eighteenth-Century Studies. Graduate students in Comparative Literature are eligible for Folger Institute Fellowships to study in seminars and workshops at the Folger Library, Washington, D.C.

Title VI Center for Global Studies Assistantship
Available to beginning and continuing graduate students in Comparative Literature and other programs.

Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not be used to meet deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Learning Outcomes

Master of Arts (M.A.)
1. Graduates will demonstrate knowledge of literature and critical theory from a global perspective, in multiple languages and media, and across a broad range of historical periods.
2. Graduates will demonstrate their development of new knowledge in the discipline, by designing and executing a sustained piece of scholarship (MA Paper) that brings their newly created knowledge into conversation with on-going debates in the discipline.
3. Graduates will demonstrate the ability to participate appropriately in a variety of professional situations, including seminars, lectures, and, when feasible and advisable, conferences or teaching.

Doctor of Philosophy (Ph.D.)
1. Graduates will demonstrate knowledge of literature and critical theory from a global perspective, in multiple languages and media, and across a broad range of historical periods.
2. Graduates will demonstrate the ability to organize disciplinary knowledge through the creation of syllabi, by discussing and thinking about their teaching in ways that reflect current pedagogical practice and theory, and, as feasible, by teaching introductory and advanced concepts and topics appropriate to their field.
3. Graduates will demonstrate their development of new knowledge in the discipline, by designing and executing a sustained piece of scholarship (the dissertation) that brings their newly created knowledge into conversation with on-going debates in the field.
4. Graduates will demonstrate the mastery of conventions for presenting research suitable for presentation at professional conferences and for writing articles suitable for submission to literary journals.
5. Graduates will demonstrate the ability to participate appropriately in a variety of professional situations, including seminars, lectures, conferences, and job interviews.

Contact
Graduate Program Head: Robert R. Edwards
Director of Graduate Studies/Professor-in-Charge: Charlotte Eubanks
Primary Program Contact: Laura Shaffer
Email: lab5@psu.edu
Mailing Address: 442 Burrowes Bldg., University Park, PA 16082
Telephone: (814)865-1352
Program Website: Comparative Literature (http://complit.la.psu.edu)

Computer Science
Graduate Program Head: Rafic Bachnak
Program Code: COMP
Campus(es): Harrisburg (M.S.)
Degrees Conferred:
Master of Science (M.S.)
Integrated B.S. in Computer Science and M.S. in Computer Science

The Graduate Faculty
View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=rac&prog=COMP)

The program is professionally oriented and designed to prepare students for employment in industry or government. Courses emphasize practical concerns as well as the relevant theoretical background. The program will provide appropriate background for diverse tasks such as:

• developing scientific and engineering applications,
• developing system software,
• developing safety or security critical systems,
• solving computationally hard problems, and
• developing distributed applications.

While not intended as preparation for subsequent entrance to a Ph.D. program, this goal is not precluded. Once the specific course requirements are met, appropriate selection of electives will enable individual interests to be met within the program.

Admission Requirements
Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Applicants must present a baccalaureate degree in Computer Science or a related field from a regionally accredited institution. A minimum GPA of 2.75 (on a 4.0 scale) is required. While a bachelor’s degree in Computer Science is not required, admission without deficiency requires that an applicant has completed courses in analysis of algorithms, operating systems, database, and linear algebra. If these courses are not taken before admission to the program, they may be taken at Penn State Harrisburg, but the student will receive at most 3 credits toward the M.S. degree for these courses.
At the discretion of the program, applicants may be required to provide scores from the Graduate Record Examinations (GRE) and/or the GRE subject test in computer science. In addition, applicants must provide three letters of reference, at least one of which is from an academic source, and a letter outlining significant work experience and academic and career objectives.

**Degree Requirements**

**Master of Science (M.S.)**

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

A total of 30 credits (400-, 500-, 600-, or 800-level) is required for the Master of Science in Computer Science. Students are required to take the following courses:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMP 505</td>
<td>Theory of Computation</td>
<td>3</td>
</tr>
<tr>
<td>COMP 511</td>
<td>Design and Analysis of Algorithms</td>
<td>3</td>
</tr>
<tr>
<td>COMP 512</td>
<td>Advanced Operating Systems</td>
<td>3</td>
</tr>
<tr>
<td>COMP 519</td>
<td>Advanced Topics in Database Management Systems</td>
<td>3</td>
</tr>
</tbody>
</table>

**Total Credits**: 12

Additionally, students are required to complete either a thesis or a paper according to one of the two options described below. Students who believe that they have completed a course substantially similar to one of the specific course requirements may apply to have their previous work evaluated for the purpose of exemption to that requirement. If the exemption is granted, another approved course shall be taken in place of that required course. The remaining 18 credits must be completed according to one of the following options:

**Thesis Option**

*Research into a specific computer science problem, development of a scholarly written paper, and an oral defense. This option requires:*

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMP 600</td>
<td>Thesis Research</td>
<td>6</td>
</tr>
<tr>
<td>3 credits from approved 500-level electives in computer science, mathematics, engineering, and information systems courses</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>9 credits from approved 400- and 500-level electives in computer science, mathematics, engineering, and information systems courses</td>
<td>9</td>
<td></td>
</tr>
</tbody>
</table>

**Total Credits**: 18

**Paper Option**

*In-depth study of specific computer science problems, development of a written paper or project, and an oral defense. This option requires:*

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMP 594</td>
<td>Master's Studies</td>
<td>3</td>
</tr>
<tr>
<td>9 credits from approved 500-level electives in computer science, mathematics, engineering, and information systems courses</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>6 credits from approved 400- and 500-level electives in computer science, mathematics, engineering, and information systems courses</td>
<td>6</td>
<td></td>
</tr>
</tbody>
</table>

**Total Credits**: 18

A maximum of 9 transfer credits will be allowed for course work completed as a graduate student at another institution, subject to restrictions outlined in GCAC-309 Transfer Credit (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/transfer-credit).

**Suggested Tracks**

For students with interests in the areas of software engineering, systems programming, and artificial intelligence, the program suggests the following course work. These tracks are only advisory–there is no requirement that a student follow any track, and tracks will not be noted on diplomas or transcripts.

**Track in Software Engineering**

Students following the track in software engineering will be provided with the conceptual tools needed for designing and managing large software systems. In addition to the required core, the track in software engineering consists of the following courses:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMP 513</td>
<td>Formal Methods for Software Engineering</td>
<td>3</td>
</tr>
<tr>
<td>COMP 516</td>
<td>Advanced Programming Languages</td>
<td>3</td>
</tr>
<tr>
<td>INFSY 570</td>
<td>Software Engineering in the Analysis and Design of Information Systems</td>
<td>3</td>
</tr>
</tbody>
</table>

In addition to these courses, CMPSC 470 is highly recommended, as compiler development is an ideal environment for gaining practical experience with software engineering techniques and tools.

**Track in Systems Programming**

Students following the track in systems programming will receive instruction in both the conceptual foundation of systems software and the implementation of such systems. In addition to the required core, the track in systems programming consists of the following courses:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMPSC 436</td>
<td>Communications and Networking</td>
<td>3</td>
</tr>
<tr>
<td>COMP 517</td>
<td>Computer Security</td>
<td>3</td>
</tr>
<tr>
<td>COMP 545</td>
<td>Computer Architecture</td>
<td>3</td>
</tr>
</tbody>
</table>

**Track in Artificial Intelligence**

Students following the track in artificial intelligence are expected to gain an understanding in the theory and applications of AI methods as well as evolutionary methods for solving a variety of problems. In addition to the required core, the track in artificial intelligence consists of the following courses:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMP 520</td>
<td>Artificial Intelligence</td>
<td>3</td>
</tr>
<tr>
<td>COMP 524</td>
<td>Evolutionary Computation</td>
<td>3</td>
</tr>
<tr>
<td>COMP 556</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Integrated Undergrad-Grad Programs**

**Integrated B.S. in Computer Science and M.S. in Computer Science**

Requirements listed here are in addition to requirements listed in GCAC-210 Integrated Undergraduate-Graduate (UG) Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/integrated-undergraduate-graduate-degree-programs).
The Computer Science program offers a limited number of academically superior Bachelor of Science candidates the opportunity to enroll in an integrated, continuous program of study leading to both the Bachelor of Science in Computer Science and the Master of Science in Computer Science. The ability to coordinate as well as concurrently pursue the two degree programs enables the student to earn the two degrees in five years.

Students in the IUG program must satisfy the degree requirements for both Bachelor of Science and Master of Science degrees. However, the total course load is reduced due to the maximum of 12 credits that can count towards both degrees.

The first two years of the IUG program are identical to the first two years of the Bachelor of Science program. The third and fourth years of the IUG program differ from those of the Bachelor of Science program due to the courses that count toward the Master of Science degree requirements. Student performance will be monitored on an on-going basis. In addition, a formal evaluation of student academic performance will be performed when the student has completed 100 to 105 credits, which is at the end of the first semester of the senior year for a typical student in the program. Students who have not maintained a 3.5 GPA in their Math and Computer Science courses will be put on probationary status with respect to the IUG program. Their ability to continue in the IUG program will be based on their academic performance in the last semester of their senior year.

As part of the review in the senior year, students will be advised about the paper option and thesis option in the graduate program. Students intending to pursue the thesis option would be advised to do so only if they have been doing very well in the program and are in no danger of not being able to continue into the fifth year.

A minimum grade point average of 3.5 must be earned in all math and computer science course work that is applied toward the graduate degree. This includes any courses that count toward both the undergraduate and graduate degrees, as well as all courses taken during the fifth year.

If for any reason a student admitted to the IUG program is unable to complete the requirements for the Master of Science degree, the student will be permitted to receive the Bachelor of Science degree assuming all the undergraduate degree requirements have been satisfactorily completed. Students who successfully complete the courses listed in the recommended schedule will satisfy the requirements for the Bachelor of Science degree by the end of their fourth year.

Admission Requirements

To initiate the application process, students must submit an Integrated Undergraduate-Graduate (IUG) Degree in Computer Science Application Form, a transcript, and a faculty recommendation, in addition to applying for admission to the Graduate School (http://gradschool.psu.edu/prospective-students/how-to-apply).

Students must apply to the program via the Graduate School application for admission (http://www.gradschool.psu.edu/prospective-students/how-to-apply), and must meet all the admission requirements of the Graduate School and the Computer Science graduate program for the Master of Science degree, listed on the Admission Requirements tab. Students shall be admitted to an IUG program no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree, as specified in the proposed IUG plan of study.

In consultation with an adviser, students must prepare a plan of study appropriate to this integrated program, and must present their plan of study in person to the head of the graduate program or the appropriate committee overseeing the integrated program prior to being admitted to the program. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser as the student advances through the program.

In order to apply for the IUG program, students must have completed a minimum of 45 credits. A typical student would apply after completing between 45 to 60 credits, that is, after the fourth semester and before the end of the fifth semester. For consideration for acceptance into the program, students must have completed and earned a minimum grade point average of 3.0 in the following Computer Science and Mathematics courses:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 141</td>
<td>Calculus with Analytic Geometry II</td>
<td>4</td>
</tr>
<tr>
<td>MATH 220</td>
<td>Matrices</td>
<td>2-3</td>
</tr>
<tr>
<td>CMPSC 121</td>
<td>Introduction to Programming Techniques</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 122</td>
<td>Intermediate Programming</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 360</td>
<td>Discrete Mathematics for Computer Science</td>
<td>3</td>
</tr>
</tbody>
</table>

Student applications will be evaluated based on their overall academic performance, in addition to the above requirements. In all cases, admission to the program will be at the discretion of the Graduate Admissions Committee in Computer Science.

Degree Requirements

Students must fulfill all degree requirements for each degree in order to be awarded that degree, subject to the double-counting of credits as outlined below. Degree requirements for the Bachelor of Science in Computer Science are listed in the Undergraduate Bulletin (http://bulletins.psu.edu/undergraduate). Degree requirements for the Master of Science in Computer Science are listed on the Degree Requirements tab. Students must sequence their courses so all undergraduate degree requirements are fulfilled before taking courses to count solely towards the graduate degree. If students accepted into the IUG program are unable to complete the M.S. degree, they are still eligible to receive their undergraduate degree if all the undergraduate degree requirements have been satisfied.

Up to 12 credits may be double-counted towards the degree requirements for both the graduate and undergraduate degrees; a minimum of 50% of the double-counted courses must be at the 500 or 800 level. Credits associated with the culminating experience for the graduate degree cannot be double-counted.

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.
Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Learning Outcomes
1. KNOW: Graduates will be able to demonstrate mastery of core principles in Computer Science.
2. THINK/APPLY/CREATE: Graduates will be able to critically and creatively conceptualize, evaluate, formulate, and solve computing problems.
3. COMMUNICATE: Graduates will be able to effectively communicate, to diverse audiences, solutions to complex problems.
4. PROFESSIONAL PRACTICE: Graduates will be able to demonstrate an understanding of professional and ethical responsibility and conduct themselves accordingly.

Contact
Graduate Program Head: Rafic Bachnak
Director of Graduate Studies/Professor-in-Charge: Sukmoon Chang
Primary Program Contact: Jeanne M. Miller
Email: jmb84@psu.edu
Mailing Address: W255 Olmsted, 777 West Harrisburg Pike, Middletown, PA 17057
Telephone: (717) 948-6081
Program Website: Computer Science (https://harrisburg.psu.edu/science-engineering-technology/computer-science-and-mathematics/master-science-computer-science)

Computer Science and Engineering
Graduate Program Head: Chitaranjan Das
Program Code: CSE
Campus(es): University Park (Ph.D., M.S., M.Eng.)
Degrees Conferred:
- Doctor of Philosophy (Ph.D.)
- Master of Science (M.S.)
- Master of Engineering (M.Eng.)
- Dual-Title Ph.D., M.S., and M.Eng. in Computer Science and Engineering and Operations Research

The Graduate Faculty:
View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=CSE)

The department offers courses and is prepared to direct research in a variety of subfields of computer science and engineering, including VLSI, computer architecture, parallel/distributed processors and processing, multiprocessors, interconnection networks, pattern recognition and image processing, performance evaluation, reliability, fault tolerance, theory of computation, computer systems, numerical analysis and optimization, programming methodology, and analysis of algorithms. Research and instruction are supported by extensive computing facilities within the University’s Information Technology Services and by the computer laboratories operated by the department.

Admission Requirements
Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

All applicants must provide a one-page statement of purpose and scores from the Graduate Record Examinations (GRE) Aptitude Test (verbal, quantitative, and analytical). A subject test in Computer Science is not required, but the subject test in Computer Science is recommended.

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. See GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-305/admission-requirements-international-students) for more information.

Those students seeking an assistantship in Computer Science and Engineering are required to submit a Test of Spoken English (TSE) or the TOEFL iBT. A score of 26 on the speaking section of the TOEFL iBT is equivalent to passing the TSE. A lower score would require remedial English as a Second Language courses. For score reporting for TOEFL, the institution code is 2660 and the department code is 78.

Degree Requirements
Master of Engineering (M.Eng.)
Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

All students are expected to have completed appropriate courses in computer architecture and machine organization, data structures and analysis of algorithms, programming languages, operating systems, and logical design/switching theory or theory of automata. Students who do not meet background requirements will be required to take the appropriate 400-level courses to prepare them for the 500-level courses. At most, 3 credits of background course work can be used to satisfy the degree requirements except as specified for the M.Eng. degree. Students admitted to the M.S. program will not be permitted to switch to the M.Eng. program at a later time, except under extenuating circumstances and at the discretion of the program.

A minimum of 30 credits is required for the M. Eng. degree:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMPSC 465</td>
<td>Data Structures and Algorithms</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>6 credits of the following:</td>
<td>6</td>
</tr>
<tr>
<td>CMPSC 443</td>
<td>Introduction to Computer and Network Security</td>
<td></td>
</tr>
<tr>
<td>&amp; CMPSC 431</td>
<td>and Database Management Systems</td>
<td></td>
</tr>
<tr>
<td>CMPEN 431</td>
<td>Introduction to Computer Architecture</td>
<td></td>
</tr>
<tr>
<td>&amp; CMPEN 472</td>
<td>and Microprocessors and Embedded Systems</td>
<td></td>
</tr>
<tr>
<td>3 credits of the following:</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>CSE 500</td>
<td>CSE 589</td>
<td></td>
</tr>
</tbody>
</table>
CSE 597 Special Topics

**Spring Semester**

12 credits of the following: 12

- CSE 500 - CSE 589
- CSE 597 Special Topics

**Summer Semester**

CSE 820 Software & Hardware Project Management 3
CSE 594 Research Topics 3

Total Credits 30

The culminating experience for the program is a paper completed while the student is enrolled in CSE 594.

**Master of Science (M.S.)**

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

All students are expected to have completed appropriate courses in computer architecture and machine organization, data structures and analysis of algorithms, programming languages, operating systems, and logical design/switching theory or theory of automata. Students who do not meet background requirements will be required to take the appropriate 400-level courses to prepare them for the 500-level courses. At most, 3 credits of background course work can be used to satisfy the degree requirements. Students admitted to the M.S. program will not be permitted to switch to the M. Eng. program at a later time, except under extenuating circumstances and at the discretion of the program.

A minimum of 30 credits is required for the M.S. degree:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Required Courses</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>15 credits of CSE courses numbered 500-589, including a minimum of 9 credits that satisfy a breadth requirement</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>9 credits of 400-, 500-, or 800-level courses (excluding independent studies courses). This must include at least 1, and at most 2, credits of CSE 590</td>
<td>9</td>
</tr>
<tr>
<td>CSE 600</td>
<td>Thesis Research</td>
<td>6</td>
</tr>
<tr>
<td>or CSE 610</td>
<td>Thesis Research Off-Campus</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Total Credits</strong></td>
<td>30</td>
</tr>
</tbody>
</table>

To qualify for a Ph.D. degree, students who do not have an M.S. degree in Computer Science or Computer Engineering must take a minimum of 33 credits, including:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Required Courses</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>6 credits of the following:</td>
<td></td>
</tr>
<tr>
<td>CSE 565</td>
<td>Algorithm Design and Analysis</td>
<td>6</td>
</tr>
<tr>
<td>CSE 511</td>
<td>Operating Systems Design</td>
<td></td>
</tr>
<tr>
<td>CSE 530</td>
<td>Fundamentals of Computer Architecture</td>
<td></td>
</tr>
<tr>
<td></td>
<td>15 credits of CSE courses (excluding CSE 596 and CSE 598)</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>9 credits of 400-, 500-, or 800-level courses in CSE/EE/MATH/STAT, or 500- or 800-level IST courses (which may include up to 3 credits of CSE 596)</td>
<td>9</td>
</tr>
<tr>
<td>CSE 590</td>
<td>Colloquium</td>
<td>2</td>
</tr>
<tr>
<td>CSE 591</td>
<td>Research Experience in Computer Science and Engineering</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td><strong>Total Credits</strong></td>
<td>33</td>
</tr>
</tbody>
</table>

Students admitted to the Ph.D. program with an M.S. degree in Computer Science or Computer Engineering must take a minimum of 21 credits, including:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Required Courses</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>6 credits of the following:</td>
<td></td>
</tr>
<tr>
<td>CSE 565</td>
<td>Algorithm Design and Analysis</td>
<td>6</td>
</tr>
<tr>
<td>CSE 511</td>
<td>Operating Systems Design</td>
<td></td>
</tr>
<tr>
<td>CSE 530</td>
<td>Fundamentals of Computer Architecture</td>
<td></td>
</tr>
<tr>
<td></td>
<td>9 credits of CSE courses (excluding CSE 596 and CSE 598)</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>3 credits of 400-, 500-, or 800-level courses in CSE/EE/MATH/STAT, or 500- or 800-level IST courses (which may include up to 3 credits of CSE 596)</td>
<td>3</td>
</tr>
<tr>
<td>CSE 590</td>
<td>Colloquium</td>
<td>2</td>
</tr>
<tr>
<td>CSE 591</td>
<td>Research Experience in Computer Science and Engineering</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td><strong>Total Credits</strong></td>
<td>21</td>
</tr>
</tbody>
</table>

A student must pass the Ph.D. qualifying examination by the third regular semester after entering the program. After completion of most of the course work and meeting the English competency requirement, students must pass the Ph.D. comprehensive examination.

A dissertation must be completed under the direction of the dissertation committee and the results must be successfully defended in the final oral examination. To earn the Ph.D. degree, doctoral candidates must write a dissertation that is accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

**Doctor of Philosophy (Ph.D.)**

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

Students applying for and gaining admittance to the Ph.D. program will not be permitted to switch to the master's program at a later date, except under extenuating circumstances, at the discretion of the program.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Required Courses</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>6 credits of the following:</td>
<td></td>
</tr>
<tr>
<td>CSE 565</td>
<td>Algorithm Design and Analysis</td>
<td>6</td>
</tr>
<tr>
<td>CSE 511</td>
<td>Operating Systems Design</td>
<td></td>
</tr>
<tr>
<td>CSE 530</td>
<td>Fundamentals of Computer Architecture</td>
<td></td>
</tr>
<tr>
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<td>9 credits of CSE courses (excluding CSE 596 and CSE 598)</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>3 credits of 400-, 500-, or 800-level courses in CSE/EE/MATH/STAT, or 500- or 800-level IST courses (which may include up to 3 credits of CSE 596)</td>
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<td>CSE 590</td>
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<td><strong>Total Credits</strong></td>
<td>21</td>
</tr>
</tbody>
</table>

A student must pass the Ph.D. qualifying examination by the third regular semester after entering the program. After completion of most of the course work and meeting the English competency requirement, students must pass the Ph.D. comprehensive examination.

A dissertation must be completed under the direction of the dissertation committee and the results must be successfully defended in the final oral examination. To earn the Ph.D. degree, doctoral candidates must write a dissertation that is accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

**Dual-Titles**

**Dual-Title M.Eng., M.S., and Ph.D. in Computer Science and Engineering and Operations Research**

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).
Admissions Requirements
Students must apply and be admitted to the graduate program in Computer Science and Engineering and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Operations Research dual-title program. Refer to the Admission Requirements section of the Operations Research Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/operations-research) Doctoral students must be admitted into the dual-title degree program in Operations Research prior to taking the qualifying examination in their primary graduate program.

Degree Requirements
To qualify for the dual-title degree, students must satisfy the degree requirements for the degree they are enrolled in Computer Science and Engineering, listed on the Degree Requirements tab. In addition, students must complete the degree requirements for the dual-title in Operations Research, listed on the Operations Research Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/operations-research).

The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Computer Science and Engineering and must include at least one Graduate Faculty member from the Operations Research program. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. There will be a single qualifying examination, containing elements of both Computer Science and Engineering and Operations Research. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of a Computer Science and Engineering and Operations Research dual-title Ph.D. student must include at least one member of the Operations Research Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in Operations Research, the member of the committee representing Operations Research must be appointed as co-chair. The Operations Research representative on the student’s dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their dissertation committee and reflects their original research and education in Computer Science and Engineering and Operations Research. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

Student Aid
Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact
Graduate Program Head: Chitaranjan Das
Director of Graduate Studies/Professor-in-Charge: Bhuvan Urgaonkar
Primary Program Contact: Jennifer Houser
Email: jjh2@psu.edu
Mailing Address: Graduate Admissions, W303 Westgate Building, University Park, PA 16802
Telephone: (814)865-9186
Program Website: Computer Science and Engineering (http://www.cse.psu.edu/prospective/graduate)

Corporate Innovation and Entrepreneurship
Graduate Program Head: Brian Cameron
Program Code: CIENT
Campus(es): World Campus (M.P.S.)
Degrees Conferred: Master of Professional Studies (M.P.S.)
The Graduate Faculty: View (https://secure.gradsch.psu.edu/gmps/index.cfm?searchType=fac&prog=CIENT)

The Master of Professional Studies in Corporate Innovation and Entrepreneurship program prepares graduates to stand out in the workplace and/or a competitive job market by studying at a highly-reputed business school with some of the world’s leading academic thinkers and industry experts. This program provides students with the business, leadership, and organizational skills needed to lead and facilitate corporate innovation in its many forms, new venture creation, effective change management, and entrepreneurial business planning. Students will acquire the skills needed to succeed in today's dynamic work environments, gain a firm understanding of business and technology issues and problems, and be prepared to become leaders of innovation. The two primary concentration areas provided through this program, involving business and engineering, will give students the opportunity to develop competencies tailored to their needs in a corporate setting. Additional secondary academic concentrations are offered to allow students to explore focused business domains in-depth that relate directly to innovation and entrepreneurship. The program is taught by the same world-class professors who teach our M.B.A., executive education, and engineering students. A solid foundation in innovation, entrepreneurship, strategy, decision analysis, management, organizational behavior, accounting, marketing, business planning, and finance will make graduates more attractive to hiring managers and
enable them to advance more rapidly into management and leadership positions. These learning outcomes are achieved by a combination of online learning experiences, lectures by faculty, invited guest lecturers, reading of key literature, individual and team projects, and a capstone experience that synthesizes and integrates past learning.

**Admission Requirements**

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Applicants will be required to:

- Have completed an average of three years of post-undergraduate, professional work experience. Managerial or team leadership experience is preferred but not required. Less experienced candidates will be considered at the discretion of the program director.
- Submit two strong letters of recommendation.
- Submit official transcripts from all post-secondary institutions attended. (http://www.gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission)
- Submit a statement of purpose (a 600 word essay articulating career and education goals) and a current resume.

GRE/GMAT scores are NOT required.

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. See GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

Applicants to the Penn State Smeal Master of Professional Studies in Corporate Innovation and Entrepreneurship program must have a minimum TOEFL score of 585 on the paper-based test, or a total score of 80 with a 20 on the speaking section for the Internet-based test (iBT). The minimum acceptable composite score for the IELTS for applicants is 6.5.

**Degree Requirements**

**Master of Professional Studies (M.P.S.)**

Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

A minimum of 33 credits is required for the Master of Professional Studies in Corporate Innovation and Entrepreneurship program. At least 18 credits must be at the 500 or 800 level, with at least 6 at the 500 level. In addition to the 15 required core credits listed below, students are required to complete 9 elective credits in a Primary Concentration area, and 9 elective credits in a Secondary Concentration. The list of courses that will fulfill the Primary and Secondary Concentration areas is maintained by the graduate program office.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MBADM 531</td>
<td>Corporate Innovation and Entrepreneurship</td>
<td>3</td>
</tr>
<tr>
<td>ENTR 810</td>
<td>Emerging Trends, Technology, and Corporate Innovation</td>
<td>3</td>
</tr>
<tr>
<td>ENTR 502</td>
<td>Business Modeling and New Venture Creation</td>
<td>3</td>
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</table>

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>ENTR 820</td>
<td>Corporate Innovation Strategies and Entrepreneurial Methods</td>
<td>3</td>
</tr>
</tbody>
</table>

**Primary Concentration**

- 9 credits

**Secondary Concentration**

- 9 credits

**Culminating Experience**

- ENTR 830 Entrepreneurial Business Planning and Strategy Execution 3 credits

**Total Credits**

- 33

The capstone course, ENTR 830, serves a critical role in helping students synthesize and integrate past learning in the M.P.S. program, providing additional education on how to write a form business case or business plan, implement plans and new venture strategies, and scale new ventures to become mature business organizations. Additionally, this class requires students to write a robust, in-depth research paper on a topic related to innovation and entrepreneurship.

**Student Aid**

World Campus students in graduate degree programs may be eligible for financial aid. Refer to the Tuition and Financial Aid section (http://www.worldcampus.psu.edu/tuition-and-financial-aid) of the World Campus website for more information.

**Courses**

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**Contact**

**Graduate Program Head:** Brian Cameron

**Director of Graduate Studies/Professor-in-Charge:** Shawn Clark

**Primary Program Contact:** Michelle Rockower

**Email:** CIENT@psu.edu

**Mailing Address:** 220 Business Building, University Park, PA 16802

**Telephone:** (814) 863-0474

**Program Website:** Corporate Innovation and Entrepreneurship (http://www.worldcampus.psu.edu/degrees-and-certificates/penn-state-online-corporate-innovation-and-entrepreneurship-masters/overview)
Counselor Education

Graduate Program Head  
Carlos Zalaquett

Program Code  
CNED

Campus(es)  
University Park (Ph.D., D.Ed., M.Ed.)

Degrees Conferred  
Doctor of Philosophy (Ph.D.)  
Doctor of Education (D.Ed.)  
Master of Education (M.Ed.)  
Dual-Title Ph.D., D.Ed., and M.Ed. in Counselor Education and Comparative and International Education

The Graduate Faculty

View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=CNED)

Professional preparation is offered at the master’s level (M.Ed.) with emphasis in areas in career counseling, clinical mental health counseling, school counseling, and rehabilitation counseling.

The Ph.D. program prepares candidates for positions as counselor education faculty members. The D.Ed. program helps students prepare to become supervisors of counseling services.

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Scores from the Graduate Record Examination (GRE) are required for admission to the Ph.D. program. GRE scores are not required for the M.Ed. or D.Ed. programs.

M.Ed. applications with a 3.0 junior/senior average (on a scale of 4.00) and with appropriate course backgrounds will be considered for admission. The best-qualified applicants will be accepted up to the number of spaces that are available for new students. Exceptions to the minimum 3.0 grade-point average may be made for students with special backgrounds, abilities, and interests.

Doctoral applicants must have completed a master’s degree in counselor education prior to admission into the Ph.D. or D.Ed. program. A master’s degree is required for admission that must be comprised of a minimum of 48 credit hours that align with the standards of the Counsel for Accreditation of Counseling and Related Educational Programs (CACREP). All doctoral applicants should present at least a 3.33 average in all graduate study completed prior to admission. Post-master’s counseling experience is required for admission to the D.Ed. program.

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. See GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-305/admission-requirements-international-students) for more information.

Degree Requirements

All candidates are expected to exhibit, in addition to academic competence, effectiveness in interpersonal relations and in both written and oral communication. They also must provide evidence in support of professional counseling activities and involvement in professional organizations. All degree options require students to participate in extensive practicum or fieldwork experience under supervision.

Master of Education (M.Ed.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

The M.Ed. program includes 51 to 60 credits depending on the area of emphasis. This includes 39 credits of core requirements plus 12 to 21 credits depending on the area of emphasis. All courses must be taken at the 400 or 500 level.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>CNED 404</td>
<td>Group Procedures in Guidance and Counseling</td>
<td>3</td>
</tr>
<tr>
<td>CNED 500</td>
<td>Introduction to Counseling and Development</td>
<td>3</td>
</tr>
<tr>
<td>CNED 501</td>
<td>Counseling Theory and Method</td>
<td>3</td>
</tr>
<tr>
<td>CNED 503</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>CNED 505</td>
<td>Foundations of Career Development and Counseling Information</td>
<td>3</td>
</tr>
<tr>
<td>CNED 506</td>
<td>Individual Counseling Procedures</td>
<td>3</td>
</tr>
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<td>CNED 507</td>
<td>Multicultural Counseling: Foundations</td>
<td>3</td>
</tr>
<tr>
<td>CNED 525</td>
<td>Applied Testing in Counseling</td>
<td>3</td>
</tr>
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<td>CNED 526</td>
<td>Research in Counselor Education</td>
<td>3</td>
</tr>
<tr>
<td>CNED 595A</td>
<td>Counseling Practicum</td>
<td>3</td>
</tr>
<tr>
<td>CNED 595G</td>
<td>Counseling Internship and Integrative Seminar</td>
<td>6</td>
</tr>
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</table>

Culminating Experience

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CNED 596</td>
<td>Individual Studies (Master's Paper)</td>
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</tr>
</tbody>
</table>

Total Credits 39

Doctor of Education (D.Ed.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

The D.Ed. Program consists of a minimum of 91 credits including the master’s-level preparation in counselor education. Students in the D.Ed. program in Counselor Education must satisfy degree requirements in core counselor education courses (21 credits), empirical foundations (12 credits), and a counseling specialty area (15 credits) such as: career guidance, administration, planning, and management in service delivery settings. D.Ed. students must complete a dissertation (15 dissertation credits) that is of practical significance to the delivery or administration of counseling services.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>CNED 554</td>
<td>Cross-Cultural Counseling</td>
<td>3</td>
</tr>
<tr>
<td>CNED 580</td>
<td>Foundations: History and Trends in Counselor Education</td>
<td>3</td>
</tr>
<tr>
<td>CNED 581</td>
<td>Professional Issues in Counselor Education</td>
<td>3</td>
</tr>
<tr>
<td>CNED 589</td>
<td>Seminar on Counseling Supervision</td>
<td>3</td>
</tr>
<tr>
<td>CNED 595D</td>
<td>Supervision of Counselors</td>
<td>3</td>
</tr>
<tr>
<td>CNED 595K</td>
<td>Counselor Education Doctoral Counseling Internship</td>
<td>3</td>
</tr>
</tbody>
</table>
Qualifying Examination
All D.Ed. students are required to have a master’s degree in counselor education prior to admission. After completion of 12 credits of doctoral study, which may allow the student to take the qualifying examination as early as the second semester in their doctoral program, D.Ed. students may take a qualifying examination. Given the requirement that doctoral students will have a master’s degree in counselor education thereby demonstrating their ability to complete graduate work successfully, the nature of the qualifying examination will include a review of the following by the student’s qualifying examination committee:

1. the student’s professional resume,
2. a statement regarding the general direction of the student’s research interests and possible areas of dissertation inquiry,
3. grades from completed graduate courses,
4. proposed course of study for subsequent semesters,
5. selected graduate papers written by the student, and
6. a statement regarding the student’s professional goals.

In the qualifying examination, the student’s qualifying examination committee determines the student’s ability to continue in the program and to conduct doctoral research.

Comprehensive Examination
D.Ed. candidates are required to take a written and oral comprehensive examination once their course work is completed (or when they are in their final semester of required course work) and prior to the dissertation. The examination, prepared by the student’s dissertation committee, covers all areas of the student’s doctoral work.

Dissertation Committee Composition
The dissertation committee must meet all Graduate Council requirements (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation).

Doctoral Dissertation and Final Oral Examination
D.Ed. students should complete the writing of the dissertation and make revisions to the satisfaction of the committee chair, who is expected to ensure that the dissertation is in near final form before allowing the final oral examination (defense) to be scheduled. The student is responsible for arranging and scheduling a time so that all members of the committee can be present. The student must give each committee member a copy of the complete dissertation two weeks before the final oral examination. Students should not expect this to be the final version for submission to the Graduate School, as there are typically revisions after successful completion of the oral defense.

English Competence
Students in the D.Ed. program are required to demonstrate high-level competence in the use of English language, including reading, writing, and speaking. Counselor Education evaluates English language proficiency in several ways. Prior to admission all students are required to provide written goals statements and personal development statements that are evaluated by faculty as a portion of the application process. Additionally, international students must have either earned a master's degree in the United States or supply official minimum scores for the TOEFL. Once admitted to the program and prior to taking the qualifying examination, students are evaluated for their reading, writing, and speaking in class assignments and as a part of their first-year portfolio evaluation. When problems are identified, individual remediation programs are developed that utilize faculty and all appropriate University resources.

Doctor of Philosophy (Ph.D.)
Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

The Ph.D. program consists of a minimum of four academic years of graduate level preparation (including master’s-level preparation), defined as eight semesters.

The Ph.D. program consists of a minimum of 96 credits including master-level preparation in counselor education. Ph.D. students must satisfy advanced degree requirements in the CACREP counselor education core areas (36 credits including a counseling and teaching internship), a specialty area of study (15 credits), and empirical foundations (15 credits). Students in the Ph.D. program are expected to complete a dissertation involving independent and original research. Students are expected to use theoretical models of counseling to investigate problems of importance to the field. The additional credits in the Ph.D. program incorporate advanced course work in research design, statistics, and counseling theory to prepare students for their subsequent roles as faculty members in counselor education programs.

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<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CNED 502</td>
<td>Advanced Counseling Theory and Method</td>
<td>3</td>
</tr>
<tr>
<td>CNED 554</td>
<td>Cross-Cultural Counseling</td>
<td>3</td>
</tr>
<tr>
<td>CNED 555</td>
<td>Career Counseling</td>
<td>3</td>
</tr>
<tr>
<td>CNED 580</td>
<td>Foundations: History and Trends in Counselor Education</td>
<td>3</td>
</tr>
<tr>
<td>CNED 581</td>
<td>Professional Issues in Counselor Education</td>
<td>3</td>
</tr>
<tr>
<td>CNED 582</td>
<td>Advanced Group Psychotherapy</td>
<td>3</td>
</tr>
<tr>
<td>CNED 589</td>
<td>Seminar on Counseling Supervision</td>
<td>3</td>
</tr>
<tr>
<td>CNED 595D</td>
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<tr>
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<td>3</td>
</tr>
<tr>
<td>CNED 595K</td>
<td>Counselor Education Doctoral Counseling</td>
<td>3</td>
</tr>
<tr>
<td>CNED 595P</td>
<td>Counselor Education Doctoral Counseling</td>
<td>6</td>
</tr>
<tr>
<td>Specialty Area of Study</td>
<td>Practicum (two semesters)</td>
<td>15</td>
</tr>
<tr>
<td>Empirical Foundations</td>
<td></td>
<td>15</td>
</tr>
<tr>
<td>Total Credits</td>
<td></td>
<td>66</td>
</tr>
</tbody>
</table>
demonstrating their ability to complete graduate work successfully, the nature of the qualifying examination will include a review of the following by the student’s qualifying examination committee:

1. the student’s professional resume,
2. a statement regarding the general direction of the student’s research interests and possible areas of dissertation inquiry,
3. grades from completed graduate courses,
4. proposed course of study for subsequent semesters,
5. selected graduate papers written by the student, and
6. a statement regarding the student’s professional goals.

In the qualifying examination, the student’s qualifying examination committee determines the student’s ability to continue in the program and to conduct doctoral research.

Comprehensive Examination
Ph.D. students are required to take a written and oral comprehensive examination once their course work is completed (or when they are in their final semester of required course work) and prior to the dissertation. The examination, prepared by the student’s dissertation committee, covers all areas of the student’s doctoral work. The comprehensive examination for Ph.D. students must include an assessment of the student’s competence related to conducting independent and original research.

Dissertation Committee Composition
The dissertation committee must meet all Graduate Council requirements (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation).

Doctoral Dissertation and Final Oral Examination
Ph.D. students should complete the writing of the dissertation and make revisions to the satisfaction of the committee chair, who is expected to ensure that the dissertation is in near final form before allowing the final oral examination (defense) to be scheduled. The student is responsible for arranging and scheduling a time so that all members of the committee can be present. The student must give each committee member a copy of the complete dissertation two weeks before the final oral examination. Students should not expect this to be the final version for submission to the Graduate School, as there are typically revisions after successful completion of the oral defense.

English Competence
Candidates for the Ph.D. program are required to demonstrate high-level competence in the use of English language, including reading, writing, and speaking. Counselor Education evaluates English language proficiency in several ways. Prior to admission all students are required to provide written goals statements and personal development statements that are evaluated by faculty as a portion of the application process. Additionally, international students must have either earned a master’s degree in the United States or supply official minimum scores for the TOEFL. Once admitted to the program and prior to taking the qualifying examination, students are evaluated for their reading, writing, and speaking in class assignments and as part of their first-year portfolio evaluation. When problems are identified, individual remediation programs are developed that utilize faculty and all appropriate University resources.

Dual-Titles
Dual-Title M.Ed., D.Ed., and Ph.D. in Counselor Education and Comparative and International Education
Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

Admissions Requirements
Students must apply and be admitted to the graduate program in Counselor Education and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Comparative and International Education dual-title program. Refer to the Admission Requirements section of the Comparative and International Education Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/comparative-international-education). Doctoral students must be admitted into the dual-title degree program in Comparative and International Education prior to taking the qualifying examination in their primary graduate program.

Degree Requirements
To qualify for the dual-title degree, students must satisfy the degree requirements for the degree they are enrolled in Counselor Education, listed on the Degree Requirements tab. In addition, students must complete the degree requirements for the dual-title in Comparative and International Education, listed on the Comparative and International Education Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/comparative-international-education). The qualifying examination committee for the dual-title D.Ed. and Ph.D. degrees will be composed of Graduate Faculty from Counselor Education and must include at least one Graduate Faculty member from the Comparative and International Education program. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. There will be a single qualifying examination, containing elements of both Counselor Education and Comparative and International Education. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of a Counselor Education and Comparative and International Education dual-title D.Ed. or Ph.D. student must include at least one member of the Comparative and International Education Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in Comparative and International Education, the member of the committee representing Comparative and International Education must be appointed as co-chair. The Comparative and International Education representative on the student’s dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the D.Ed. and Ph.D. dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their dissertation committee and reflects their interest and education in Counselor Education and Comparative and International Education. Upon completion of the doctoral dissertation, the candidate must pass a
final oral examination (the dissertation defense) to earn the Ph.D. or D.Ed. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

**Student Aid**

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

**Courses**

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**Contact**

Graduate Program Head: Carlos Zalaquett

Primary Program Contact: Christine Andrus (cma18@psu.edu)

Program Email: cned-program@psu.edu

Mailing Address: 125 Cedar Building, University Park, PA 16802

Telephone: (814) 867-6252

Program Website: Counselor Education (http://ed.psu.edu/epcse/counselor-education)

**Criminal Justice**

Graduate Program Head: Alexander Siedschlag

Program Code: CRIMJ

Campus(es): Harrisburg (M.A.)

Degrees Conferred: Master of Arts (M.A.)

The Graduate Faculty: View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fa&prog=CRIMJ)

The program reflects the numerous complexities of the discipline. It provides academic leadership for students to work within corrections, institutionalized and non-institutionalized settings, victim services, adult and juvenile services, policing and law enforcement, private security, courts, and other human service organizations serving the clients of these institutions. It also helps develop research acumen for those students who may wish to consider doctoral studies.

Strong ties developed in state, local, and federal level law enforcement, corrections, drug treatment, victimization, and crime control policy organizations provide research and learning opportunities for interested students.

The degree may be earned by full or part-time study. Most courses will be offered in the evening, although some will be offered during the day or on weekends.

**Admission Requirements**

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

- A completed Graduate School application for admission (http://www.gradschool.psu.edu/prospective-students/how-to-apply) with the application fee.
- Official transcripts from all post-secondary institutions attended (http://www.gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission).
- Three letters of recommendation.
- A brief (two-page) statement of purpose or a writing sample.
- Minimum GPA of a 3.0 for the last 60 credits of undergraduate study.
- Satisfactory scores on the Graduate Record Examination (GRE), Graduate Management Admissions Test (GMAT), or Law School Admissions Test (LSAT) are required if the GPA is less than 3.0. Note: All students who seek funding must take one of these standardized tests, preferably the GRE.
- Some foundational course work may be required for those students who did not major in criminal justice as an undergraduate. This decision will be made by the MACJ Program Coordinator after a close review of the undergraduate transcript.
- In exceptional cases, the program may also approve admission by reason of special backgrounds, abilities, and interests.

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. See GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

**Degree Requirements**

**Master of Arts (M.A.)**

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students)

The thesis track requires 30 credits. Six of the credits (CRIMJ 600) will be for the thesis.

The master’s paper track requires 30 credits. Three of these credits will be awarded for successful completion of a master’s paper, for which a student will register for three credits of CRIMJ 594.

All credits must be at the 400, 500, 600, or 800 level, with a minimum of 18 credits at the 500 or 600 level. A minimum of 24 credits must be at the 500, 600, or 800 level.

A minimum grade-point average of a 3.0 must be earned for course work taken as a graduate student.

Students are required to take the following courses: CRIMJ 500, CRIMJ 501, CRIMJ 502, CRIMJ 503, and CRIMJ 504. Students must complete a 9 credit concentration. Students in the non-thesis track will
also be required to complete an additional 3-credit elective. A list of courses required for each concentration and additional approved elective courses is maintained by the graduate program office.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>CRIMJ 500</td>
<td>Advanced Criminological Theory</td>
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</tr>
<tr>
<td>CRIMJ 501</td>
<td>Advanced Research Methods for Criminal Justice</td>
<td>3</td>
</tr>
<tr>
<td>CRIMJ 502</td>
<td>Public Policy and the Criminal Justice System</td>
<td>3</td>
</tr>
<tr>
<td>CRIMJ 503</td>
<td>Advanced Statistics in Criminal Justice</td>
<td>3</td>
</tr>
<tr>
<td>CRIMJ 504</td>
<td>Criminal Justice Organization and Management</td>
<td>3</td>
</tr>
</tbody>
</table>

### Required Courses

The number of openings in the integrated B.S./M.A. program is limited. Admission is selective based on specific criteria and the unqualified recommendation of faculty. Applicants to the integrated program:

1. Must be enrolled in the B.S. program in Criminal Justice and meet the admission requirements of the Criminal Justice M.A. program at Harrisburg.
2. Must apply to the program via the Graduate School application for admission (http://www.gradschool.psu.edu/prospective-students/how-to-apply), and must meet the admission requirements of the Graduate School.
3. Shall be admitted no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree, as specified in the proposed IUG plan of study.
4. Must submit transcript(s) of undergraduate work taken outside of Penn State, recommendations from two faculty members, writing sample, and statement of goals.
5. Must have an overall GPA at or above 3.0 (on a 4.0 scale) in undergraduate coursework and a GPA at or above 3.25 in all coursework completed for their major.
6. Must present a plan of study approved by the student's adviser in the application process. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser as the student advances through the program.

### Degree Requirements

Students must fulfill all requirements for each degree in order to be awarded that degree, subject to the double-counting of credits as outlined below. Degree requirements for the B.S. in Criminal Justice are listed in the Undergraduate Bulletin (http://bulletins.psu.edu/undergraduate). Degree requirements for the M.A. degree are listed in the Degree Requirements section. Up to 12 credits may be double-counted towards the degree requirements for both the graduate and undergraduate degrees; a minimum of 50% of the double-counted courses must be at the 500 or 800 level. Credits associated with the culminating experience for the graduate degree cannot be double-counted.

### Integrated B.S. in Criminal Justice and M.A. in Criminal Justice

Requirements listed here are in addition to requirements listed in GCAC-210 Integrated Undergraduate-Graduate (IUG) Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/integrated-undergraduate-graduate-degree-programs).

The Criminal Justice Program offers an integrated B.S./M.A. program that is designed to allow academically superior baccalaureate students enrolled in the Criminal Justice major to obtain both the B.S. and the M.A. degrees in Criminal Justice within five years of study. The first two years of undergraduate coursework typically include the University General Education requirements and lower-level courses. In the third year, students typically take upper-division coursework in Criminal Justice and define areas of interest. The fourth year involves graduate-level Criminal Justice coursework including required courses in Criminal Justice Theory and Policy (CRIMJ 500, CRIMJ 502). The fifth and final year of the program typically consists of graduate course work in Criminal Justice including Advanced Research Methods and Statistics in Criminal Justice (CRIMJ 501; CRIMJ 503) and identification of an original research project that will culminate in the completion of a thesis (CRIMJ 600) or master's paper (CRIMJ 594).

### Admission Requirements

1. Must be enrolled in the B.S. program in Criminal Justice and meet the admission requirements of the Criminal Justice M.A. program at Harrisburg.
2. Must apply to the program via the Graduate School application for admission (http://www.gradschool.psu.edu/prospective-students/how-to-apply), and must meet the admission requirements of the Graduate School.
3. Shall be admitted no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree, as specified in the proposed IUG plan of study.
4. Must submit transcript(s) of undergraduate work taken outside of Penn State, recommendations from two faculty members, writing sample, and statement of goals.
5. Must have an overall GPA at or above 3.0 (on a 4.0 scale) in undergraduate coursework and a GPA at or above 3.25 in all coursework completed for their major.
6. Must present a plan of study approved by the student’s adviser in the application process. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser as the student advances through the program.

### Degree Requirements

Students must fulfill all requirements for each degree in order to be awarded that degree, subject to the double-counting of credits as outlined below. Degree requirements for the B.S. in Criminal Justice are listed in the Undergraduate Bulletin (http://bulletins.psu.edu/undergraduate). Degree requirements for the M.A. degree are listed in the Degree Requirements section. Up to 12 credits may be double-counted towards the degree requirements for both the graduate and undergraduate degrees; a minimum of 50% of the double-counted courses must be at the 500 or 800 level. Credits associated with the culminating experience for the graduate degree cannot be double-counted.

### Integrated B.S. in Criminal Justice and M.A. in Criminal Justice

Requirements listed here are in addition to requirements listed in GCAC-210 Integrated Undergraduate-Graduate (IUG) Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/integrated-undergraduate-graduate-degree-programs).

The Criminal Justice Program offers an integrated B.S./M.A. program that is designed to allow academically superior baccalaureate students enrolled in the Criminal Justice major to obtain both the B.S. and the M.A. degrees in Criminal Justice within five years of study. The first two years of undergraduate coursework typically include the University General Education requirements and lower-level courses. In the third year, students typically take upper-division coursework in Criminal Justice and define areas of interest. The fourth year involves graduate-level Criminal Justice coursework including required courses in Criminal Justice Theory and Policy (CRIMJ 500, CRIMJ 502). The fifth and final year of the program typically consists of graduate course work in Criminal Justice including Advanced Research Methods and Statistics in Criminal Justice (CRIMJ 501; CRIMJ 503) and identification of an original research project that will culminate in the completion of a thesis (CRIMJ 600) or master's paper (CRIMJ 594).

### Admission Requirements

1. Must be enrolled in the B.S. program in Criminal Justice and meet the admission requirements of the Criminal Justice M.A. program at Harrisburg.
2. Must apply to the program via the Graduate School application for admission (http://www.gradschool.psu.edu/prospective-students/how-to-apply), and must meet the admission requirements of the Graduate School.
3. Shall be admitted no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree, as specified in the proposed IUG plan of study.
4. Must submit transcript(s) of undergraduate work taken outside of Penn State, recommendations from two faculty members, writing sample, and statement of goals.
5. Must have an overall GPA at or above 3.0 (on a 4.0 scale) in undergraduate coursework and a GPA at or above 3.25 in all coursework completed for their major.
6. Must present a plan of study approved by the student’s adviser in the application process. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser as the student advances through the program.

### Degree Requirements

Students must fulfill all requirements for each degree in order to be awarded that degree, subject to the double-counting of credits as outlined below. Degree requirements for the B.S. in Criminal Justice are listed in the Undergraduate Bulletin (http://bulletins.psu.edu/undergraduate). Degree requirements for the M.A. degree are listed in the Degree Requirements section. Up to 12 credits may be double-counted towards the degree requirements for both the graduate and undergraduate degrees; a minimum of 50% of the double-counted courses must be at the 500 or 800 level. Credits associated with the culminating experience for the graduate degree cannot be double-counted.

### Integrated B.S. in Criminal Justice and M.A. in Criminal Justice

Requirements listed here are in addition to requirements listed in GCAC-210 Integrated Undergraduate-Graduate (IUG) Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/integrated-undergraduate-graduate-degree-programs).

The Criminal Justice Program offers an integrated B.S./M.A. program that is designed to allow academically superior baccalaureate students enrolled in the Criminal Justice major to obtain both the B.S. and the M.A. degrees in Criminal Justice within five years of study. The first two years of undergraduate coursework typically include the University General Education requirements and lower-level courses. In the third year, students typically take upper-division coursework in Criminal Justice and define areas of interest. The fourth year involves graduate-level Criminal Justice coursework including required courses in Criminal Justice Theory and Policy (CRIMJ 500, CRIMJ 502). The fifth and final year of the program typically consists of graduate course work in Criminal Justice including Advanced Research Methods and Statistics in Criminal Justice (CRIMJ 501; CRIMJ 503) and identification of an original research project that will culminate in the completion of a thesis (CRIMJ 600) or master's paper (CRIMJ 594).
Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School's website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

**Courses**

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**Contact**

Graduate Program Head: Alexander Siedschlag

Director of Graduate Studies/Professor-in-Charge: Jonathan Lee

Primary Program Contact: Maria Peiffer

Email: map54@psu.edu

Mailing Address: School of Public Affairs, 777 West Harrisburg Pike, 160 W Olmsted Bldg., Middletown, PA 17057

Telephone: (717)939-8431

Program Website: Criminal Justice (https://harrisburg.psu.edu/public-affairs/criminal-justice/master-arts-criminal-justice)

**Criminal Justice Policy and Administration**

The M.P.S. in CJPA degree program capitalizes on Penn State's strengths as a premier research institution to provide an advanced professional degree in criminal justice policy and administration. Combining theory and applied research, this degree allows professionals and students entering the work force to gain graduate level expertise in this growing, applied field of study. The degree caters to professionals in criminal justice (broadly, policing, courts, corrections, probation/parole, and treatment), government, administration, and offender or victim services.

**Admission Requirements**

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

**Educational Background**

Students who do not have an undergraduate GPA of at least 3.0 will be considered on a case-by-case basis depending on the quality of their overall application. Work experience will be considered for applicants who have more than two years of experience in a related field.

**Core Application Packet**

- Completed official online Graduate School application (http://gradschool.psu.edu/prospective-students/how-to-apply) and payment of a nonrefundable application fee.
- Statement of purpose: a 2-3 page essay articulating career and educational goals that demonstrate the student's written communication skills and describes their background with basic statistics education and/or usage.
- A current curriculum vitae (vita) or résumé.
- Three letters of recommendation that attest to the student's readiness for graduate study. Letters must be submitted through the online application system. Within the online application you will be asked to enter the names and email addresses of three individuals who will be providing your recommendation. Those individuals will receive a note via email asking them to complete a brief form that will serve as your recommendation. Please inform all recommenders they must submit the form in order for your application to be complete.
- Official transcripts from all post-secondary institutions attended (http://www.gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission).

**Degree Requirements**

**Master of Professional Studies (M.P.S.)**

Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

The 30-credit program of study emphasizes social science perspectives to the study of criminal justice. The degree consists of core courses (18 credits) and allows students to choose from among several electives.

Total required credits for the M.P.S.: 30 credits. At least 18 credits must be completed at the 500 level or 800 level, with at least 6 credits at the 500 level.

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<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tr>
<td>CJPA 501</td>
<td>Criminal Justice Institutions</td>
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<tr>
<td>CJPA 502</td>
<td>Theories of Crime</td>
<td>3</td>
</tr>
<tr>
<td>CJPA 803</td>
<td>Applied Research Methods</td>
<td>3</td>
</tr>
<tr>
<td>CRIMJ 503</td>
<td>Advanced Statistics in Criminal Justice</td>
<td>3</td>
</tr>
<tr>
<td>CJPA 820</td>
<td>Criminal Procedure</td>
<td>3</td>
</tr>
<tr>
<td>CJPA 865</td>
<td>Criminal Justice Ethics in a Diverse Society</td>
<td>3</td>
</tr>
</tbody>
</table>

**Electives**

- Select 9 elective credits

**Culminating Experience**

- CJPA 808 Capstone Project in Criminal Justice and Policy Administration 3

Total Credits 30
1 Students will have the opportunity to tailor their program of study to their interests by choosing from a list of elective courses. The elective courses will be chosen in consultation with the student’s advisor. The list of approved elective courses is maintained by the graduate program office.

The capstone course provides students with an opportunity to apply their knowledge from their courses to a project. The choice of project topic and exact form will be mutually determined by faculty mentors and the student. For example, the capstone experience could be an academic research project, an evidence-based policy evaluation, or the development of a program. The student will work with a faculty mentor/adviser on a capstone project that will be written up as a capstone report. Students are expected to utilize theories, literature, and methods acquired during other courses in the M.P.S. in Criminal Justice Policy and Administration. The report will be formally presented to peers in the M.P.S. and faculty members at the end of the semester. The capstone report must be approved by the faculty mentor/adviser as meeting the course requirements.

Course Substitutions
Substitutions for the above prescribed courses, either with resident-education courses, alternate online courses, or courses from other institutions, will be considered on a case-by-case basis subject to restrictions outlined in GCAC-309 Transfer Credit (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/transfer-credit). Course substitutions must be petitioned and approved in advance by the Chair/Co-Chair, with input from the student’s adviser.

Student Aid
World Campus students in graduate degree programs may be eligible for financial aid. Refer to the Tuition and Financial Aid section (http://www.worldcampus.psu.edu/tuition-and-financial-aid) of the World Campus website for more information.

Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact
Jeff Ulmer, Professor of Sociology and Criminology
211 Oswald Tower
University Park, PA 16802
814-865-6429

Criminology
Graduate Program Head
Eric Baumer

Program Code
CRIM

Campus(es)
University Park (Ph.D., M.A.)

Degrees Conferred
Doctor of Philosophy (Ph.D.)
Master of Arts (M.A.)

The Graduate Faculty
View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=CRIM)

The graduate program in Criminology is for students seeking the Ph.D. degree. Students may either enter the program with an M.A. degree or earn that degree en route to the Ph.D. program. The program offers an advanced education on various aspects of criminology to persons interested in research careers in academia and public service.

The graduate program emphasizes theory and research on crime and justice, research and statistical methodology, and substantive knowledge about crime and its control.

Admission Requirements
Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Applications from students with either the B.A. or M.A. degree will be accepted through early January for admission in the fall of the following academic year. Selection is based on:

• official transcripts from all post-secondary institutions attended
• three letters of recommendation from persons familiar with the applicant’s academic performance,
• a statement of goals,
• a sample of written work such as a term paper,
• and Graduate Record Examinations (GRE) verbal, quantitative, and writing scores.

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. See GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

Degree Requirements
Master of Arts (M.A.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

Students entering the program with the B.A. degree will first earn the M.A. degree. Thirty-seven credits of course work at the 400, 500, 600, or 800 level, with a minimum of 18 credits at the 500 and 600 level, combined,
and a master's thesis, including 6 credits of thesis research, are required for the M.A. The course work includes:

- a proseminar,
- an introduction to graduate studies seminar,
- a sequence of methods and statistics courses;
- a criminological theory course;
- a course in the organization and criminal justice system;
- and additional 500-level substantive criminology courses selected in consultation with a student's faculty committee.

**Doctor of Philosophy (Ph.D.)**

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

For the Ph.D., 30 credits beyond the M.A. are required, no more than three of which may be for Individual Studies. All Ph.D. candidates must have completed all courses required for the M.A. degree or their equivalent. The 30 credits beyond the M.A. must include 6 hours of Criminology seminars and 12 hours of elective seminars, all of which should be selected in consultation with the Ph.D. committee. Seminar requirements are not fulfilled by Individual Studies credits.

**Qualifying Examination**

A qualifying exam is required of all students seeking the Ph.D., after a master's degree has been earned. Students admitted with a master's degree will stand for this exam in the second semester of full-time study.

**Language Requirement**

The program in Criminology has no formal foreign language or communication requirement.

**Dissertation Committee Composition**

The student's Ph.D. studies are conducted under the supervision of a dissertation committee that must meet all Graduate Council requirements (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation). At least two members of the dissertation committee must be Criminology tenure-line faculty and one must be from outside the Criminology Program and Sociology Department and must represent a field outside the candidate's major field of study. One Criminology tenure-line faculty member is designated chair of the Ph.D. committee; ordinarily this person also serves as general adviser and director of the dissertation.

**Comprehensive Examination**

After completing all course work, doctoral students must pass a comprehensive examination that will be administered by the student's dissertation committee. At the discretion of the committee, examination content will include material on:

1. general criminological theory,
2. criminal justice/law,
3. research methods/statistics, and
4. the student's area of specialization.

**Dissertation and Dissertation Defense**

In order to earn the Ph.D., students are required to write and orally defend a dissertation on a topic that reflects their original research and education.

**Student Aid**

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School's website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

All students admitted to the program are supported with stipends and tuition waivers for either four years (students entering with a master's degree) or five years (students entering with a bachelor's degree). Support may be in the form of research assistantships or teaching assistantships, with most students receiving a combination of types of support across their graduate careers.

**Courses**

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**Learning Outcomes**

1. **Know:** Graduates will demonstrate a deep conceptual understanding of criminological theory and the interrelated institutions and processes of the criminal justice system, as well as specialized knowledge in a sub-area of the discipline.
2. **Apply:** Graduates will be able to apply theory and current research to identify gaps in the literature and generate new knowledge in criminology.
3. **Communicate:** Graduates will be able to communicate with the discipline through clear, well-organized manuscripts, proposals, and formal presentations.
4. **Think:** Graduates will be able to critically analyze unpublished and published research by other scholars in criminology and in their specialty area.
5. **Professional Practice.** Graduates will demonstrate a commitment to active citizenship in the department and the discipline and engage with research, as well as with colleagues and students, in an ethical manner.

**Contact**

**Graduate Program Head:** Eric Baumer

**Director of Graduate Studies/Professor-in-Charge:** Jeremy Staff

**Primary Program Contact:** Eunice Hockenberry

**Email:** emf133@psu.edu

**Mailing Address:** 213 Oswald Tower, University Park, PA 16802

**Telephone:** (814)865-3455

**Program Website:** Department of Sociology and Criminology (http://sociology.la.psu.edu)
Curriculum and Instruction

Graduate Program Head
Rose Mary Zbiek

Program Code
CI

Campus(es)
University Park (Ph.D., M.S., M.Ed.)
World Campus (M.Ed.)

Degrees Conferred
Doctor of Philosophy (Ph.D.)
Master of Science (M.S.)
Master of Education (M.Ed.)
Dual-Title Ph.D., M.S., or M.Ed. in Curriculum and Instruction and Comparative and International Education
Dual-Title M.S. or Ph.D. in Curriculum and Instruction and Women's Studies
Integrated B.S. in Biology and M.Ed. in Curriculum and Instruction
Integrated B.S. in Chemistry and M.Ed. in Curriculum and Instruction
Integrated B.S. in Mathematics and M.Ed. in Curriculum and Instruction
Integrated B.S. in Special Education and M.Ed. in Curriculum and Instruction

The Graduate Faculty

This program provides advanced professional preparation in the special areas of:

- Bilingual education
- Curriculum and supervision
- Early childhood education
- Elementary education
- Instructional leadership
- Language and literacy education
- Science education
- Social studies education
- Mathematics education

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Scores from the Miller Analogies Test (MAT) or the Graduate Record Examinations (GRE) are required for admission. However, applicants for the doctoral degree are strongly encouraged to take the GRE. Moreover, students with excellent academic records who wish to be considered for fellowships, scholarships, and assistantships should take the GRE as a matter of course. At the discretion of an emphasis area, a student may be admitted provisionally for graduate study in a program without these scores. Each IUG might have additional requirements.

Students with appropriate course and professional backgrounds will be considered for admission, subject to the limitation of program facilities. For admission to the professional degree programs leading to the M.Ed., teaching or equivalent experience and at least 18 credits in education are recommended.

Degree Requirements

Master of Education (M.Ed.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

M.Ed. students are expected to complete CI 590 as well as a core of one course in each of three areas:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CI 590</td>
<td>Colloquium</td>
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</tr>
<tr>
<td></td>
<td>Select one course in each of the following three areas:</td>
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Learning/Foundation

<table>
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<th>Credits</th>
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<tbody>
<tr>
<td>EDPSY 421</td>
<td>Learning Processes in Relation to Educational Practices</td>
<td></td>
</tr>
<tr>
<td>EDPSY 526</td>
<td>The Psychology of Reading</td>
<td></td>
</tr>
<tr>
<td>SCIED 552</td>
<td>Science Teaching and Learning</td>
<td></td>
</tr>
<tr>
<td>CI 560</td>
<td>Theories of Childhood</td>
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Research

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<th>Code</th>
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<tbody>
<tr>
<td>CI 400</td>
<td>Introduction to Research Literature</td>
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</tr>
<tr>
<td>CI 501</td>
<td>Teaching as Inquiry</td>
<td></td>
</tr>
<tr>
<td>SCIED 558</td>
<td>Research Problems in Science Teaching</td>
<td></td>
</tr>
<tr>
<td>STAT 500</td>
<td>Applied Statistics</td>
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<tr>
<td>EDPSY 400</td>
<td>Introduction to Statistics in Educational Research</td>
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Curriculum

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<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>CI 550</td>
<td>Overview of Contemporary School Curriculum</td>
<td></td>
</tr>
<tr>
<td>C-S 551</td>
<td>Curriculum Design: Theory and Practice</td>
<td></td>
</tr>
<tr>
<td>SCIED 550</td>
<td>Science Education Curriculum</td>
<td></td>
</tr>
</tbody>
</table>

1 Through CI 590, students complete Scholarship and Academic Research Integrity (SARI) training.

M.Ed. candidates submit a professional master's culminating paper.

Master of Science (M.S.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

M.S. students are expected to complete CI 590 as well as a core of one course in each of three areas:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
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<tr>
<td>CI 590</td>
<td>Colloquium</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Select one course in each of the following three areas:</td>
<td>9</td>
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</table>

Learning/Foundation

<table>
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<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>EDPSY 421</td>
<td>Learning Processes in Relation to Educational Practices</td>
<td></td>
</tr>
<tr>
<td>EDPSY 526</td>
<td>The Psychology of Reading</td>
<td></td>
</tr>
</tbody>
</table>

1 Through CI 590, students complete Scholarship and Academic Research Integrity (SARI) training.
Theories of Childhood

Introduction to Statistics in Educational Research

Research Problems in Science Teaching

Overview of Contemporary School Curriculum

Introduction to Research Literature

Curriculum and Instruction and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Comparative and International Education dual-title program. Refer to the Admission Requirements section of the Comparative and International Education Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/comparative-international-education). Doctoral students must be admitted into the dual-title degree program in Comparative and International Education prior to taking the qualifying examination in their primary graduate program.

Degree Requirements

To qualify for the dual-title degree, students must satisfy the degree requirements for the degree they are enrolled in Curriculum and Instruction, listed in the Degree Requirements section. In addition, students must complete the degree requirements for the dual-title in Comparative and International Education, listed on the Comparative and International Education Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/comparative-international-education).

The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Curriculum and Instruction and must include at least one Graduate Faculty member from the Comparative and International Education program. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. There will be a single qualifying examination, containing elements of both Curriculum and Instruction and Comparative and International Education. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of a Curriculum and Instruction and Comparative and International Education dual-title Ph.D. student must include at least one member of the Comparative and International Education Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in Comparative and International Education, the member of the committee representing Comparative and International Education must be appointed as co-chair. The Comparative and International Education representative on the student’s dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their dissertation committee and reflects their original research and education in Curriculum and Instruction and Comparative and International Education. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

**Dual-Titles**

**Dual-title Ph.D., M.S., or M.Ed. in Curriculum and Instruction and Comparative and International Education**

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

Admissions Requirements

Students must apply and be admitted to the graduate program in Curriculum and Instruction and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Comparative and International Education dual-title program. Refer to the Admission Requirements section of the Comparative and International Education Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/comparative-international-education). Doctoral students must be admitted into the dual-title degree program in Comparative and International Education prior to taking the qualifying examination in their primary graduate program.

Degree Requirements

To qualify for the dual-title degree, students must satisfy the degree requirements for the degree they are enrolled in Curriculum and Instruction, listed in the Degree Requirements section. In addition, students must complete the degree requirements for the dual-title in Comparative and International Education, listed on the Comparative and International Education Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/comparative-international-education).

The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Curriculum and Instruction and must include at least one Graduate Faculty member from the Comparative and International Education program. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. There will be a single qualifying examination, containing elements of both Curriculum and Instruction and Comparative and International Education. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of a Curriculum and Instruction and Comparative and International Education dual-title Ph.D. student must include at least one member of the Comparative and International Education Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in Comparative and International Education, the member of the committee representing Comparative and International Education must be appointed as co-chair. The Comparative and International Education representative on the student’s dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their dissertation committee and reflects their original research and education in Curriculum and Instruction and Comparative and International Education. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

**Dual-title M.S. or Ph.D. in Curriculum and Instruction and Women’s Studies**

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).
Admissions Requirements
Students must apply and be admitted to the graduate program in Curriculum and Instruction and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Women's Studies dual-title program. Refer to the Admission Requirements section of the Women's Studies Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/womens-studies). Doctoral students must be admitted into the dual-title degree program in Women's Studies prior to taking the qualifying examination in their primary graduate program.

Degree Requirements
To qualify for the dual-title degree, students must satisfy the degree requirements for the degree they are enrolled in Curriculum and Instruction, listed in the Degree Requirements section. In addition, students must complete the degree requirements for the dual-title in Women's Studies, listed on the Women's Studies Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/womens-studies).

The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Curriculum and Instruction and must include at least one Graduate Faculty member from the Women's Studies program. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. There will be a single qualifying examination, containing elements of both Curriculum and Instruction and Women's Studies. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of a Curriculum and Instruction and Women's Studies dual-title Ph.D. student must include at least two members of the Women's Studies Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in Women's Studies, the member of the committee representing Women's Studies must be appointed as co-chair. The Women's Studies representative on the student's dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their dissertation committee and reflects their original research and education in Curriculum and Instruction and Women's Studies. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

Integrated Undergrad-Grad Programs
Integrated B.S. in Biology and M.Ed. in Curriculum and Instruction
Requirements listed here are in addition to requirements listed in GCAC-210 Integrated Undergraduate-Graduate (IUG) Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/integrated-undergraduate-graduate-degree-programs). This Integrated Undergraduate/Graduate (IUG) degree program combines the Bachelor of Science in Biology with the Master of Education in Curriculum and Instruction, Science Education emphasis. The program is designed to be completed in five years. The program enables highly qualified and motivated students to delve deeply into a scientific content area and to pursue graduate level preparation in the theory and practice of teaching. Most students in this option intend to seek Pennsylvania teacher certification, and a semester of student teaching comprises part of their final year of studies. The IUG may also be suitable for a student who does not need to become certified, because they intend to teach in a private secondary school or a non-formal educational setting; in such cases, the second graduate semester will be a program of studies determined through consultation with the graduate advisor and customized for the student's specific needs.

Students shall be admitted to the program no earlier than the beginning of the third semester of undergraduate study and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree. Application materials to be submitted include:

- a current undergraduate transcript,
- statement of purpose,
- draft plan of study,
- two letters of recommendation,
- and concurrent submission of an application for master's study to the graduate program in Curriculum and Instruction, Science Education emphasis area.

In addition, a minimum GPA of 3.5 in Science and Education courses is required. Admission will be based on a recommendation by the Science Education Program Coordinator in consultation with the Associate Chair for Undergraduate Education in the Biology Department. Additional details about the graduate application procedure can be found in the Admission Requirements section. Applications must be submitted via the Graduate School.

IUG students fulfill all degree requirements for a B.S. in Biology in the Eberly College of Science, listed in the Undergraduate Bulletin (http://bulletins.psu.edu/undergraduate). If a student chooses to leave the program without completing M.Ed. requirements, he or she may still receive the relevant B.S. degree, after all B.S. requirements are completed.

For the M.Ed. degree, students must earn at least 30 credits at the 400/500 level, at least 18 of them at the 500 level. One graduate semester is usually devoted to full time student teaching. Additional graduate course work is completed in a second semester. Courses required for the M.Ed. degree include a course in learning theory (e.g., SCIED 552), a course in research methods (e.g., SCIED 558), a course in curriculum (e.g., SCIED 550), and a course in research ethics (CI 590).

Students pursuing teacher certification (the usual option) additionally complete a 500-level EDTHP course, CI 595, and CI 496. SCIED 558, CI 496, and CI 595 comprise the student-teaching semester course load. Students who are not pursuing teacher certification substitute 15 credits of other 400- or 500-level coursework for the student teaching semester; those courses are selected in consultation with their advisors, in order to address the students’ specific career aspirations.

The following courses may be double-counted toward both the B.S. and the M.Ed. degrees, up to a limit of 12 credits: EDTHP 500-level courses, SCIED 411, SCIED 412, and SCIED 500-level courses. Note that at least
50% of credits proposed for double-counting must be at the 500 level. In addition to the double-counted courses taken during the first four years, the timeline for the M.Ed. is one year that includes these specified courses. The program is designed to be finished in five years.

There are a number of other requirements for Pennsylvania teacher certification, including state-required tests and clearances, as well as course work that can be completed at either the undergraduate or graduate level. Some courses, not enumerated above, that are usually required to satisfy teacher certification requirements include CI 280, SPLED 400, and CI 495C. Please note that changes in Pennsylvania certification requirements are common; students should check the Certification FAQ page at the Penn State Science Education website (https://ed.psu.edu/c-and-i/science/certification) for updates and clarification about the specific requirements that affect them, based on their admission date to the IUG program option. Note also that students in the IUG program option are not required to complete all Penn State teacher certification requirements in order to receive their B.S. and M.Ed. degrees, as long as they have completed the requirements for those degrees, as described in the Undergraduate and Graduate Bulletins. For example, a student who has completed all degree requirements but has not yet received a score for the Pennsylvania-required Biology content exam may be awarded both of his or her earned degrees.

**Integrated B.S. in Chemistry and M.Ed. in Curriculum and Instruction**

Requirements listed here are in addition to requirements listed in GCAC-210 Integrated Undergraduate-Graduate (IUG) Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/integrated-undergraduate-graduate-degree-programs).

These Integrated Undergraduate/Graduate (IUG) degree programs combine the Bachelor of Science in Chemistry with the Master of Education in Curriculum and Instruction, Science Education emphasis. The programs are designed to be completed in five years. The programs enable highly qualified and motivated students to delve deeply into a scientific content area and to pursue graduate level preparation in the theory and practice of teaching.

Students shall be admitted to the program no earlier than the beginning of the third semester of undergraduate study and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree. Application materials to be submitted include:

- an undergraduate transcript,
- statement of purpose,
- draft plan of study,
- two letters of recommendation,
- and concurrent submission of an application for master’s study to the graduate program in Curriculum and Instruction, Science Education emphasis area.

In addition, a minimum GPA of 3.5 in Science and Education courses is required. Admission will be based on a recommendation by the Science Education Program Coordinator in consultation with the Associate Chair for Undergraduate Education in the Chemistry Department. Additional details about the graduate application procedure can be found in the Admissions Requirements section. Applications must be submitted via the Graduate School.

IUG students fulfill all degree requirements for a B.S. in Chemistry in the Eberly College of Science, listed in the Undergraduate Bulletin (http://bulletins.psu.edu/undergraduate). If a student chooses to leave the program without completing M.Ed. requirements, he or she may still receive the relevant B.S. degree, after all B.S. requirements are completed.

For the M.Ed. degree, students must earn at least 30 credits at the 400/500 level, at least 18 of them at the 500 level. One graduate semester is devoted to full time student teaching. Additional graduate course work is completed in a second graduate semester. Courses required for the M.Ed. degree include:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>SCIED 552</td>
<td>Science Teaching and Learning</td>
<td>3</td>
</tr>
<tr>
<td>SCIED 558</td>
<td>Research Problems in Science Teaching</td>
<td>3</td>
</tr>
<tr>
<td>500-level EDTHP course</td>
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<td>3</td>
</tr>
<tr>
<td>CI 590</td>
<td>Colloquium</td>
<td>1</td>
</tr>
<tr>
<td>CI 595</td>
<td>Internship in Curriculum, Supervision, or Instruction</td>
<td>12</td>
</tr>
<tr>
<td>500-level course in curriculum (e.g. SCIED 550)</td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>

1. Of these, SCIED 558 and CI 595 comprise the student teaching semester course load.

The following courses may be double-counted toward both the B.S. and the M.Ed. degrees, up to a limit of 12 credits: EDTHP 500-level courses, SCIED 411 & SCIED 412, and SCIED 500-level courses. Note that at least 50% of credits proposed for double-counting must be at the 500 level. In addition to the double-counted courses taken during the first four years, the timeline for the M.Ed. is one year that includes these specified courses. The program is designed to be finished in five years.

There are a number of other requirements for Pennsylvania teacher certification, including state-required tests and clearances, as well as course work that can be completed at either the undergraduate or graduate level. Some courses, not enumerated above, that are usually required to satisfy teacher certification requirements include CI 280, SPLED 400, and CI 495C. Please note that changes in Pennsylvania certification requirements are common; students should check the Certification FAQ page at the Penn State Science Education website (https://ed.psu.edu/c-and-i/science/certification) for updates and clarification about the specific requirements that affect them, based on their admission date to the IUG program option. Note also that students in the IUG program option are not required to complete all Penn State teacher certification requirements in order to receive their B.S. and M.Ed. degrees, as long as they have completed the requirements for those degrees. For example, a student who has completed all degree requirements but has not yet received a score for the Pennsylvania-required Chemistry content exam may be awarded both of his or her earned degrees.

**Integrated B.S. in Mathematics and M.Ed. in Curriculum and Instruction**

Requirements listed here are in addition to requirements listed in GCAC-210 Integrated Undergraduate-Graduate (IUG) Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/integrated-undergraduate-graduate-degree-programs).

The Mathematics and Curriculum Instruction with Emphasis in Mathematics Education Integrated Undergraduate-Graduate (MATH/CI-MTHED IUG) Degree Program consists of the integration of required
courses for a B.S. in Mathematics Systems Analysis Option, a M.Ed. in Curriculum and Instruction with emphasis in Mathematics Education (MTHED), and Pennsylvania certification for Mathematics Grades 7-12.

The MATH/CI-MTHED IUG is a five-year program for highly qualified students seeking to teach mathematics at the secondary level. A hallmark of the program is its strong statistics strand in combination with its mathematics core. In addition to developing advanced understanding of mathematics and statistics, students will learn how to develop and implement lessons and to incorporate technology and research in instruction designed to reach all students.

Students are expected to complete courses required for the certification program integrated with their undergraduate and graduate experiences and will likely complete one summer in residence. Completion of the IUG (along with earning a passing score on Pennsylvania Department of Education required test[s]) leads to a B.S. in Mathematics, certification in Mathematics Grades 7-12, and a M.Ed. in Curriculum and Instruction.

Students shall be admitted to the program no earlier than the beginning of the third semester of undergraduate study and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree. Admission to the MATH/CI-MTHED IUG Mathematics Grades 7-12 program will be based upon having attained a minimum GPA of 3.5 after completing at least 60 credits of the program, with a grade of C or better in all courses. Application materials to be submitted include:

- a current undergraduate transcript,
- statement of purpose,
- draft plan of study,
- two letters of recommendation,
- and concurrent submission of an application for master’s study to the graduate program in Curriculum and Instruction, Mathematics Education emphasis area.

Admission will be based on a recommendation by the Mathematics Department in consultation with the Mathematics Education faculty in the Department of Curriculum and Instruction.

For the B.S./M.Ed. Degree in integrated Mathematics B.S. and Curriculum and Instruction M.Ed., 129 credits are required for the B.S. degree, 30 credits are required for the M.Ed., and 41 credits are required for field experiences and additional courses required for secondary mathematics certification in Pennsylvania. A maximum of 12 credits, at least half of which are at the 500-level, may be dual-counted toward the B.S. and M.Ed. The following courses can be used in both the B.S. and the M.Ed. degrees: two MATH 400-level electives, STAT 501, STAT 502. Students can complete the B.S. in Mathematics and not advance to the M.Ed. in Curriculum and Instruction degree if they desire. Students who have been accepted into the IUG program but are unable to complete the M.Ed. in Curriculum and Instruction may be awarded the B.S. in Mathematics after having completed all degree requirements for the B.S. The M.Ed. requires one full year beyond the B.S., including student teaching in the graduate year.

<table>
<thead>
<tr>
<th>Code</th>
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<th>Credits</th>
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<tr>
<td></td>
<td>Required Courses</td>
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<tr>
<td>9</td>
<td>credits - choose one course from each area</td>
<td>9</td>
</tr>
<tr>
<td>CI 550</td>
<td>Overview of Contemporary School Curriculum (or equivalent)</td>
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**Research**

<table>
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<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT 500</td>
<td>Applied Statistics (or equivalent)</td>
<td></td>
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</table>

**Learning**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDPSY 421</td>
<td>Learning Processes in Relation to Educational Practices (or equivalent)</td>
<td></td>
</tr>
</tbody>
</table>

**Emphasis in Mathematics Education**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CI 590</td>
<td>Colloquium</td>
<td>1-3</td>
</tr>
<tr>
<td>STAT 501</td>
<td>Regression Methods (or equivalent)</td>
<td>3</td>
</tr>
</tbody>
</table>

Select one of the following:

- MATH 485  Graph Theory
- MATH 486 Mathematical Theory of Games
- MATH/CMPSC Numerical Computations 451
- MTHED 511 Connections Between Mathematics and Mathematics Education (or equivalent) 3
- MTHED 524

Select at least one additional 400-level MATH course

Select at least one additional 400- or 500-level MTHED course

1 Required courses.
2 Other than:
   - MATH 401
   - MATH 405
   - MATH 406
   - MATH 441
   - MATH 470
   - MATH 471

A Master’s paper is required for completion of the M.Ed.

A passing score on the state-required Mathematics Content Exam is required for Mathematics Grades 7-12 certification.

### Integrated B.S. in Special Education and M.Ed. in Curriculum and Instruction

Requirements listed here are in addition to requirements listed in GCAC-210 Integrated Undergraduate-Graduate (IUG) Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/integrated-undergraduate-graduate-degree-programs).

The Special Education and Curriculum and Instruction with emphasis in Language and Literacy Education Integrated Undergraduate-Graduate (SE/CI-LLED IUG) leading to certification as a Reading Specialist.

The Special Education and Curriculum Instruction with Emphasis in Language and Literacy Education Integrated Undergraduate-Graduate (SE/CI-LLED IUG) Degree Program consists of integration of required courses for a B.S. in Special Education with courses required for certification as a Reading Specialist and a M.Ed. in Curriculum and Instruction with emphasis in Language and Literacy Education (LLED). The five-year, SE/CI-LLED IUG is an option for highly qualified students seeking certification to teach Special Education in Pennsylvania in grades K-12. Students in this IUG will be taught how to design and deliver appropriate instruction based on individual needs and incorporate a variety of materials and strategies. Students are expected to complete courses required for the graduate level K-12 reading specialist integrated with their undergraduate experiences and coursework in Special Education and will complete a summer practicum in an on-campus reading clinic as well as a capstone Special Education teaching
experience in their final semester. Completion of the IUG (along with earning a passing score on PDE required content tests) leads to a B.S. in Special Education, certification in special education and as a reading specialist in the state of Pennsylvania, and a M.Ed. in Curriculum and Instruction.

In addition to the admission requirements for the Curriculum and Instruction M.Ed., admission to the SE/CI-LLED IUG Reading Specialist program will be based upon having attained a minimum GPA of 3.5 in Special Education courses, with a grade of B or better in SPLED 412. Admission will be based on a recommendation by the Reading Specialist Program Coordinator in consultation with the Coordinator of Teacher Education in Special Education.

For the B.S./M.Ed. Degree in integrated Special Education B.S. and Curriculum and Instruction M.Ed., a minimum of 150 credits is required. Up to 12 credits can apply to both undergraduate and graduate degrees; half of these must be at the 500-level. Students who have been accepted into the IUG program but are unable to complete the M.Ed. in Curriculum and Instruction may be awarded the B.S. in Special Education after having completed all degree requirements for the B.S.

Load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

**Courses**

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**Learning Outcomes**

1. Demonstrate mastery of the student’s specific program emphasis area, which includes knowledge of primary and secondary literature related to research methodologies, programmatic research priorities, and implications of that research for professional practice. Assessed through candidacy and comprehensive exams (rubric).
2. Students will design and carry out a research project that includes articulating an important and original question, analyzing appropriate literature, demonstrating conceptual and methodological creativity, and carrying out an original inquiry. Assessed through dissertation proposal and defense (rubric).
3. Demonstrate standards of field in written and oral communication by presenting the results of dissertation research in clear, concise oral presentations to an audience of peers. Assessed through dissertation defense.
4. Demonstrate critical thinking about selected recent research in the program emphasis area through the description of an emerging scholarly theme/area, identification of specific publications that reflect it, and assessment of its strengths and weaknesses. Assessed through written and oral candidacy assessment (rubric).
5. Demonstrate knowledge and comprehension of research ethics issues including knowledge of ethical principles related to authorship, research reporting, data fabrication, plagiarism, conflicts of interest, peer review, data sharing and other areas of misconduct. Assessed through SARI examinations and participation in CI 590.

**Contact**

**Graduate Program Head:** Rose Mary Zbiek

**Director of Graduate Studies/Professor-in-Charge:** Gwendolyn Lloyd

**University Park Campus**

**Primary Program Contact:** Bonnie Richardson

**Email:** bli103@psu.edu

**Mailing Address:** Curriculum & Instruction, 270A Chambers Building, University Park, PA 16802

**Telephone:** (814)865-2168

**Program Website:** Curriculum and Instruction at University Park (http://ed.psu.edu/c-and-i/graduate)

**World Campus**

**Primary Program Contact:** Anthony Chiocco

**Email:** abc167@psu.edu

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<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Required Courses</td>
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<td></td>
</tr>
<tr>
<td>9 credits - choose one course from each area:</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td><strong>Curriculum</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CI 550</td>
<td>Overview of Contemporary School Curriculum</td>
<td></td>
</tr>
<tr>
<td><strong>Research</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CI 501</td>
<td>Teaching as Inquiry</td>
<td></td>
</tr>
<tr>
<td>EDPSY 400</td>
<td>Introduction to Statistics in Educational Research</td>
<td></td>
</tr>
<tr>
<td><strong>Learning</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EDPSY 421</td>
<td>Learning Processes in Relation to Educational Practices</td>
<td></td>
</tr>
<tr>
<td>EDPSY 545</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HDFS 429</td>
<td>Advanced Child Development</td>
<td></td>
</tr>
<tr>
<td><strong>Emphasis in Language and Literacy Education with Reading Specialist</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EDLDR 563</td>
<td>Designing Staff Development Programs</td>
<td>3</td>
</tr>
<tr>
<td>EDPSY 526</td>
<td>The Psychology of Reading</td>
<td>3</td>
</tr>
<tr>
<td>LLED 500</td>
<td>The Reading and Writing Classroom</td>
<td>3</td>
</tr>
<tr>
<td>LLED 501</td>
<td>Teaching Writing in Elementary and Secondary Schools</td>
<td>3</td>
</tr>
<tr>
<td>LLED 550</td>
<td>Theory and Practicum in Assessment and Remediation of Reading Difficulties</td>
<td>3</td>
</tr>
<tr>
<td>LLED 595A</td>
<td>Practicum: Remedial Procedures and Diagnosis</td>
<td>3-6</td>
</tr>
<tr>
<td>Total Credits</td>
<td>30</td>
<td></td>
</tr>
</tbody>
</table>

1 Required courses.

A Master’s paper is required for completion of the M.Ed.

A passing score on the state-required Reading Specialist Exam (qualifying score of 570) is required for Reading Specialist certification.
Data Analytics

Graduate Program Head
Colin J. Neill

Program Code
DAAN

Campus(es)
Great Valley (M.P.S., M.S.)
World Campus (M.P.S.)

Degrees Conferred
Master of Science (M.S.)
Master of Professional Studies (M.P.S.)

The Graduate Faculty
View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=DAAN)

The M.S. in Data Analytics (M.S.-DAAN) degree is a research-oriented graduate degree program focused on applying predictive and prescriptive analytics to problems across domains. The program will provide students the skills necessary to frame problems in analytical terms amenable to data analysis; identify the datasets necessary to address the problem; the techniques appropriate to reveal the insight sought, and present that insight to stakeholders.

The M.P.S. in Data Analytics (M.P.S.-DAAN) degree is an interdisciplinary master's program that provides students the skills required to collect, classify, analyze, and model data at large and ultra-large scales and across domains using statistics, computer science, machine learning, and software engineering.

The M.P.S. curriculum is delivered both in residence at the School of Graduate Professional Studies (Great Valley) and online through the Penn State World Campus. The program provides broad coverage of topics related to predictive analytics while provide in-depth coverage of topics such as data collection and quality, large scale data storage and retrieval, and business and enterprise analytics.

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Master of Professional Studies (M.P.S.)

Admission to the M.P.S. in Data Analytics program will be based on baccalaureate academic records, applicable work experience, and two letters of recommendation from a previous professor or supervisor who can attest to the applicant's academic potential. Applicants with an undergraduate degree in a quantitative discipline such as science, engineering, or business may apply. Students from other disciplines will be considered based on prior course work and/or standardized test scores. Applications must include a statement of professional goals, a curriculum vitae or resume, and two letters of recommendation. Test scores from the GMAT or GRE exams are required. An undergraduate cumulative grade-point average of 3.0 or better on a 4.0 scale in the final two years of undergraduate studies is required.

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. See GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-305/admission-requirements-international-students) for more information.

Master of Science (M.S.)

Admission to the M.S. in Data Analytics program will be based on baccalaureate academic records, applicable work experience, and two letters of recommendation from a previous professor or supervisor who can attest to the applicant's academic potential. Applicants with an undergraduate degree in a quantitative discipline such as science, engineering, or business may apply. Students from other disciplines will be considered based on prior course work and/or standardized test scores. Applications must include a statement of professional goals, a curriculum vitae or resume, and two letters of recommendation. Test scores from the GMAT or GRE exams are required. An undergraduate cumulative grade-point average of 3.0 or better on a 4.0 scale in the final two years of undergraduate studies is required.

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. See GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-305/admission-requirements-international-students) for more information.

Degree Requirements

Master of Professional Studies (M.P.S.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

The M.P.S.-DAAN degree is conferred upon students who earn a minimum of 30 credits of coursework while maintaining an average grade-point average of 3.0 or better in all course work, including at least 18 credits at the 500 or 800 level (with at least 6 credits at the 500 level). The program curriculum includes 9 credits of core courses, 9 credits of either a selected option or the base program, 9 credits of electives, and a 3-credit capstone course.

Students select to follow either the base program, which prepares them to design and deploy predictive analytics systems, or specialized options in Business Analytics or Marketing Analytics. The base program is available both in residence and online; the options are only available online.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT 500</td>
<td>Applied Statistics</td>
<td>3</td>
</tr>
<tr>
<td>IE 575</td>
<td>Foundations of Predictive Analytics</td>
<td>3</td>
</tr>
<tr>
<td>SWENG 545</td>
<td>Data Mining</td>
<td>3</td>
</tr>
<tr>
<td>or STAT 557</td>
<td>Data Mining I</td>
<td></td>
</tr>
<tr>
<td>Base Program or Option</td>
<td></td>
<td>9</td>
</tr>
<tr>
<td>Electives 1</td>
<td></td>
<td>9</td>
</tr>
<tr>
<td>Culminating Experience 2</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Total Credits</td>
<td></td>
<td>30</td>
</tr>
</tbody>
</table>

Penn State University
An additional 9 credits of elective courses must be selected from the approved list. The list of approved elective courses is maintained by the graduate program office.

All students will complete their program of study with the capstone course corresponding to their chosen option.

All students will complete their program of study with the capstone course corresponding to their chosen option. While each capstone course focuses on problems relevant to their specific domains, they all provide students with an opportunity to apply their knowledge of the theories, methods, processes, and tools of data analytics, learned throughout their program, in a culminating and summative experience. The choice of project topic and exact form will be mutually determined by the instructor and each student. A written paper based on the applied project is required and must contain project description, analysis, and interpretation of its findings. Students are encouraged to upload their capstone projects to be available publically via ScholarSphere and to participate in the Graduate Exhibition.

**Base Program**
*(Offered at Penn State Great Valley and through World Campus)*

The base program will create graduates who can design, deploy, and manage the technology infrastructure and data analytical processes of predictive analytics including data aggregation, cleaning, storage, and retrieval. These graduates will work in positions that require them to design and maintain data analytics systems and tools such as Data Modeler, Data Architect, Extraction, Transformation, Loading (ETL) Developer, Business Intelligence (BI) Developer, Data Warehouse Developer and Data Analyst.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>INSC 521</td>
<td>Database Design Concepts</td>
<td>3</td>
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<tr>
<td>DAAN 825</td>
<td>Large-Scale Database and Warehouse</td>
<td>3</td>
</tr>
<tr>
<td>DAAN 881</td>
<td>Data-Driven Decision Making</td>
<td>3</td>
</tr>
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</table>

**Culminating Experience**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>DAAN 888</td>
<td>Design and Implementation of Analytics Systems</td>
<td>3</td>
</tr>
</tbody>
</table>

**Business Analytics option**
*(Offered through World Campus)*

This option prepares graduates to explore and analyze large data sets to support data-driven business decisions. Target audiences include business analysts, analytic system designers and the data scientists who have a focus on problems arising in the context of business decision-making. The BAN option is organized around the industry-standard rubric of the spectrum of analytics activities: descriptive (what happened), diagnostic (why did it happen), predictive (what will happen) and prescriptive (what should happen).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAN 530</td>
<td>Business Strategies for Data Analytics</td>
<td>3</td>
</tr>
<tr>
<td>BAN 540</td>
<td>Marketing Analytics</td>
<td>3</td>
</tr>
<tr>
<td>BAN 550</td>
<td>Prescriptive Analytics for Business</td>
<td>3</td>
</tr>
</tbody>
</table>

**Culminating Experience**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAN 888</td>
<td>Implementing Analytics for Business</td>
<td>3</td>
</tr>
</tbody>
</table>

**Marketing Analytics Option**
*(Offered through World Campus)*

The aim of this option is to convey how marketing analytics are (1) applied within organizations, (2) conducted, and (3) meaningfully communicated and applied to business decision-making and strategy. The target market would be college graduates that desire to build their skills in marketing analytics functions, but may have little or no formal training in marketing analytics. The MAN option will be highly industry applicable, since it is aimed at giving students the core marketing analytics knowledge they will need to successfully apply marketing analytics in today's data-driven organizations.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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</tr>
</thead>
<tbody>
<tr>
<td>MKTG 811</td>
<td>Driving Business Success with Marketing Analytics</td>
<td>3</td>
</tr>
<tr>
<td>MKTG 812</td>
<td>Evaluating Marketing Communications in the Digital World</td>
<td>3</td>
</tr>
<tr>
<td>MKTG 813</td>
<td>Data-Driven Customer Acquisition &amp; Retention</td>
<td>3</td>
</tr>
</tbody>
</table>

**Culminating Experience**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MKTG 814</td>
<td>Analytics for Brand Management and Customer Experience</td>
<td>3</td>
</tr>
</tbody>
</table>

**Master of Science (M.S.)**

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

The M.S. degree is an academic degree, which is strongly oriented toward research. To receive the Master of Science degree in Data Analytics, a student must complete at least 30 credits beyond the baccalaureate degree at the 400, 500, 600, or 800 level. At least 18 credits in the 500 and 600 series, combined, must be included in the program.

The program curriculum includes 15 credits of core courses, 9 credits of elective courses, and 6 credits of supervised research. The thesis must be accepted by the advisers and/or committee members, the head of the graduate program, and the Graduate School, and the student must pass a thesis defense.

<table>
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<tr>
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<tr>
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</tr>
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<td>SWENG 545</td>
<td>Data Mining</td>
<td>3</td>
</tr>
<tr>
<td>DAAN 501</td>
<td>Analytics Research and Problem Framing</td>
<td>3</td>
</tr>
<tr>
<td>DAAN 871</td>
<td>Data Visualization</td>
<td>3</td>
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</tbody>
</table>

**Additional Courses**

An additional 9 credits of elective courses must be selected from the approved list of elective courses maintained by the graduate program office.

**Thesis Research**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>DAAN 600</td>
<td>Thesis Research</td>
<td>1</td>
</tr>
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</table>

**Total Credits**

30

* Students must take a minimum of 6 credits of DAAN 600.

The thesis work should be an in-depth investigation intended to extend the state of knowledge in some specialty area. For thesis guidelines
Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School's website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

World Campus students in graduate degree programs may be eligible for financial aid. Refer to the Tuition and Financial Aid section (http://www.worldcampus.psu.edu/tuition-and-financial-aid) of the World Campus website for more information.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Learning Outcomes

1. COMMUNICATE Graduates will be able to effectively communicate technical knowledge, including ideas, data analysis, findings, or decision justification in written formats in a manner appropriate to the audience.
2. APPLY Graduates will be able to analyze large data sets to support data-driven decision making.
3. KNOW Graduates will demonstrate understanding of machine learning and statistical analysis techniques.
4. THINK Graduates will be able to discriminate between descriptive, diagnostic, predictive, and prescriptive analytics and the techniques used in each.
5. KNOW Graduates will demonstrate their understanding of technologies used to develop, optimize, and deploy large-scale databases.
6. PROFESSIONAL PRACTICE. Graduates will demonstrate knowledge of and ability to practice the professional standards of engineering and professional behavior.

Contact

Graduate Program Head: Colin Neill

Great Valley Campus
Mailing Address: Penn State Great Valley, 30 E. Swedesford Road, Malvern, PA 19355

Program Website: Data Analytics at Great Valley (http://greatvalley.psu.edu/academics/masters-degrees/data-analytics)

World Campus
Mailing Address: Penn State Great Valley, 30 E. Swedesford Road, Malvern, PA 19355

Program Website: Data Analytics at World Camps (https://www.worldcampus.psu.edu/degrees-and-certificates/data-analytics-base/overview)

Demography

 Graduate Program Head
Stephen A. Matthews

Program Code
DEMOG

Campus(es)
University Park

Degrees Conferred
Dual-Title

The Graduate Faculty
View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=DEMOG)

Students electing this option through participating programs will earn a degree with a dual title at both the Ph.D. and M.A./M.S. levels, i.e., Ph.D. in (graduate program name) and Demography, or M.A. or M.S. in (graduate program name) and Demography.

The following graduate programs offer dual-title degrees in Demography:

- M.A. and Ph.D. in Anthropology and Demography
- M.A. and Ph.D. in Economics and Demography
- M.S. and Ph.D. in Energy, Environmental, and Food Economics, and Demography
- M.S. and Ph.D. in Health Policy and Administration and Demography
- M.S. and Ph.D. in Human Development and Family Studies, and Demography
- M.S. and Ph.D. in Rural Sociology and Demography
- M.A. and Ph.D. in Sociology and Demography

The Demography dual-title degree program option is administered by the Demography Program Committee, which is responsible for management of the program. The committee maintains program definition, identifies faculty and courses appropriate to the option, and recommends policies and procedures for its operation to the dean of the Graduate School. This dual-title degree program is offered as an option to graduate major programs in three colleges Agricultural Sciences, Health and Human Development, and the Liberal Arts. The option enables students from diverse graduate programs to attain and be identified with the content, techniques, methodology, and policy implications of demography, while maintaining a close association with areas of application. Through demography, students study:

1. the size, composition, and distribution of the population;
2. changes in these characteristics;
3. the processes that determine these changes—fertility, migration, and mortality; and
4. their social, economic, and cultural causes and consequences.

Admission Requirements

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

To pursue a dual-title degree in Demography, the student must apply to the Graduate School and be admitted to one of the following graduate programs: Anthropology, Economics, Energy, Environmental and Food
Economics, Health Policy and Administration, Human Development and Family Studies, Rural Sociology, or Sociology.

Students applying for admission to the dual-title in Demography must provide a positive recommendation by a Demography Graduate Faculty member in their graduate major program.

Applicants should have a junior/senior cumulative grade-point average of well above 3.00 (on a 4.00 scale) and appropriate courses in statistics and in the social science department to which they are applying. The application should include three letters of reference and a statement describing and explaining the applicant’s interest in demography and goals during and after graduate study. Doctoral students must apply and be admitted to the Demography dual-title program prior to taking the qualifying exam.

**Degree Requirements**

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

To qualify for a dual-title degree, students must satisfy the requirements of the graduate program in which they are enrolled, including the communication/foreign language requirements, if any. In addition, they must satisfy the minimum requirements for the dual-title in Demography described here, as established by the Demography Program Committee. Within this framework, final course selection is determined by students and their degree committees. All dual-title degree candidates who are in residence must enroll in DEMOG 590 for 1 credit each year in residence.

**Master's Degrees**

For the M.A. and M.S. degree with the Demography option, 12 course credits are required in addition to the colloquium credit or credits. A minimum of 3 credits is required in each of the following areas:

1. disciplinary perspective courses;
2. demographic methods courses (SOC 573 is required of all students);
3. seminars in demographic processes;
4. seminars in population studies.

The courses that satisfy the area requirements can be chosen from a list of approved courses maintained by the graduate program office.

Particular courses may satisfy both the graduate major program requirements and those of the Demography option. The thesis supervisor must be a member of the Graduate Faculty recommended by the chair or the graduate officer of the program granting the degree and a member of the Demography faculty.

**Doctoral Degrees**

For the Ph.D. degree with a dual-title in Demography, a minimum of 24 credits is required in addition to the colloquium credits. For students entering with a master's degree from another institution, equivalent course credits may be accepted. The following minimum number of credits is required in each curriculum category.

- 3 credits of disciplinary perspective courses;
- 6 credits of demographic methods courses;
- SOC 573 is required of all students;
- 6 credits of seminars in demographic processes;
- 3 credits of seminars in population studies;
- and 6 credits of electives.

Final course selection is determined in consultation with the dissertation committee.

The qualifying examination committee for the dual-title Ph.D. degree must include at least one Graduate Faculty member from the Demography program. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. There will be a single qualifying examination, containing elements of both the primary graduate degree program and Demography. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the chair and at least one additional member of the dissertation committee must be members of the Graduate Faculty in Demography. The Demography faculty members on the student’s committee are responsible for administering an examining in demography that constitutes a portion of the comprehensive examination of the dual-title doctoral student. Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their dissertation committee and reflects their original research and education in both their primary graduate program and Demography. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

**Minor**

Requirements listed here are in addition to requirements for minors in Graduate Council policies listed under GCAC-600 Research Degree Requirements (http://gradschool.psu.edu/graduate-education-policies) and GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

A Ph.D. minor in Demography is available for doctoral students in graduate programs other than the dual-title participating programs who find it advantageous to include demographic content, methods, and policy analysis in their program of study. The student’s dissertation committee must approve the choice of this minor, and one member of the dissertation committee must be from the Demography Graduate Faculty.

To qualify for a minor in Demography, students must satisfy the requirements of their graduate major program and take at least 6 credits in demography in addition to colloquium credits. A minimum of at least 6 credits must be at the 500 level. A minimum of at least 3 credits each in:

1. disciplinary perspective,
2. demographic methods courses (SOC 573 is required of all candidates),
3. seminars in demographic processes, and
4. seminars in population studies is required.

Students must enroll in DEMOG 590 for 1 credit during each year enrolled in the program and in residence.
Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School's website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

In addition, the following awards typically have been available to graduate students in this program: Affiliated departments and The Population Research Institute Assistantships, and the NICHD Traineeship awards.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact

Graduate Program Head: Stephen Matthews
Primary Program Contact: Angela Jordan
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Telephone: (814)865-0486
Program Website: Demography (http://www.pop.psu.edu/demography)

Earth Sciences

Graduate Program Head: Eliza Marone
Program Code: EARTH
Campus(es): World Campus (M.Ed.)
Degrees Conferred: Master of Education (M.Ed.)
The Graduate Faculty: View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=EARTH)

The M.Ed. in Earth Sciences program is designed for secondary science teachers who seek to enrich their knowledge and practice through rigorous courses and individual projects supervised by Penn State faculty members. Combining graduate courses from academic departments in Penn State’s College of Earth and Mineral Sciences, College of Education, and Eberly College of Science, the curriculum will prepare teachers to help students in grades 7 through 12 master educational objectives related to Earth and space science, as specified in National Science Education Standards (National Academy of Sciences, 1996). To accommodate working teachers who are only able to study part-time and at a distance, courses will be offered online through Penn State's World Campus. Fall, Spring, and Summer semester offerings will be available. Students will be granted licenses to use the courseware modules developed for the M.Ed. in Earth Sciences program in their secondary classroom.

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. See GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

Students may initially enroll in M.Ed. in Earth Sciences classes as non-degree graduate students. Up to 15 credits earned in non-degree status may be counted toward the M.Ed. in Earth Sciences degree, subject to restrictions outlined in GCAC-309 Transfer Credit (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-309/transfer-credit).

Degree Requirements

Master of Education (M.Ed.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

The M.Ed. in Earth Sciences degree is conferred upon students who earn a minimum of 30 credits at the 400, 500, or 800 level while maintaining an average grade of 3.0 or better in all course work, including at least 18 credits at the 500 or 800 level (with at least 6 credits at the 500 level), and who complete a quality culminating individual project in consultation with a graduate adviser. Students will have the opportunity to participate in face-to-face field experiences or workshops at University Park or other locations during Summer sessions.

Student Aid

World Campus students in graduate degree programs may be eligible for financial aid. Refer to the Tuition and Financial Aid section (http://www.worldcampus.psu.edu/tuition-and-financial-aid) of the World Campus website for more information.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Learning outcomes

1. Summarize current thinking on several specific areas of current research in the Earth sciences, collect and analyze data relevant to these topics, and formulate a plan to teach appropriate content from these topics to secondary school audiences.
2. Become conversant with the historical background and personalities involved in the scientific revolution of plate tectonic theory.
3. Know how to construct a dataset appropriate for comparing with a given empirical observation.
4. Know of how human lives are impacted by natural processes, and
   conversely how human activities impact Earth’s surface and the
   Critical Zone.
5. Conceptualize principles of ocean science and use them to think
critically about ocean-related issues.
6. Explain the uncertainty inherent to predicting climate change

Contact

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PA 16802
Telephone: (814) 867-5401
Program Website: Earth Sciences (https://earth.e-education.psu.edu)

Ecology

Graduate Program Head: Jason Kaye
Program Code: ECLGY
Campus(es): University Park (Ph.D., M.S.)
Degrees Conferred: Doctor of Philosophy (Ph.D.),
Master of Science (M.S.),
Dual-Title Ph.D. in Ecology and Biogeochemistry

The Graduate Faculty

This intercollege program emphasizes the properties of ecosystems by
focusing attention on interactions of single organisms, populations, and
communities with their environment. It is designed to give students an
advanced understanding of ecological theory and hypothesis testing and
is complementary to other environmental programs that emphasize the
human role in ecosystems.

The program is administered by a committee drawn from faculty
members in several departments and colleges of the University. This
committee and its chair are appointed by the dean of the Graduate
School. The instructional staff is composed of participating faculty in
those departments offering graduate courses in fields closely allied to
ecology.

Admission Requirements

Applicants apply for admission to the program via the Graduate School
application for admission (http://gradschool.psu.edu/prospective-
students/how-to-apply). Requirements listed here are in addition to
Graduate Council policies listed under GCAC-300 General Admissions
Standards (http://gradschool.psu.edu/graduate-education-policies).

Scores from the Graduate Record Examination (GRE), including verbal,
quantitative, and advanced biology test, are required for admission.
Candidates should have a strong science background, including
chemistry through organic chemistry, mathematics through calculus,
physics, and biology. A limited number of such courses can be made up
while the student is pursuing graduate student.

Students with a background in another discipline that has potential value
to original ecological work will be seriously considered. A junior/senior
grade-point average of 3.00 or better (on a 4.00 scale) is required.

Students are strongly urged to choose their research interests and initiate
communication with the relevant faculty member(s) before applying for
admission. A student will not be admitted without the commitment of a
faculty member to serve as the student’s research adviser. Teaching and
research assistantships are available only through the student’s faculty
adviser.

The following are required:
1. three or more letters of recommendation regarding the student’s
   academic and professional promise;
2. a concise one-page statement describing the student’s goals both
   within the program and in professional life; and
3. GRE scores (general test and the subject test in biology).

Specific inquiries about the Ecology Program may be directed to the
program chair. Applications received by December 15 will have preferred
consideration for assistantships and fellowships for fall semester
admission.

Degree Requirements

Master of Science (M.S.)

Requirements listed here are in addition to Graduate Council policies
listed under GCAC-600 Research Degree Requirements. (http://
gradschool.psu.edu/graduate-education-policies)

In addition to Graduate Council requirements, the instructional program
includes:

• two graduate core courses in ecology (one each in two of the three
  core areas: population ecology, community/ecosystem ecology, and
  physiological ecology),
• an advanced 3-credit statistics course,
• two credits of colloquium,
• a minimum of six thesis credits,
• breadth courses selected by the student in consultation with the
  research adviser and research committee,
• and a thesis research project directed by the student’s adviser. A
  non-thesis option is available for the M.S. degree, at the adviser’s
discretion.

Doctor of Philosophy (Ph.D.)

Requirements listed here are in addition to Graduate Council policies
listed under GCAC-600 Research Degree Requirements. (http://
gradschool.psu.edu/graduate-education-policies)

In addition to Graduate Council requirements, the instructional program
includes:

• three graduate core courses in ecology (one each of three core
  areas: population ecology, community/ecosystem ecology, and
  physiological ecology),
• two advanced 3-credit statistics courses,
• 4 credits of colloquium,
• breadth courses selected by the student in consultation with the research adviser and dissertation committee,
• a minimum of 15 thesis credits,
• and a thesis research project directed by the student’s adviser.

The communication and foreign language requirement for the Ph.D. degree may be satisfied by strong performance in two semesters of one foreign language or the equivalent. Both the qualifying and comprehensive examinations will be written and oral.

The dissertation committee is selected by the candidate and his/her adviser and approved by the Graduate School. The committee has the responsibility for determining the course program and research acceptable in satisfying degree requirements.

Options

Five options for specialization are offered, for both the M.S. and the Ph.D.:

1. Conservation Biology
2. Microbial Ecology
3. Quantitative Ecology
4. Physiological Ecology
5. Watershed Stewardship

Students are not required to select an option. Each option entails extra course requirements plus a thesis directed by an ecology faculty member in the option.

The Conservation Biology option is concerned with problems of maintaining the rapidly disappearing diversity of organisms and their habitats, and the global reservoir of genetic diversity that these organisms represent.

The Microbial Ecology option includes basic aquatic and soil microbial ecology and applications to recycling of materials and release of genetically engineered organisms.

The Quantitative Ecology option includes mathematical and statistical modeling and applications of statistics to experimental design and data analysis.

The Physiological Ecology option is concerned primarily with the function and performance of organisms in their environment.

The Watershed Stewardship option is intended to provide enhanced educational opportunities for students with an interest in water resources management who are enrolled in the Intercollege Graduate Degree Program in Ecology at the University Park campus. The objective of the Graduate Option in Watershed Stewardship is to educate students to facilitate team-oriented, community-based watershed management planning directed at natural resources conservation and environmental problems encountered in Pennsylvania communities, especially non-point source water pollution. The Graduate Option in Watershed Stewardship requires 22 credits of graduate course work:

• 12 credits of breadth courses
• 2 credits of Watershed Stewardship Seminar courses (FOR 591A and FOR 591B or LARCH 510)
• 8 credits of Watershed Stewardship Practicum I and II courses (FOR 570 and FOR 571 or LARCH 817 and LARCH 550).

Breadth courses will consist of three graduate credits of course work from each of four subject matter areas: (1) water resources science, (2) social science, public policy and economics, (3) humanities, and (4) communications and design. In the watershed stewardship practicum courses, students work in teams with community, government, and business leaders to analyze and understand natural resources and ecological issues and creatively synthesize appropriate solutions in the form of a written watershed management plan.

Dual-Titles

Dual-Title Ph.D. in Ecology and Biogeochemistry

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

Graduate students with research and educational interests in biogeochemistry may apply to the Biogeochemistry dual-title degree program. Students must apply and be admitted to the graduate program in Ecology and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Biogeochemistry dual-title program. Refer to the Admission Requirements section of the Biogeochemistry Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/biogeochemistry). Doctoral students must be admitted into the dual-title degree program in Biogeochemistry prior to taking the qualifying examination in their primary graduate program.

Students in the Biogeochemistry dual-title program are required to have two advisers from separate disciplines: one individual serving as a primary adviser in their major degree program and a secondary adviser in an area within a field covered by the dual-title program and a member of the Biogeochemistry faculty.

To qualify for the dual-title degree, students must satisfy the degree requirements for the degree they are enrolled in Ecology, listed in the Degree Requirements section. In addition, students must complete the degree requirements for the dual-title in Biogeochemistry, listed on the Biogeochemistry Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/biogeochemistry).

All students must pass a qualifying examination that includes an assessment of their potential in the field of biogeochemistry. A single qualifying examination that includes biogeochemistry will be administered for admission into the student’s Ph.D. program, as well as the biogeochemistry dual-title. The structure and timing of this exam will be determined jointly by the dual-title and major program. The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Ecology and must include at least one Graduate Faculty member from the Biochemistry program. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of an Ecology and Biogeochemistry dual-title Ph.D. student must include at least one member of the Biogeochemistry Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. If the chair of the
dissertation committee is not also a member of the Graduate Faculty in Biogeochemistry, the member of the committee representing Biogeochemistry must be appointed as co-chair. The Biogeochemistry representative on the student’s dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their dissertation committee and reflects their original research and education in Ecology and Biogeochemistry. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

Student Aid
Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Learning outcomes
Master of Science (M.S.)
1. Know: demonstrate knowledge of core principles and primary literature in their specialty area including comprehension of methods, results, and data analysis in the specialty area.
2. Apply/Create: demonstrate ability to design and carry out a major research project in the discipline, including synthesis of previous work in the field, and assembling findings into a written work.
3. Think: demonstrate ability to critically analyze work by others in their specialty area.
4. Communicate: demonstrate ability to convey scientific ideas and results in clear, concise and original writing as well as in formal oral presentations.
5. Professional Practice: demonstrate comprehension of and commitment to ethical standards in the discipline.

Doctor of Philosophy (Ph.D.)
1. Know: demonstrate knowledge of core principles and primary literature in their specialty area including comprehension of methods, results, and data analysis in the specialty area.
2. Apply/Create: demonstrate ability to design and carry out a major research project in the discipline, including synthesis of previous work in the field, and assembling new findings into a written work that advances understanding in the field.
3. Think: demonstrate ability to critically analyze work by others in their specialty area.

4. Communicate: demonstrate ability to convey scientific ideas and results in clear, concise and original writing as well as in formal oral presentations.
5. Professional Practice: demonstrate comprehension of and commitment to ethical standards in the discipline. Demonstrate the ability to teach key concepts.
6. Teach: demonstrate the ability to teach key concepts of the discipline to students.

Contact
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Director of Graduate Studies/Professor-in-Charge: David Miller
Primary Program Contact: Jean Pierce
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Mailing Address: 101 Life Sciences Bldg, University Park, PA 16802
Telephone: (814)867-0371
Program Website: Ecology (http://www.huck.psu.edu/education/ecology)

Economics
Graduate Program Head Barry W. Ickes
Program Code ECON
Campus(es) University Park (Ph.D., M.A.)
Degrees Conferred Doctor of Philosophy (Ph.D.) Master of Arts (M.A.)
Dual-Title M.A. and Ph.D. in Economics and Demography Dual-Title M.A. and Ph.D. in Economics and Operations Research
The Graduate Faculty View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=ECON)

Admission Requirements
Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Graduate study in Economics relies heavily on abstract mathematics. It is recommended that, at a minimum, applicants should have taken mathematics up through multivariate calculus.

We require that applicants take the 3-part general aptitude GRE. In judging applicants, we try to take into account that different applicants expend different amounts of effort in preparing for the GRE and that there are systematic differences among applicants from different countries. We require that the GRE be taken within 5 years prior to applying to our Ph.D. program.

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. See GCAC-305 Admission Requirements for International Students.
We place considerable weight on, and require three (3) letters of recommendation. Letters should be from people who know you well and who are familiar with graduate programs in Economics at leading universities. The most valuable letters are from people who can credibly compare you to others who have succeeded in such programs.

Highly successful Ph.D. students in Economics display a wide variety of research skills, including creativity. The questions we ask on the application are intended to elicit information about those skills. Also, if you have completed a paper that displays such skills, upload it via the GRADS online application system.

**Degree Requirements**

**Master of Arts (M.A.)**
Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

The M.A. degree in economics may be earned by (a) satisfactorily completing at least 24 credits of appropriate graduate course work, together with a master’s thesis for which 6 credits is granted, and passing a final oral examination; or (b) by satisfactorily completing 30 credits of appropriate course work, presenting a master’s thesis for which no graduate credit may be granted, and passing a final oral examination. The master’s thesis option, which most students elect, includes preparation of a paper which is written under the supervision of a faculty member. Under either option, at least 18 credit hours must be in approved graduate courses.

The department does not admit students who seek an M.A. as a terminal degree.

**Doctor of Philosophy (Ph.D.)**
Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

The Ph.D. program has 3 main parts taken in sequence: the core, subfields (of specialization), and the dissertation. Most students take 5 years to complete the program. Occasionally, but rarely, a student finishes in 4 years.

**The Core**
The core consists of 2 semesters of course work: a 2-semester sequence in microeconomic theory, a 2-semester sequence in econometrics, and a course in mathematics for economists followed by an intensive single-semester in macroeconomic theory. At the beginning of the third semester, students are required to take two 3-hour qualifying exams: one in microeconomics and one in macroeconomics. Students who fail an exam on their first attempt are allowed to take the exam a second time. Competence in econometrics must be demonstrated through satisfactory completion of the course work. Students with prior graduate training may, however, obtain permission to skip some of the course work in the core and take the qualifying exams earlier than the 3rd semester.

**Subfields**
Students must demonstrate competence in 3 subfields. Competence in a subfield is usually demonstrated by completing 6 credits in the subfield with no grade lower than a B. The department offers the following subfields:

- development economics
- econometrics
- game theory
- industrial organization
- international economics
- macroeconomics

With the permission of the student’s adviser and the Director of Graduate Studies, a student may take a subfield in another department. For instance, students have taken subfield courses in Demography, Political Science, and Statistics.

**First Year**

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**Total Credits 24-27**

1 In their second year, all students must enroll in ECON 512A (1 credit offered in the fall.) This course introduces students to computational methods used to numerically solve and simulate economic models and program econometric estimators. Also, all students in their second year must enroll in ECON 512B (2 credits offered in the spring semester.) This course is a continuation of ECON 512A covering the modern computational methods used in both theoretical and empirical research in economics. Students will be required to work on a small project involving data analysis.

- 3rd-year paper requirement must be completed before spring semester of 3rd year
- Comprehensive exam (dissertation proposal defense) must be completed before fall semester of 4th year

**3rd-Year Paper**
Students must complete a paper by the end of their 5th semester, the spring semester of their 3rd year. The paper must be approved by a 3-person faculty committee. The paper must contain original research and must be written in a form suitable for submission to a journal.

**Dissertation Research**
Most dissertations consist of several essays, each of which has the substance and quality of a journal article. However, a dissertation which has the substance and quality of a single major article in a leading journal is also acceptable. The comprehensive exam (dissertation proposal...
defense) must be completed before fall semester of 4th year. The student will spend the 4th year and the beginning of the 5th year completing the dissertation and will use the summer after the 4th year and the beginning of the 5th year in preparation for the job market.

**Good Standing**
A student must remain in "good standing" while in the program. This means following the course sequence outlined above, maintaining a GPA of at least 3.0 and completing the qualifying, third-year paper and comprehensive exam requirements on time.

**Dual-Titles**

**Dual-title M.A. and Ph.D. in Economics and Demography**
Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs ([http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs](http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs)).

**Admissions Requirements**
Students must apply and be admitted to the graduate program in Economics and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Demography dual-title program. Refer to the Admissions Requirements section of the Demography Bulletin page ([http://bulletins.psu.edu/graduate/programs/majors/demography](http://bulletins.psu.edu/graduate/programs/majors/demography)).

Doctoral students must be admitted into the dual-title degree program in Demography prior to taking the qualifying examination in their primary graduate program.

**Degree Requirements**
To qualify for the dual-title degree, students must satisfy the degree requirements for the degree they are enrolled in Economics, listed in the Degree Requirements section. In addition, students must complete the degree requirements for the dual-title in Demography, listed on the Demography Bulletin page ([http://bulletins.psu.edu/graduate/programs/majors/demography](http://bulletins.psu.edu/graduate/programs/majors/demography)).

The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Economics and must include at least one Graduate Faculty member from the Demography program. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. There will be a single qualifying examination, containing elements of both Economics and Demography. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for dissertation committees ([http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation](http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation)), the dissertation committee of an Economics and Demography dual-title Ph.D. student must include at least one member of the Demography Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Demography Faculty in Demography, the member of the committee representing Demography must be appointed as co-chair. The Demography representative on the student's dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their dissertation committee and reflects their original research and education in Economics and Demography. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

**Dual-title M.A. and Ph.D. in Economics and Operations Research**
Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs ([http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs](http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs)).

**Admissions Requirements**
Students must apply and be admitted to the graduate program in Economics and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Operations Research dual-title program. Refer to the Admission Requirements section of the Operations Research Bulletin page ([http://bulletins.psu.edu/graduate/programs/majors/operations-research](http://bulletins.psu.edu/graduate/programs/majors/operations-research)). Doctoral students must be admitted into the dual-title degree program in Operations Research prior to taking the qualifying examination in their primary graduate program.

**Degree Requirements**
To qualify for the dual-title degree, students must satisfy the degree requirements for the degree they are enrolled in Economics, listed in the Degree Requirements section. In addition, students must complete the degree requirements for the dual-title in Operations Research, listed on the Operations Research Bulletin page ([http://bulletins.psu.edu/graduate/programs/majors/operations-research](http://bulletins.psu.edu/graduate/programs/majors/operations-research)).

The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Economics and must include at least one Graduate Faculty member from the Operations Research program. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. There will be a single qualifying examination, containing elements of both Economics and Operations Research. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for dissertation committees ([http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation](http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation)), the dissertation committee of a Economics and Operations Research dual-title Ph.D. student must include at least one member of the Operations Research Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in Operations Research, the member of the committee representing Operations Research must be appointed as co-chair. The Operations Research representative on the student's dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their
dissertation committee and reflects their original research and education in Economics and Operations Research. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

Student Aid
Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Learning Outcomes
1. CORE: Graduates will demonstrate broad knowledge and comprehension of the major macroeconomic and microeconomic models and econometric methodology.
2. FIELD: Graduates will acquire in-depth knowledge and comprehension of the major models, study designs and results of their specialty area.
3. RESEARCH: Graduates will be proficient in advancing knowledge in their specialty area through new approaches, models, methods, or the creative application of existing approaches, models and methods to produce new results.
4. TRANSFER: Graduates will learn to convey the major issues in their specialty area and their specific projects through research collaborations, discussions, presentations and publications.

Contact
Graduate Program Head: Barry W. Ickes
Director of Graduate Studies/Professor-in-Charge: Marc Henry
Program Email: econgrad@psu.edu
Program Website: Economics (http://www.econ.psu.edu)
Ph.D. Program Contact
Primary Program Contact: Krista Winkelblech
Email: kfg106@psu.edu
Mailing Address: 515 Kern Graduate Building, University Park, PA 16802
Telephone: (814)865-1458
M.A. Program Contact
Primary Program Contact: Giselle Thompson
Email: g1b6@psu.edu

Mailing Address: 503 Kern Graduate Building, University Park, PA 16802
Telephone: (814)863-1956

Educational Leadership
Graduate Program Head: Kevin Kinser
Program Code: EDLDR
Campus(es): University Park (Ph.D., D.Ed., M.Ed.)
World Campus (M.Ed.)
Degrees Conferring
Doctor of Philosophy (Ph.D.)
Doctor of Education (D.Ed.)
Master of Education (M.Ed.)
Dual-Title Ph.D., D.Ed., and M.Ed. in Comparative and International Education
Joint J.D./Ph.D., D.Ed., or M.Ed. with Penn State Law
The Graduate Faculty
View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=EDLDR)

Graduate work in the Educational Leadership program encompasses two major career paths. The first path focuses on those who want to engage in a wide variety of leadership roles within and directly affecting schools and districts. These roles include, but are not limited to: teacher leadership, instructional leadership, principal leadership, and district-level leadership. This path may also lead to certification and/or letters of endorsement in supervision, the principalship or the superintendent. The second path focuses on those who want to exercise leadership roles in educational policy arenas and/or engage in educational research. Possible roles include: intermediate unit officials, state and federal agency administrators and staff, professors of educational administration, and research and development personnel. The principalship certification is also available at Penn State Harrisburg. The teacher leadership path and principal certification may also be pursued in the online M.Ed.

The M.Ed. in Educational Leadership is designed for students who wish to pursue leadership positions in educational organizations.

Admission Requirements
Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

The Educational Leadership program requires all graduate program applicants to submit:

- three letters of recommendation,
- official transcripts from all post-secondary institutions attended (http://www.gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission),
- a brief personal statement of intent, and
- a current resume or curriculum vita.

Applicants must present evidence of at least a 3.0 grade-point average in the last two years of undergraduate work. A grade-point average of 3.50
in prior graduate work is required of those desiring admission to enter a doctoral program. The best-qualified students will be accepted up to the number of spaces available. Special backgrounds and experiences may allow for conditional admission to those not meeting stated criteria, at the discretion of the program.

Applicants are required to submit a writing sample. For master’s degree applicants, this should be a reflection paper. Doctoral degree applicants should submit a writing sample that reviews and critiques an academic article related to education leadership or education policy that affects education leaders.

Official scores from the GRE, the Miller Analogy Test, or the Law School Admissions Test (LSAT) from within the last 5 years are required.

### Degree Requirements

**Master of Education (M.Ed.)**

Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

All candidates for the M.Ed. degree will complete a minimum of 30 credits, with at least 18 credits at the 500 or 800 level, and at least 6 credits at the 500 level. M.Ed. students also must complete a capstone project as described below.

The three designated emphases for the Educational Leadership M.Ed. are Teacher Leadership, School Leadership, and General Leadership.

#### Teacher Leadership (Online)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDLDR 540</td>
<td>Technology Applications in Educational Leadership</td>
<td>3</td>
</tr>
<tr>
<td>EDLDR 559</td>
<td>School Improvement</td>
<td>3</td>
</tr>
<tr>
<td>EDLDR 560</td>
<td>Principles of Instructional Supervision</td>
<td>3</td>
</tr>
<tr>
<td>EDLDR/C-S 551</td>
<td>Curriculum Design: Theory and Practice</td>
<td>3</td>
</tr>
<tr>
<td>CI 501</td>
<td>Teaching as Inquiry</td>
<td>3</td>
</tr>
<tr>
<td>EDLDR 801</td>
<td>Introduction to Teacher Leadership</td>
<td>3</td>
</tr>
<tr>
<td>EDLDR 802</td>
<td>How Schools Work</td>
<td>3</td>
</tr>
<tr>
<td>EDLDR/C-S 563</td>
<td>Designing Staff Development Programs</td>
<td>3</td>
</tr>
<tr>
<td>ADTED 505</td>
<td>The Teaching of Adults</td>
<td>3</td>
</tr>
<tr>
<td>or EDPSY 421</td>
<td>Learning Processes in Relation to Educational Practices</td>
<td>3</td>
</tr>
</tbody>
</table>

**Culminating Experience**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDLDR 894</td>
<td><strong>SPECIAL TOPICS</strong> (Capstone Inquiry Course)</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits: 30

The final course (EDLDR 894) is a project-based course that represents the culmination of academic work toward the M.Ed. degree. Course requirements involve the development of a final capstone project focused on evaluation, analysis, or application of concepts first introduced and developed over the course of the student’s M.Ed. program. The project should be planned in coordination with an EDLDR faculty member who agrees to serve as the student’s adviser for this project and must reflect an appropriate degree of graduate-level scholarship, as determined by the adviser.

#### School Leadership (Online)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDLDR 540</td>
<td>Technology Applications in Educational Leadership</td>
<td>3</td>
</tr>
<tr>
<td>EDLDR 559</td>
<td>School Improvement</td>
<td>3</td>
</tr>
<tr>
<td>EDLDR 560</td>
<td>Principles of Instructional Supervision</td>
<td>3</td>
</tr>
<tr>
<td>EDLDR/C-S 551</td>
<td>Curriculum Design: Theory and Practice</td>
<td>3</td>
</tr>
<tr>
<td>EDLDR 480</td>
<td>Introduction to Educational Leadership</td>
<td>3</td>
</tr>
<tr>
<td>EDLDR 530</td>
<td>Leadership for Inclusive Education</td>
<td>3</td>
</tr>
<tr>
<td>EDLDR 568</td>
<td>The Principalship</td>
<td>3</td>
</tr>
<tr>
<td>EDLDR 576</td>
<td>The Law and Education</td>
<td>3</td>
</tr>
<tr>
<td>EDLDR 579</td>
<td>Financial Management for Schools</td>
<td>3</td>
</tr>
</tbody>
</table>

**Culminating Experience**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>EDLDR 595</td>
<td>Internship</td>
<td>3</td>
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</tbody>
</table>

Total Credits: 30

The final course (EDLDR 595) is a project-based course that represents the culmination of academic work toward the M.Ed. degree. Course requirements involve the development of a final capstone project focused on evaluation, analysis, or application of concepts first introduced and developed over the course of the student’s M.Ed. program. The project should be planned in coordination with an EDLDR faculty member who agrees to serve as the student’s adviser for this project and must reflect an appropriate degree of graduate-level scholarship, as determined by the adviser.

#### General M.Ed. (Residential)

18 credits of Educational Leadership coursework required, with a total of 30 credits, inclusive of EDLDR 596. This emphasis is created and defined through the interaction of student and adviser based on the student’s career path.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Select 18 credits of the following:</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>EDLDR 480</td>
<td>Introduction to Educational Leadership</td>
<td>3</td>
</tr>
<tr>
<td>EDLDR 530</td>
<td>Leadership for Inclusive Education</td>
<td>3</td>
</tr>
<tr>
<td>EDLDR 540</td>
<td>Technology Applications in Educational Leadership</td>
<td>3</td>
</tr>
<tr>
<td>EDLDR 559</td>
<td>School Improvement</td>
<td>3</td>
</tr>
<tr>
<td>EDLDR 560</td>
<td>Principles of Instructional Supervision</td>
<td>3</td>
</tr>
<tr>
<td>EDLDR 576</td>
<td>The Law and Education</td>
<td>3</td>
</tr>
<tr>
<td>EDLDR 579</td>
<td>Financial Management for Schools</td>
<td>3</td>
</tr>
<tr>
<td>EDLDR 568</td>
<td>The Principalship</td>
<td>3</td>
</tr>
</tbody>
</table>

**Electives**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDLDR 596</td>
<td>Individual Studies (Master’s Paper)</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits: 30

The final course (EDLDR 596) is a project-based course that represents the culmination of academic work toward the M.Ed. degree. Course requirements involve the development of a final capstone project focused on evaluation, analysis, or application of concepts first introduced and developed over the course of the student’s M.Ed. program. The project should be planned in coordination with an EDLDR faculty member who agrees to serve as the student’s adviser for this project and must reflect an appropriate degree of graduate-level scholarship, as determined by the adviser.
an appropriate degree of graduate-level scholarship, as determined by the adviser.

**Doctor of Education (D.Ed.)**

Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

Expectations of candidates for both the D.Ed. and Ph.D. are high in the field of research competence and require the ability to identify and conceptualize a research problem for the thesis. The D.Ed. is more appropriate for those with career goals in administration and policy making. The Ph.D. is more appropriate for those with career goals in research and scholarship.

A minimum of 90 credits is required for the D.Ed., of which at least 30 credits must be earned in residence at the University Park campus. A maximum of 30 credits from a completed master's degree earned at an institution that does not grant a doctorate in the student's major program may be accepted towards this minimum, subject to restrictions outlined in GCAC-309 Transfer Credit (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/transfer-credit). A maximum of 60 credits beyond the baccalaureate from an institution that grants the doctorate in the student's major program may be accepted towards this minimum, subject to restrictions outlined in GCAC-309 Transfer Credit (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/transfer-credit).

The 90 required credits, including transfer credits, must be earned in the following:

- **Major Field (48 cr.):** In the Major Field Area, D.Ed. students are required to take a minimum of 48 credits in Educational Leadership courses and courses related to the graduate major field. These courses should be selected in consultation with the student's advisor from a list of areas of concentration and courses that have been approved by the program to fulfill this requirement. If approved, transfer credits may be used to fulfill a portion of this requirement.
- **Minor or General Studies Group (15 cr.):** A graduate minor can be taken in any approved graduate degree program offered at Penn State, or in one of the approved stand-alone minors. A general studies group may include up to 6 credits taken as part of previous master's degree. These courses must be taken outside the EDLDR program. Selection of these courses should be done in close consultation with the student's advisor.
- **Special Education Focused Course (3 cr.):** a minimum of 3 credits concerning special education issues in a course approved by the program to fulfill this requirement.
- **Research (9 cr.):**
  - 3 credits of quantitative research
  - 3 credits of qualitative research
  - 3 credits of research design or advanced research methods
- **Dissertation Research (15 cr.):** EDLDR 600 or EDLDR 610.

Doctoral students must pass a qualifying examination, a comprehensive written and oral examination (the proposal defense), and a final oral examination (the dissertation defense). To earn the D.Ed. degree, doctoral students must also write a dissertation that is accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

**Doctor of Philosophy (Ph.D.)**

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

Expectations of candidates for both the D.Ed. and Ph.D. are high in the field of research competence and require the ability to identify and conceptualize a research problem for the thesis. The D.Ed. is more appropriate for those with career goals in administration and policy making. The Ph.D. is more appropriate for those with career goals in research and scholarship.

A minimum of 36 credits is required for the Ph.D.:

- **EDLDR Course Work (15 cr.):** A minimum of 15 credits chosen in conjunction with the student's academic advisor from a list of areas of concentration and courses that have been approved by the program to fulfill this requirement.
- **Research Course Requirements (12 cr.):**
  - A 3-credit course with statistical focus up to multivariate inference
  - A 3-credit course with focus on qualitative research methods
  - A 3-credit advanced course in either of the above areas (including course work in Mixed Methods)
- **EDLDR 585 Research Design: Implications for Decisions in Higher Education**
- **Supporting Field (9 cr.):** A minimum of 9 credits selected from outside of the EDLDR program. All supporting field courses should be at the 500-level or above; however, appropriate 400-level courses may be approved by the advisor. As noted above, a student may choose to have research as a supporting field and substitute additional research courses to fulfill this requirement.

Ph.D. students may not enroll in more than 6 credits of independent study.

Doctoral students must pass a qualifying examination, a comprehensive written and oral examination (the proposal defense), and a final oral examination (the dissertation defense). To earn the Ph.D. degree, doctoral students must also write a dissertation that is accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

**Dual-Titles**

**Dual-Title M.Ed., D.Ed., and Ph.D. in Comparative and International Education**

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

**Admission Requirements**

Students must apply and be admitted to the graduate program in Educational Leadership and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Comparative and International Education dual-title program. Refer to the Admission Requirements section of the Comparative and International Education Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/comparative-international-education). Doctoral students must be admitted into the dual-title degree program to fulfill this requirement. If approved, transfer credits may be used to fulfill a portion of this requirement.
program in Comparative and International Education prior to taking the qualifying examination in their primary graduate program.

**Degree Requirements**

To qualify for the dual-title degree, students must satisfy the degree requirements for the degree they are enrolled in Educational Leadership. In addition, students must complete the degree requirements for the dual-title in Comparative and International Education, listed on the Comparative and International Education Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/comparative-international-education). Some courses may satisfy both Educational Leadership and Comparative and International Education degree requirements. Final course selection must be approved by the student's dissertation committee.

The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Educational Leadership and must include at least one Graduate Faculty member from the Comparative and International Education program. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. There will be a single qualifying examination, containing elements of both Educational Leadership and Comparative and International Education. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of an Educational Leadership and Comparative and International Education dual-title Ph.D. student must include at least one member of the Comparative and International Education Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in Comparative and International Education, the member of the committee representing Comparative and International Education must be appointed as co-chair. The Comparative and International Education representative on the student's dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their dissertation committee and reflects their original research and education in Educational Leadership and Comparative and International Education. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

**Joint Degrees**

**Joint J.D. / M.Ed., D.Ed., or Ph.D. with Penn State Law**

Requirements listed here are in addition to requirements listed in GCAC-211 Joint Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/joint-degree-programs).

Penn State Law (PSL) and the Educational Leadership (EDLDR) Program offer a joint degree program leading to a Juris Doctor (J.D.); and either a Master of Education (M.Ed.), a Doctor of Education (D.Ed) or a Doctor of Philosophy (Ph.D.) in Educational Leadership.

**Admission Requirements**

Applicants to the joint degree program must apply and be admitted first to Penn State Law, and subsequently to the Educational Leadership graduate program. Admissions requirements and applications for admission for Penn State Law are listed in the J.D. Admissions (https://pennstatelaw.psu.edu/penn-state-law-jd-admissions) section of the Penn State Law website. When applying to the Educational Leadership graduate program, applicants must include two letters of recommendation from Penn State Law faculty members and a career statement. Applicants to the joint degree program may submit LSAT scores instead of GRE scores. Students must be admitted to the program prior to taking the first course they intend to count towards the graduate degree.

**Residency**

Students will normally spend four semesters in residence at the Law School and as many additional semesters in residence as needed to complete the additional requirements for the pertinent EDLDR degree. Ph.D. students must arrange the sequence of semesters to ensure that they are in residence as full-time students in the EDLDR program for at least two consecutive semesters (Fall-Spring or Spring-Fall) excluding summer in a single twelve-month period.

**Degree Requirements**

Students must fulfill all requirements for each degree in order to be awarded that degree, subject to the double-counting of credits as outlined below. Degree requirements for the J.D. program are listed on the Penn State Law website (https://pennstatelaw.psu.edu/jd-degree-requirements).

**PSL:** A maximum of twelve credits for EDLDR course work may be double-counted for credit toward the J.D. degree at PSL. Students must obtain a grade satisfactory to PSL for the course work to be credited toward the J.D. degree. The following EDLDR courses may qualify for credit in PSL:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDLDR 533</td>
<td>The Politics of Local School Districts</td>
<td>3</td>
</tr>
<tr>
<td>EDLDR 565</td>
<td>Personnel Management and Contract Administration</td>
<td>3</td>
</tr>
<tr>
<td>EDLDR 568</td>
<td>The Principalship</td>
<td>3</td>
</tr>
<tr>
<td>EDLDR 569</td>
<td>Decision Making in Educational Organizations</td>
<td>3</td>
</tr>
<tr>
<td>EDLDR 573</td>
<td>Public School Finance</td>
<td>3</td>
</tr>
<tr>
<td>EDLDR 576</td>
<td>The Law and Education</td>
<td>3</td>
</tr>
<tr>
<td>EDLDR 577</td>
<td>Law and Ethics in Education</td>
<td>3</td>
</tr>
</tbody>
</table>

**EDLDR:** The courses that may be double-counted will be determined by the student's degree program. Normally a maximum of twelve credits of PSL course work will be counted for credit for the minimum requirements for a master's degree, subject to approval by the student's advisory committee. Normally, a maximum of 30 credits from a master's degree program will be counted for credit for the minimum requirements for a Ph.D. or D.Ed. degree.

**Sequence**

The sequence of courses will be determined by students and their advisers.
Recommended Program of Study and Advising
All students in the program will have two advisers, one from PSL and one from EDLDR. Periodic interaction between the two advisers is encouraged.

Tuition
Students will be charged the applicable PSL tuition to cover the J.D. program and the applicable graduate tuition to cover the EDLDR degree program. PSL tuition will be paid for the semesters in which the student is registered for PSL courses, and graduate tuition will be paid for the semesters in which the student is registered for graduate courses. A student may take up to one course (3 credit hours) per semester in the program where the student is not primarily registered without any change in tuition, but must pay additional tuition to the program that the student is not primarily registered if he or she wishes to take additional course work pursuant to that program during the semester.

Financial Aid and Assistantships
Decisions on financial aid and assistantships will be made by each school according to that school's procedures.

Fulfillment of Degree Requirements and Graduation
All courses in one program that will count toward meeting the requirements of the other program must be completed before the awarding of either degree. If students accepted into the joint degree program are unable to complete the J.D. degree, they are still eligible to receive the EDLDR degree if all EDLDR degree requirements have been satisfied.

Student Aid
Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School's website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Learning Outcomes

Master of Education (M.Ed.)
1. Demonstrate mastery of the student’s specific program emphasis area, which includes knowledge of primary and secondary literature related to research methodologies, programmatic research priorities, and implications of that research for professional practice. Assessed through coursework and master’s paper.
2. Students will design and carry out a research project that includes articulating an important and original question, analyzing appropriate literature, demonstrating conceptual and methodological creativity, and carrying out an original inquiry. Assessed through dissertation proposal and defense (rubric).
3. Demonstrate critical thinking about selected recent research in the program emphasis area through the description of an emerging scholarly theme/area, identification of specific publications that reflect it, and assessment of its strengths and weaknesses. Assessed through coursework and master’s paper.
4. Demonstrate standards of field in written and oral communication by requiring research presentations in several courses.
5. Demonstrate knowledge and comprehension of research ethics issues including knowledge of ethical principles related to authorship, research reporting, data fabrication, plagiarism, conflicts of interest, peer review, data sharing and other areas of misconduct. Assessed through SARI examinations and participation.

Doctor of Education (D.Ed.)
1. Demonstrate mastery of the student’s specific program emphasis area, which includes knowledge of primary and secondary literature related to research methodologies, programmatic research priorities, and implications of that research for professional practice. Assessed through candidacy and comprehensive exams (rubric).
2. Students will design and carry out a research project that includes articulating an important and original question, analyzing appropriate literature, demonstrating conceptual and methodological creativity, and carrying out an original inquiry. Assessed through dissertation proposal and defense (rubric).
3. Demonstrate critical thinking about selected recent research in the program emphasis area through the description of an emerging scholarly theme/area, identification of specific publications that reflect it, and assessment of its strengths and weaknesses. Assessed through written and oral candidacy assessment (rubric).
4. Demonstrate standards of field in written and oral communication by preparing a qualifying paper for Advancement to Doctoral Candidacy (b) preparing and presenting a written thesis proposal/comprehensive exam for the dissertation, and (c) preparing and presenting the results of dissertation research in clear, concise oral presentations to an audience of peers. Assessed through qualifying paper, thesis proposal and dissertation defense.
5. Demonstrate knowledge and comprehension of research ethics issues including knowledge of ethical principles related to authorship, research reporting, data fabrication, plagiarism, conflicts of interest, peer review, data sharing and other areas of misconduct. Assessed through SARI examinations and participation.
6. Participate in conducting research with faculty, working on the boards of professional journals, teaching an undergraduate or graduate course, or other significant professional engagement as identified by the doctoral adviser. Assessed through faculty written evaluation, standardized assessment instruments, and/or other appropriate and clearly defined means.

Doctor of Philosophy (Ph.D.)
1. Demonstrate mastery of the student's specific program emphasis area, which includes knowledge of primary and secondary literature related to research methodologies, programmatic research priorities, and implications of that research for professional practice. Assessed through candidacy and comprehensive exams (rubric).
2. Students will design and carry out a research project that includes articulating an important and original question, analyzing appropriate literature, demonstrating conceptual and methodological creativity, and carrying out an original inquiry. Assessed through dissertation proposal and defense (rubric).
3. Demonstrate critical thinking about selected recent research in the program emphasis area through the description of an emerging scholarly theme/area, identification of specific publications that reflect it, and assessment of its strengths and weaknesses. Assessed through coursework and master’s paper.
reflect it, and assessment of its strengths and weaknesses. Assessed through written and oral candidacy assessment (rubric).

4. Demonstrate standards of field in written and oral communication by (a) preparing a qualifying paper for Advancement to Doctoral Candidacy (b) preparing and presenting a written thesis proposal for the dissertation, and (c) preparing and presenting the results of dissertation research in clear, concise oral presentations to an audience of peers. Assessed through qualifying paper, thesis proposal and dissertation defense.

5. Demonstrate knowledge and comprehension of research ethics issues including knowledge of ethical principles related to authorship, research reporting, data fabrication, plagiarism, conflicts of interest, peer review, data sharing and other areas of misconduct. Assessed through SARI examinations and participation in EPS 585 and 586.

6. Participate in conducting research with faculty, working on the boards of professional journals, teaching an undergraduate or graduate course, or other significant professional engagement as identified by the doctoral adviser. Assessed through faculty written evaluation, standardized assessment instruments, and/or other appropriate and clearly defined means.

**Contact**

**Graduate Program Head:** Kevin Kinser

**University Park Campus**

**Director of Graduate Studies/Professor-in-Charge:** Edward Fuller

**Primary Program Contact:** Barbara Duncan

**Email:** EDLDR@psu.edu

**Mailing Address:** 200 Rackley Building, University Park, PA 16802

**Telephone:** (814)865-1487

**Program Website:** Educational Leadership at University Park (http://www.ed.psu.edu/educ/eps/edldr)

**World Campus**

**Director of Graduate Studies/Professor-in-Charge:** Edward Fuller

**Primary Program Contact:** Barbara Duncan

**Email:** EDLDR@psu.edu

**Mailing Address:** 200 Rackley Building, University Park, PA 16802

**Telephone:** (814)865-1487

**Program Website:** Educational Leadership at World Campus (http://www.worldcampus.psu.edu/degrees-and-certificates/educational-leadership-masters/overview)

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**Educational Psychology**

**Graduate Program Head:** David Lee

**Program Code:** EDPSY

**Campus(es):** University Park (Ph.D., M.S.)

**Degrees Conferred**

- Doctor of Philosophy (Ph.D.)
- Master of Science (M.S.)
- Dual-Titled Ph.D. and M.S. in Educational Psychology and Comparative and International Education

**The Graduate Faculty**

- View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=EDPSY)

The graduate program in Educational Psychology focuses on the study of learning, instruction, and measurement across the life span. The learning and instruction emphasis applies the study of cognitive psychology to research on learning and instruction in applied settings like schools.

The course of study provides a strong foundation in psychological theory, principles related to instructional applications, and quantitative methodology. The measurement emphasis applies cognitive psychology and theories of measurement to test design, instrument construction, scale analysis, and measurement theory. The Educational Psychology program emphasizes the use of rigorous quantitative methodology in the scientific study of learning, instruction, and measurement in applied settings. Typically this program prepares individuals for professions in universities, research institutions, government agencies, and industry.

Individuals interested in more clinical applications of psychology, such as counseling psychology or school psychology should contact those specific graduate programs in the University.

**Admission Requirements**

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Applicants are required to submit scores from the Graduate Record Examinations (GRE) verbal, quantitative, and analytic writing. Successful applicants typically score above 500 on both Verbal and Quantitative on the GRE, or above 153 on Verbal and above 144 on the Quantitative sections of the revised GRE. Typically applicants have at least a 3.0 junior/senior grade-point average (on a 4.0 point scale) and broad undergraduate background including college level mathematics. Exceptions may be made for students with special backgrounds, abilities, and interests. Applicants with a master’s degree will be required to show strong performance in their graduate program. Applicants will also supply letters of reference and a written statement of their professional goals.

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. See GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.
Degree Requirements

Master of Science (M.S.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

Students in the master’s degree program are required to take 30 credits, including:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDPSY 421</td>
<td>Learning Processes in Relation to Educational Practices</td>
<td>3</td>
</tr>
<tr>
<td>EDPSY 450</td>
<td>Principles of Measurement</td>
<td>3</td>
</tr>
<tr>
<td>EDPSY 475</td>
<td>Introduction to Educational Research</td>
<td>3</td>
</tr>
<tr>
<td>EDPSY 505</td>
<td>Statistical Applications in Educational Research</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits: 12

The 30 credits must be at the 400, 500, 600, or 800 level, and at least 18 of those credits must be at the 500 and 600 level, combined. Students will also take at least one foundational course in educational theory, philosophy, or individual differences. The remaining credits will be taken in a way to develop the student’s area of specialization, in consultation with the student’s adviser. The program offers two pathways, M.S. with a thesis, and an M.S. without a thesis. Students wishing to go on to the Ph.D. are required to complete the M.S. with a thesis.

Doctor of Philosophy (Ph.D.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

Students in the doctoral degree program will select a major emphasis in either learning or measurement. Students in the doctoral program must complete the core required courses as listed in the Master of Science (M.S.) program. All students must also have at least one advanced-level course in learning and in measurement. Students will also have three courses spread across the foundational areas of:

1. educational theory and history,
2. philosophy,
3. and individual differences.

Students must pass a qualifying examination to enter into the doctoral program, assessing their mastery of the content in the core courses. Students must also pass a comprehensive examination assessing their areas of specialization near the end of their doctoral studies. Students are also expected to develop and defend a theoretically based scholarly research proposal that will become their dissertation project. The doctoral program culminates in the production of and defense of the student's dissertation that is expected to be a publishable quality independent research study.

Minor

Requirements listed here are in addition to requirements for minors in Graduate Council policies listed under GCAC-600 Research Degree Requirements (http://gradschool.psu.edu/graduate-education-policies) and GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

At the doctoral level, a minor is also possible in EDPSY. Like all doctoral minors, it requires at least 15 credits of work within the program; the specific requirements for the doctoral minor in Educational Psychology are EDPSY 421, EDPSY 450, and EDPSY 505, plus at least two other courses in EDPSY, in consultation with the minor adviser. The minor adviser should be a member of the Graduate Faculty and should be appointed to the student’s dissertation committee as early as possible.

Dual-Titles

Dual-Title M.S. and Ph.D. in Educational Psychology and Comparative and International Education

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-208/dual-title-graduate-degree-programs).

Admissions Requirements

Students must apply and be admitted to the graduate program in Educational Psychology and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Comparative and International Education dual-title program. Refer to the Admission Requirements section of the Comparative and International Education Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/comparative-international-education). Doctoral students must be admitted into the dual-title degree program in Comparative and International Education prior to taking the qualifying examination in their primary graduate program.

Degree Requirements

To qualify for the dual-title degree, students must satisfy the degree requirements for the degree they are enrolled in Educational Psychology, listed in the Degree Requirements section. In addition, students must complete the degree requirements for the dual-title in Comparative and International Education, listed on the Comparative and International Education Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/comparative-international-education).

The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Educational Psychology and must include at least one Graduate Faculty member from the Comparative and International Education program. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. There will be a single qualifying examination, containing elements of both Educational Psychology and Comparative and International Education. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of an Educational Psychology and Comparative and International Education dual-title Ph.D. student must include at least one member of the Comparative and International Education Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in Comparative and International Education, the member of the committee representing Comparative and International Education must be appointed as co-chair. The Comparative and International Education representative
on the student’s dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their dissertation committee and reflects their original research and education in Educational Psychology and Comparative and International Education. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

**Student Aid**

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

All applicants are considered for Graduate Assistantships that are available in the program. Typically these assistantships provide tuition waiver plus a stipend.

**Courses**

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**Learning Outcomes**

**Master of Science (M.S.) - Thesis**

1. Students demonstrate appropriate breadth and depth of knowledge in the science of learning.
2. Students demonstrate the ability to apply theory and methods in the science of learning to analyze educational contexts.
3. Students demonstrate the ability to evaluate and synthesize theory and methods in the science of learning to execute research.
4. Students demonstrate the ability to think critically and analytically about disciplinary knowledge in oral and written communication.
5. Students have knowledge of and conduct themselves according to ethical and professional standards.

**Master of Science (M.S.) - Non-Thesis**

1. Students demonstrate appropriate breadth and depth of knowledge in the science of learning.
2. Students demonstrate the ability to apply theory and methods in the science of learning to examine educational contexts.
3. Students demonstrate the ability to evaluate and synthesize theory and methods in the science of learning to generate educational applications.
4. Students demonstrate the ability to think critically and analytically about disciplinary knowledge in oral and written communication.
5. Students have knowledge of and conduct themselves according to ethical and professional standards.

**Doctor of Philosophy**

1. Students demonstrate appropriate breadth and depth of knowledge in the science of learning.
2. Students demonstrate the ability to apply theory and methods in the science of learning to generate novel insights into educational contexts.
3. Students demonstrate the ability to evaluate and synthesize theory and methods in the science of learning to generate novel hypotheses and research.
4. Students demonstrate the ability to think critically and analytically about disciplinary knowledge in oral and written communication.
5. Students have knowledge of and conduct themselves according to ethical and professional standards.

**Contact**

Graduate Program Head: David Lee

Director of Graduate Studies/Professor-in-Charge: Pui-Wa Lei

Primary Program Contact: Samantha Walker (slw5581@psu.edu)

Program Email: edpsy@psu.edu

Mailing Address: 125D Cedar Building, University Park, PA 16802

Telephone: (814)865-1881

Program Website: Educational Psychology (http://www.ed.psu.edu/educ/epcse/edpsych)

**Educational Theory and Policy**

<table>
<thead>
<tr>
<th>Grad Program Head</th>
<th>Kevin Kinser</th>
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</thead>
<tbody>
<tr>
<td>Program Code</td>
<td>EDTHP</td>
</tr>
<tr>
<td>Campus(es)</td>
<td>University Park (Ph.D., M.A.)</td>
</tr>
<tr>
<td>Degrees Confected</td>
<td>Doctor of Philosophy (Ph.D.) Master of Arts (M.A.) Dual-Title M.A. and Ph.D. in Educational Theory and Policy and Comparative and International Education Joint J.D. / Ph.D. or M.A. with Penn State Law</td>
</tr>
</tbody>
</table>

**The Graduate Faculty**

View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=EDTHP)

**Admission Requirements**

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Scores from the Graduate Record Examinations (GRE) are required for admission. The best-qualified applicants will be accepted up to the number of spaces that are available for new students. Students with a 2.75 grade-point average will be considered for admission to the master’s program, and with a 3.00 grade-point average at the master’s level for the Ph.D. program. Exceptions to the minimum grade-point average may be
made for students with special backgrounds, abilities, and interests, at the discretion of the program.

Degree Requirements

Master of Arts (M.A.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

Candidates who seek an M.A. in Educational Theory and Policy shall complete programs that will include studies in social theory, policy, and planning or in the social sciences or humanities.

A minimum of 36 credits is required, with at least 18 credits in the 500 and 600 series combined, and a minimum of 6 credits of thesis research (EDTHP 600 or EDTHP 610).

<table>
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<tr>
<th>Code</th>
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<th>Credits</th>
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<tbody>
<tr>
<td>Required Courses</td>
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<tr>
<td>EDTHP 500</td>
<td>Proseminar in Educational Theory and Policy</td>
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<tr>
<td>EDTHP 585</td>
<td>Research Design: Implications for Decisions in</td>
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<tr>
<td></td>
<td>Higher Education</td>
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<tr>
<td>EDPSY 406</td>
<td>Applied Statistical Inference for the Behavioral</td>
<td></td>
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<tr>
<td></td>
<td>Sciences (or another approved statistics course)</td>
<td></td>
</tr>
<tr>
<td>EDTHP 586</td>
<td>Qualitative Methods in Educational Research</td>
<td></td>
</tr>
<tr>
<td>Electives 1</td>
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<td>18</td>
</tr>
</tbody>
</table>

Culminating Experience

EDTHP 600 or EDTHP 610 Thesis Research

Total Credits 36

1 Students will need to explain how the three chosen courses will have prepared them for their dissertation research. This justification will become a part of the qualifying examination materials routed to all EDTHP faculty for approval. The course work must have a unifying theme. It does not have to be taken in the EDTHP program.

Only 3 credits of EDTHP 596 may be counted toward the M.A.

A thesis is required. The thesis must be accepted by the advisers and/or committee members, the head of the graduate program, and the Graduate School.

Doctor of Philosophy (Ph.D.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

Candidates who seek a Ph.D. in Educational Theory and Policy shall complete programs that will include studies in social theory, policy, and planning, or in the social sciences or humanities.

A minimum of 57 credits is required:

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<tr>
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<th>Title</th>
<th>Credits</th>
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<tbody>
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<td>Required Courses</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EDTHP 500</td>
<td>Proseminar in Educational Theory and Policy</td>
<td>3</td>
</tr>
<tr>
<td>EDTHP 585</td>
<td>Research Design: Implications for Decisions in</td>
<td>3</td>
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<td></td>
<td>Higher Education</td>
<td></td>
</tr>
<tr>
<td>EDTHP 586</td>
<td>Qualitative Methods in Educational Research</td>
<td>3</td>
</tr>
<tr>
<td>Electives 1</td>
<td></td>
<td>15</td>
</tr>
</tbody>
</table>

Total Credits 57

Doctoral students must pass a qualifying examination, a comprehensive written and oral examination, and a final oral examination (the dissertation defense). To earn the Ph.D. degree, doctoral students must also write a dissertation that is accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

Dual-Titles

Dual-Title M.A. and Ph.D. in Comparative and International Education

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

Admission Requirements

Students must apply and be admitted to the graduate program in Educational Theory and Policy and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Comparative and International Education dual-title program. Refer to the Admission Requirements section of the Comparative and International Education Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/comparative-international-education). Doctoral students must be admitted into the dual-title degree program in Comparative and International Education prior to taking the qualifying examination in their primary graduate program.

Degree Requirements

To qualify for the dual-title degree, students must satisfy the degree requirements for the degree they are enrolled in Educational Theory and Policy. In addition, students must complete the degree requirements for the dual-title in Comparative and International Education, listed on the Comparative and International Education Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/comparative-international-education). Some courses may satisfy both Educational Theory and Policy and Comparative and International Education degree requirements.
Final course selection must be approved by the student's doctoral committee.

The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Educational Theory and Policy and must include at least one Graduate Faculty member from the Comparative and International Education program. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. There will be a single qualifying examination, containing elements of both Educational Theory and Policy and Comparative and International Education. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of an Educational Theory and Policy and Comparative and International Education dual-title Ph.D. student must include at least one member of the Comparative and International Education Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in Comparative and International Education, the member of the committee representing Comparative and International Education must be appointed as co-chair. The Comparative and International Education representative on the student's dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their dissertation committee and reflects their original research and education in Educational Theory and Policy and Policy and Comparative and International Education. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

Joint Degrees

Joint J.D. / M.A. or Ph.D. with Penn State Law

Requirements listed here are in addition to requirements listed in GCAC-211 Joint Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/joint-degree-programs).

Penn State Law (PSL) and the Educational Theory and Policy (EDTHP) Program offer a joint degree program leading to a Juris Doctor (J.D.), and either a Master of Arts (M.A.) or a Doctor of Philosophy (Ph.D.) in Educational Theory and Policy.

Admission Requirements

Applicants to the joint degree program must apply and be admitted first to Penn State Law, and subsequently to the Educational Theory and Policy graduate program. Admissions requirements and applications for admission to Penn State Law are listed in the J.D. Admissions (https://pennstatelaw.psu.edu/penn-state-law-jd-admissions) section of the Penn State Law website. When applying to the Educational Theory and Policy graduate program, applicants must include two letters of recommendation from Penn State Law faculty members and a career statement. Applicants to the joint degree program may submit LSAT scores instead of GRE scores. Students must be admitted to the program prior to taking the first course they intend to count towards the graduate degree.

Residency

Students will normally spend four semesters in residence at PSL and as many additional semesters in residence as needed to complete the additional requirements for the pertinent EDTHP degree. Ph.D. candidates must arrange the sequence of semesters to ensure that they are in residence as full-time students in the EDTHP program for at least two consecutive semesters (Fall-Spring or Spring-Fall) excluding summer in a single twelve-month period.

Degree Requirements

Students must fulfill all requirements for each degree in order to be awarded that degree, subject to the double-counting of credits as outlined below. Degree requirements for the J.D. program are listed on the Penn State Law website (https://pennstatelaw.psu.edu/jd-degree-requirements). Degree requirements for the M.A. and Ph.D. degrees are listed in the Master's Degree and Doctoral Degree Requirements section.

PSL: A maximum of twelve credits for EDTHP course work may be double-counted for credit toward the J.D. degree at PSL. Students must obtain a grade satisfactory to PSL for the course work to be credited toward the J.D. degree. The following EDTHP courses may qualify for credit in PSL:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDTHP 518</td>
<td>Analysis of U. S. Educational Policy</td>
<td>3</td>
</tr>
<tr>
<td>EDTHP 520</td>
<td>Perspectives on Contemporary School Reform</td>
<td>3</td>
</tr>
<tr>
<td>EDTHP 533</td>
<td>Social History and Education Policy</td>
<td>3</td>
</tr>
<tr>
<td>EDTHP 541</td>
<td>Contemporary Philosophies of Education</td>
<td>3</td>
</tr>
<tr>
<td>EDTHP 587</td>
<td>Education Policy and Politics</td>
<td>3</td>
</tr>
</tbody>
</table>

EDTHP: The courses that may be double-counted will be determined by the student's degree program. Normally a maximum of twelve credits of PSL course work will be double-counted for credit for the minimum requirements for a master's or doctoral degree, subject to approval by the student's advisory committee.

Sequence

The sequence of courses will be determined by the students and their advisers.

Recommended Program of Study and Advising

All students in the program will have two advisers, one from PSL and one from EDTHP. Periodic interaction between the two advisers is encouraged.

Tuition

Students will be charged the applicable PSL tuition to cover the J.D. program and the applicable graduate tuition to cover the EDTHP degree program. PSL tuition will be paid for the semesters in which the student is registered for PSL courses, and graduate tuition will be paid for the semesters in which the student is registered for graduate courses. A student may take up to one course (3 credits) per semester in the program where the student is not primarily registered without any change in tuition, but must pay additional tuition to the program that the student is not primarily registered if he or she wishes to take additional course work pursuant to that program during the semester.
Financial Aid and Assistantships
Decisions on financial aid and assistantships will be made by each school according to that school's procedures.

Fulfillment of Degree Requirements and Graduation
All courses in one program that will count toward meeting the requirements of the other program must be completed before the awarding of either degree. If students accepted into the joint degree program are unable to complete the J.D. degree, they are still eligible to receive the EDTHP degree if all EDTHP degree requirements have been satisfied.

Student Aid
Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding section of The Graduate School's website. Students on graduate assistantships must adhere to the course load limits set by The Graduate School.

Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Learning Outcomes
Master of Arts (M.A.)
1. Demonstrate mastery of the student's specific program emphasis area, which includes knowledge of primary and secondary literature related to research methodologies, programmatic research priorities, and implications of that research for professional practice. Assessed through methods and theory coursework.
2. Students will design and carry out a research project that includes articulating an important and original question, analyzing appropriate literature, demonstrating conceptual and methodological creativity, and carrying out an original inquiry. Assessed through master's paper.
3. Demonstrate critical thinking about selected recent research in the program emphasis area through the description of an emerging scholarly theme/area, identification of specific publications that reflect it, and assessment of its strengths and weaknesses. Assessed through coursework and masters paper.
4. Demonstrate standards of written and oral communication by requiring research presentations in several courses.
5. Demonstrate knowledge and comprehension of research ethics issues including knowledge of ethical principles related to authorship, research reporting, data fabrication, plagiarism, conflicts of interest, peer review, data sharing and other areas of misconduct. Assessed through SARI examinations and participation in EDTHP 500.
6. Participate in conducting research with faculty, working on the boards of professional journals, or other significant professional engagement as identified by the master's adviser. Assessed through faculty written evaluation and/or other appropriate and clearly defined means.

Doctor of Philosophy (Ph.D.)
1. Demonstrate mastery of the student's specific program emphasis area, which includes knowledge of primary and secondary literature related to research methodologies, programmatic research priorities, and implications of that research for professional practice. Assessed through candidacy and comprehensive exams (rubric).
2. Students will design and carry out a research project that includes articulating an important and original question, analyzing appropriate literature, demonstrating conceptual and methodological creativity, and carrying out an original inquiry. Assessed through dissertation proposal and defense (rubric).
3. Demonstrate critical thinking about selected recent research in the program emphasis area through the description of an emerging scholarly theme/area, identification of specific publications that reflect it, and assessment of its strengths and weaknesses. Assessed through written and oral candidacy assessment (rubric).
4. Demonstrate standards of field in written and oral communication by (a) preparing a research grant proposal for an award competition or an internal or external funding opportunity, and (b) presenting the results of dissertation research in clear, concise oral presentations to an audience of peers. Assessed through research/award proposal and dissertation defense.
5. Demonstrate knowledge and comprehension of research ethics issues including knowledge of ethical principles related to authorship, research reporting, data fabrication, plagiarism, conflicts of interest, peer review, data sharing and other areas of misconduct. Assessed through SARI examinations and participation in EDTHP 500.
6. Participate in conducting research with faculty, working on the boards of professional journals, or other significant professional engagement as identified by the doctoral adviser. Assessed through faculty written evaluation, standardized assessment instruments, and/or other appropriate and clearly defined means.

Contact
Graduate Program Head: Kevin Kinser
Director of Graduate Studies/Professor-in-Charge: Katerina Bodovski
Primary Program Contact: Linda Grant-Oishi (lpg105@psu.edu)
Program Email: EDTHP@psu.edu
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Telephone: (814)865-1488
Program Website: Educational Theory and Policy (http://www.ed.psu.edu/educ/eps/edthp)
Electrical Engineering (Capital)

Graduate Program Head
Rafic Bachnak

Program Code
EE (M.Eng.); EENG (M.S.)

Campus(es)
Harrisburg (M.Eng., M.S.)
World Campus (M.Eng.)

Degrees Conferred
Master of Science (M.S.)
Master of Engineering (M.Eng.)
Integrated B.S. in Electrical Engineering and M.S. in Electrical Engineering

The Graduate Faculty
View (https://secure.gradsch.psu.edu/gpms/index.cfm?
searchType=fac&prog=EENG)

Admission Requirements
Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Master of engineering (M.Eng.)
A prospective graduate student in Electrical Engineering at Penn State Harrisburg must fulfill the admission requirements as set forth by Graduate Council, and have a bachelor of science degree in an electrical engineering program accredited by the Accreditation Board of Engineering and Technology (ABET), or the equivalent. An undergraduate cumulative grade-point average of 3.0 or better on a 4.0 scale is required for admission. Exceptions to this will be based on professional experience and other factors such as GRE scores.

In addition, a student who does not meet the overall 3.0 grade-point average may be considered for admission if the student has a 3.0 junior/senior grade-point average. Up to 15 credits earned in three semesters or fewer, as a nondegree student, may be applied toward the master’s degree, subject to restrictions outlined in GCAC-309 Transfer Credit (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-309/transfer-credit).

Those applying for admission as a Master of Engineering student without an electrical engineering degree may be admitted with the stipulation that deficiencies in background, if any, will be remedied early in the program and that these courses will be in addition to the required number of credits for the degree.

Applicants must submit the following:
- online Graduate School application (http://gradschool.psu.edu/prospective-students/how-to-apply) and payment of the application fee
- official transcripts from all post-secondary institutions attended (http://www.gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission)
- test scores from the Graduate Record Examinations (GRE) (preferable, but not required)
- three (3) letters of professional recommendations from individuals who can evaluate the applicant's potential
- a personal statement of technical interest, goals, and experience

Test scores from the Graduate Record Examination (GRE) are required ONLY for those applicants indicating interest in an assistantship. Assistantships are only available to students in residence.

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. See GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

Master of Science (M.S.)
Admission into the Master of Science (M.S.) Electrical Engineering program will be granted only to candidates who demonstrate high potential for success in graduate studies.

Applicants should have undergraduate degrees in engineering or technology-related fields from an accredited university and must meet the admission requirements as set by Penn State’s Graduate Council.

An undergraduate cumulative grade-point average of 3.0 or better on a 4.0 scale, and scores from the GRE are required for admission.

Applicants must submit the following:
- a completed Graduate School online application (http://gradschool.psu.edu/prospective-students/how-to-apply) with the application fee
- official transcripts from all post-secondary institutions attended (http://www.gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission)
- three (3) letters of professional recommendations from individuals who can evaluate the applicant's potential
- a personal statement of technical interest, goals, and experience
- test scores from the Graduate Record Examination (GRE)
- statement of interest in graduate assistantship, if desired

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. See GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

Completed International Application material must be submitted by the following deadlines:
- May 31 for the fall semester
- September 30 for the spring semester
- February 28 for the summer session

Applications received after these deadlines will be processed for the following semester.

Degree Requirements
Master of Engineering (M.Eng.)
Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

A total of 30 credits is required for a Master of Engineering degree, of which at least 21 must be taken through Penn State Harrisburg engineering graduate programs. Up to 9 credits of graduate work may be transferred from other institutions provided (a) credits are suitable
for the particular engineering discipline, and (b) students have earned a grade of B or better, subject to restrictions outlined in GCAC-309 Transfer Credit (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-309/transfer-credit). At least 18 credits must be at the 500 level, which includes 3 credits of EE 594.

Students enrolled in the program for the Master of Engineering degree in Electrical Engineering must earn 9 credits in the required core courses (i.e., courses with the EE prefix).

Students must write a scholarly paper and present it before two faculty members. The paper, completed in EE 594, is intended to be a relatively short document that includes a relevant literature review on a selected research topic identified by the adviser and to be prepared in a prescribed format (e.g. as papers in IEEE Transactions).

Students must have a 3.00 grade-point average in both prescribed and supporting courses approved by the program to graduate. Students pursue the program on a part-time basis. A student may complete the program within two years, based on completion of two courses a semester.

**Master of Science (M.S.)**

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

All graduate students in Electrical Engineering are required to adhere to the requirements of the Graduate Council. The requirements of the Graduate Council, however, are minimum requirements and the policies, procedures, and regulations listed below are additional and more specific for graduate students pursuing the M.S. in Electrical Engineering degree at Penn State Harrisburg. Advisers will call pertinent regulations to the attention of their advisees, but it should be understood that it is the student's personal responsibility to see that all requirements are satisfied.

The MSEEE program at Penn State Harrisburg is structured into two areas of concentration to fully take advantage of the specialty areas represented in the EENG Graduate Faculty. The areas are Electronics- Electromagnetics-Optics (EMO) and Systems.

The program requires 31 credits, including:

- 24 course credits with at least 15 credits at the 500 level,
- one colloquium credit,
- and 6 thesis credits (600-level).

All students are required to take a 500-level analysis course (EMCH 524A) in addition to prescribed courses in one of the two concentration areas. The prescribed courses are intended to establish the fundamentals of the technical areas. To incorporate some breadth into the program, students are required to take at least one course in the second concentration area. A maximum of three 400-level courses (9 credits) may be taken for the MSEE degree.

Original research, usually requiring at least two semesters of work (nominal 6 credits), is expected for a thesis. Students must write and submit a thesis. The thesis work should be an in-depth investigation intended to extend the state of knowledge in some specialty area. The thesis committee consists of three Graduate Faculty members, including the thesis adviser. For thesis guidelines and timelines, students are referred to the Penn State Graduate School web site (http://gradschool.psu.edu/current-students/etd).

The EENG program has established a six-year time limit for completion of the M.S. degree. Any extension beyond six years requires the approval of the EENG program Graduate Faculty.

The student must maintain a minimum grade point average (GPA) of 3.00 or better on a 4.00 scale in 500- and 400-level courses listed on his/her Plan of Study.

Penn State Harrisburg’s MSEE program is distinct and independent of the MSEE program offered at the University Park campus.

**Integrated Undergrad-Grad Programs**

**Integrated B.S. in Electrical Engineering and M.S. in Electrical Engineering**

Requirements listed here are in addition to requirements listed in GCAC-210 Integrated Undergraduate-Graduate (IUG) Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/integrated-undergraduate-graduate-degree-programs).

The Electrical Engineering program offers a limited number of academically superior Bachelor of Science candidates the opportunity to enroll in an integrated, continuous program of study leading to both the Bachelor of Science and the Master of Science in Electrical Engineering. The ability to coordinate as well as concurrently pursue the two degree programs enables students to earn the two degrees in five years.

Students in the IUG program must satisfy the degree requirements for both Bachelor of Science and Master of Science degrees. However, the total course load is reduced due to the maximum of 12 credits that can count towards both degrees. A minimum of 7 credits proposed to count for both degrees must be at the 500 level. Thesis credits may not be double counted. The fourth year of the IUG program differs from the fourth year of the Bachelor of Science program due to the courses that count toward the Master of Science Degree requirements.

Student performance will be monitored on an on-going basis. In addition, a formal evaluation of student’s academic performance will be conducted at the end of the first semester of the senior year for a typical student in the program. Students who have not maintained a 3.4 GPA in their Math and Electrical Engineering courses will be put on probationary status with respect to the IUG program. Their ability to continue in the IUG program will be based on academic performance in the last semester of their senior year. As part of the review in the senior year, students will be advised about the thesis requirement in the graduate program.

If for any reason a student admitted to the IUG program is unable to complete the requirements for the Master of Science degree, the student will be permitted to receive the Bachelor of Science degree assuming all the undergraduate degree requirements have been satisfactorily completed. If students successfully complete courses listed in the recommended schedule, they will satisfy the requirements for the Bachelor of Science degree by the end of their fourth year.

**Admission Requirements**

Students must apply to the program via the Graduate School application for admission (http://www.gradschool.psu.edu/prospective-students/how-to-apply), and must meet all the admission requirements of the Graduate School and the Electrical Engineering graduate program for the Master of Science degree, listed in the Admission Requirements section.
Students must submit:

- an official transcript
- three letters of professional recommendation from individuals who can evaluate the applicant’s potential
- a personal statement of technical interest and goals

A faculty adviser will help undergraduate candidates determine a sequence of courses that will prepare them for acceptance into the Integrated Undergraduate-Graduate (IUG) degree program. In order to apply for the IUG program, students must have completed a minimum of 81 credits; therefore a typical student would apply after completing the fifth semester and before the end of the sixth semester. Students will be admitted no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree, as specified in the proposed IUG plan of study. For consideration for acceptance into the program, students must have cumulative grade point average (GPA) of 3.4 or better and collective GPA of 3.4 or better in the following courses:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMPEN 271</td>
<td>Introduction to Digital Systems</td>
<td>3</td>
</tr>
<tr>
<td>CMPEN 275</td>
<td>Digital Design Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>EE 315</td>
<td>Electrical Signals and Circuits with Lab (or equivalent)</td>
<td>5</td>
</tr>
<tr>
<td>EE 341</td>
<td>Semiconductor Device Principles</td>
<td>3</td>
</tr>
<tr>
<td>CMPEH 472</td>
<td>Microprocessors</td>
<td>4</td>
</tr>
</tbody>
</table>

And all the designated MATH, PHYS, and CMPSC courses

Applications will be evaluated based on students’ overall academic performance, in addition to the above requirements. In all cases, admission to the program will be at the discretion of the Graduate Admissions Committee of the Electrical Engineering program.

**Degree Requirements**

Students must fulfill all degree requirements for each degree in order to be awarded that degree, subject to the double-counting of credits as outlined below. Degree requirements for the Bachelor of Science in Electrical Engineering are listed in the Undergraduate Bulletin. Degree requirements for the Master of Science in Electrical Engineering degree are listed in the Degree Requirements section. Students must sequence their courses so all undergraduate degree requirements are fulfilled before taking courses to count solely towards the graduate degree.

Up to 12 credits may be double-counted towards the degree requirements for both the graduate and undergraduate degrees; a minimum of 50% of the double-counted courses must be at the 500 or 800 level. Credits associated with the culminating experience for the graduate degree cannot be double-counted.

The EENG program has established a six-year time limit for completion of the M.S. degree. Any extension beyond six years requires the approval of the EENG program’s Graduate Faculty.

Students must maintain a minimum grade point average (GPA) of 3.00 or better on a 4.00 scale in 500- and 400-level courses listed on their Plan of Study.

**Student Aid**

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

World Campus students in graduate degree programs may be eligible for financial aid. Refer to the Tuition and Financial Aid section (http://www.worldcampus.psu.edu/tuition-and-financial-aid) of the World Campus website for more information.

**Courses**

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**Learning Outcomes**

1. **KNOW.** Graduates will be able to demonstrate broad mastery of core principles in electrical engineering as well as in-depth mastery in selected electrical engineering topics.
2. **CRITICAL THINKING.** Graduates will be able to critically and creatively conceptualize, evaluate and formulate electrical engineering problems, as well as perform the analyses required for problem definition.
3. **PROBLEM SOLVING.** Graduates will be able to apply advanced knowledge, techniques, skills and state of the practice tools to solve electrical engineering problems.
4. **COMMUNICATE.** Graduates will be able to effectively communicate, both orally and in writing, project outcomes, such as ideas, requirements, designs, analyses, findings, and justification for decisions.
5. **ETHICS AND PROFESSIONALISM.** Graduates will be able to demonstrate an understanding of professional and ethical responsibility and conduct themselves accordingly.

**Contact**

Graduate Program Head: Rafic Bachnak

Harrisburg Campus
Director of Graduate Studies/Professor-in-Charge: Mohammad-Reza Tofghi

Primary Program Contact: Deborah Miller

Email: dmm79@psu.edu

Mailing Address: W 256 Olmsted, 777 West Harrisburg Pike, Middletown, PA 17057

Telephone: (717) 948-6093

Program Website: Electrical Engineering at Harrisburg (http://harrisburg.psu.edu/programs/master-electrical-engineering-msee)

World Campus
Director of Graduate Studies/Professor-in-Charge: Robert Gray

Primary Program Contact: Donna Griffith
Email: dlh47@psu.edu
Mailing Address: W 215 Olmsted, 777 West Harrisburg Pike, Middletown, PA 17057
Telephone: (717) 948-4344

Electrical Engineering at World Campus (http://www.worldcampus.psu.edu/degrees-and-certificates/penn-state-online-electrical-engineering-masters-degree/overview)

Electrical Engineering (Engineering)

Graduate Program Head: Kultegin Aydin
Program Code: EE
Campus(es): University Park (Ph.D., M.S.)
Degrees Conferred:
- Doctor of Philosophy (Ph.D.)
- Master of Science (M.S.)
- Dual-Title Ph.D. and M.S. in Electrical Engineering and Operations Research

The Graduate Faculty View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=EE)

The general areas of graduate research in Electrical Engineering are electromagnetics and optics; electronics and photonics; communications, computers, networking, and signal processing; and control and power systems. Specializations available within these areas include:

- microwaves, antennas, and propagation;
- electro-optics and nonlinear optics;
- remote sensing and space systems;
- materials and devices;
- circuits and networks;
- VLSI;
- communications;
- networking;
- signal and image processing;
- computer vision and pattern recognition;
- control systems; and
- power systems.

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Applicants are required to submit:

- scores from the GRE General Test,
- three letters of reference,
- a personal statement of relevant experience and goals,
- a resume,
- official transcripts from all post-secondary institutions attended (http://www.gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission),
- and a supplemental application.

Degree Requirements

Master of Science (M.S.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

1. Thesis option--a total of 32 credits (at least 18 at the 500-and 600-level combined) including:
   a. 24 credits in course work, with at least 12 credits in courses with the EE designation;
   b. 2 colloquium credits (EE 500);
   c. 6 thesis credits (EE 600 or EE 610);
   d. and a thesis accepted by the advisers and/or committee members, the head of the graduate program, and the Graduate School;

2. Paper option--a total of 32 credits (at least 18 at the 500-level) including:
   a. 27 credits in course work, with at least 14 credits in courses with the EE designation;
   b. 2 colloquium credits (EE 500);
   c. 3 paper credits (EE 594);
   d. and a satisfactory scholarly paper.

Doctor of Philosophy (Ph.D.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

The communication requirement is met by adequacy in both spoken and written English. This is accomplished through testing and remedial course requirements. All doctoral students must pass a qualifying examination, a comprehensive examination, and a final oral examination. To earn the Ph.D. degree, doctoral students must also write a dissertation that is accepted by the dissertation committee, the head of the graduate program, and the Graduate School. The qualifying examination consists of both written and oral parts; the oral comprehensive examination is preceded by the writing of a dissertation proposal. The program requires a minimum of 39 course credits and 2 colloquium credits (EE 500) beyond the B.S. degree.

Dual-Titles

Dual-title Ph.D. and M.S. in Electrical Engineering and Operations Research

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

Admission Requirements

Students must apply and be admitted to the graduate program in Electrical Engineering and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Operations Research dual-title program.
Refer to the Admission Requirements section of the Operations Research Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/operations-research). Doctoral students must be admitted into the dual-title degree program in Operations Research prior to taking the qualifying examination in their primary graduate program.

**Degree Requirements**

To qualify for the dual-title degree, students must satisfy the degree requirements for the degree they are enrolled in Electrical Engineering, listed in the Degree Requirements section. In addition, students must complete the degree requirements for the dual-title in Operations Research, listed on the Operations Research Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/operations-research).

The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Electrical Engineering and must include at least one Graduate Faculty member from the Operations Research program. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. There will be a single qualifying examination, containing elements of both Electrical Engineering and Operations Research. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of an Electrical Engineering and Operations Research dual-title Ph.D. student must include at least one member of the Operations Research Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in Operations Research, the member of the committee representing Operations Research must be appointed as co-chair. The Operations Research representative on the student's dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their dissertation committee and reflects their original research and education in Electrical Engineering and Operations Research. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

**Student Aid**

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School's website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

In addition, the following awards typically have been available to graduate students in this program:

- Paul F. Anderson Graduate Fellowship
- Melvin P. Bloom Memorial Graduate Fellowship
- Luther B. and Patricia A. Brown Graduate Fellowship
- Joseph R. and Janice M. Monkowski Graduate Fellowship
- James R. and Barbara R. Palmer Fellowship
- Pontano Family Scholarship in Electrical Engineering
- Society of Penn State Electrical Engineers (SPSEE) Graduate Fellowship
- Fred C. and M. Joan Thompson Graduate Fellowship
- Bess L. and Mylan R Watkins Graduate Fellowship

**Courses**

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**Contact**

Graduate Program Head: Kultegin Aydin

Director of Graduate Studies/Professor-in-Charge: Victor Pasko

Primary Program Contact: Sherry Jackson (sdj2@psu.edu)

Program Email: grad_info_ee@engr.psu.edu

Mailing Address: 121 EE East, University Park, PA 16802

Telephone: (814)863-7294

Program Website: Electrical Engineering at University Park (http://www.eecs.psu.edu/students/graduate/Graduate-Degree-Programs-EE.aspx)
Application for admission to the program via the Graduate School is necessary. Applicants apply for admission to the program via the Graduate School. Admission Requirements endeavors. The program is designed to resolve the sometimes competing goals of flexible education of requisite breadth while still providing in-depth study; students are required to follow a focused curriculum that provides flexible education of students in energy and mineral sciences and engineering, with focus on both non-renewable and renewable resource and energy industries. The program is designed to resolve the sometimes competing goals of flexible education of requisite breadth while still providing in-depth study; students are required to follow a focused curriculum that combines the requisite rigor with flexibility in a rapidly changing field of endeavor.

Admission Requirements

Applicants apply for admission to the program via the Graduate School for more information. The Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Scores for the Graduate Record Examinations (GRE) are required for admission, though this may be waived at the discretion of the Energy and Mineral Engineering graduate program. The best-qualified applicants will be accepted by the Energy and Mineral Engineering graduate program up to the number of spaces available for new students. At the discretion of the Energy and Mineral Engineering graduate program, a student may be granted provisional admission (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/provisional-admission).

Admission to the Energy and Mineral Engineering graduate program in the John and Willie Leone Family Department of Energy and Mineral Engineering is competitive. Entering students must hold a bachelor’s degree in a science or engineering discipline unless they are applying to an Integrated Undergraduate-Graduate (IUG) program. Students with 3.00 or better (out of 4.00) junior/senior cumulative grade-point averages and appropriate course backgrounds will be considered for admission. Exceptions to the minimum 3.00 grade-point average may be made for students with special backgrounds, abilities, and interests.

Letters of recommendation and an applicant’s statement of purpose are also required.

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. See GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

The M.S. degree program in Energy and Mineral Engineering is designed for students to gain advanced knowledge for research, analysis, and design in Energy and Mineral Engineering. Students pursuing an M.S. degree will be required to complete 24 course credits and submit a thesis (6 credits) to the Graduate School. At least 18 of the total course credits must be at the 500 and 600 level, combined. Prescribed courses are:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EME 501</td>
<td>Design Under Uncertainty in Energy and Mineral Systems</td>
<td>3</td>
</tr>
<tr>
<td>EME 580</td>
<td>Interdisciplinary Team Project in EME Systems</td>
<td>3</td>
</tr>
<tr>
<td>EME 590</td>
<td>Colloquium</td>
<td>1</td>
</tr>
<tr>
<td>EME 600</td>
<td>Thesis Research</td>
<td>6</td>
</tr>
</tbody>
</table>

An additional 17 credits of electives are required (for students choosing to complete an option, 12 of these elective credits are prescribed)

Total Credits 30

Graduate committees in the Energy and Mineral Engineering graduate program play an important role in formulating individual course and research schedules.

All graduate students are expected to attend general Department seminars. Graduate students may be asked to contribute to...
the instructional programs of the Department by assisting with undergraduate laboratory and lecture courses.

**Doctor of Philosophy (Ph.D.)**

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

The Ph.D. program in Energy and Mineral Engineering emphasizes scholarly research and help students prepare for research and related careers in industry, government and academe. Acceptance into the Ph.D. degree program in Energy and Mineral Engineering is based on the student’s performance on the Ph.D. qualifying examination administered by the faculty of the EME graduate program. A comprehensive examination is required of all Ph.D. candidates and should be taken after substantial completion of course work. The comprehensive examination is the responsibility of the candidate’s dissertation committee and administered according to the rules specified by the Graduate Council.

The Ph.D. program in Energy and Mineral Engineering is quite flexible, with minimum formal requirements. A minimum of 12 post-M.S. course credits and 12 research credits are required. At least 18 course credits for the graduate program must be at the 500 level or above. For students entering the program with an M.S. degree, 500-level or above courses already taken either at Penn State or other institutions may be accepted in partial fulfillment of the 18 credits of 500-level or above course requirements if they are found to be appropriate.

Students meet the general communication requirement for all Ph.D. candidates through the qualifying examination where a student is required to submit a written research paper or proposal of less than 15 double-spaced pages and make a formal public presentation and defense of the research proposal. The student is assessed by the exam committee on both technical and communication proficiency. Although encouraged, competency in a foreign language is not required for the Ph.D. degree. However, each Ph.D. student is expected to demonstrate competency in communication and language by successfully completing EME 581 which teaches students methods for the conduct, analysis, and effective communication of scientific research and spatial characterization.

All graduate students are expected to attend general Department seminars. Graduate students may be asked to contribute to the instructional programs of the Department by assisting with undergraduate laboratory and lecture courses.

**Options**

Students are not required to choose an option. However, a student who desires disciplinary identity may choose from among the five available options for both the M.S. and Ph.D.:

1. energy management and policy
2. environmental health and safety engineering
3. fuel science
4. mining and mineral process engineering
5. petroleum and natural gas engineering

**Dual-Titles**

**Dual-title M.S. and Ph.D. in Human Dimensions of Natural Resources and the Environment**

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

**Admission Requirement**

Students must apply and be admitted to the graduate program in Energy and Mineral Engineering and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Human Dimensions of Natural Resources and the Environment dual-title program. Refer to the Admission Requirements section of the Human Dimensions of Natural Resources and the Environment Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/human-dimensions-natural-resources-environment). Doctoral students must be admitted into the dual-title degree program in Human Dimensions of Natural Resources and the Environment prior to taking the qualifying examination in their primary graduate program.

**Degree Requirements**

To qualify for the dual-title degree, students must satisfy the degree requirements for the degree they are enrolled in Energy and Mineral Engineering, listed in the Degree Requirements section. In addition, students must complete the degree requirements for the dual-title in Human Dimensions of Natural Resources and the Environment, listed on the Human Dimensions of Natural Resources and the Environment Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/human-dimensions-natural-resources-environment).

The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Energy and Mineral Engineering and must include at least one Graduate Faculty member from the Human Dimensions of Natural Resources and the Environment program. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. There will be a single qualifying examination, containing elements of both Energy and Mineral Engineering and Human Dimensions of Natural Resources and the Environment. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of an Energy and Mineral Engineering and Human Dimensions of Natural Resources and the Environment dual-title Ph.D. student must include at least one member of the Human Dimensions of Natural Resources and the Environment Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in Human Dimensions of Natural Resources and the Environment, the member of the committee representing Human Dimensions of Natural Resources and the Environment must be appointed as co-chair. The Human Dimensions of Natural Resources and the Environment representative on the student’s
dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their dissertation committee and reflects their original research and education in Energy and Mineral Engineering and Human Dimensions of Natural Resources and the Environment. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

**Dual-title M.S. and Ph.D. in Energy and Mineral Engineering and Operations Research**

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

**Admission Requirements**

Students must apply and be admitted to the graduate program in Energy and Mineral Engineering and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Operations Research dual-title program. Refer to the Admission Requirements section of the Operations Research Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/operations-research). Doctoral students must be admitted into the dual-title degree program in Operations Research prior to taking the qualifying examination in their primary graduate program.

**Degree Requirements**

To qualify for the dual-title degree, students must satisfy the degree requirements for the degree they are enrolled in Energy and Mineral Engineering, listed in the Degree Requirements section. In addition, students must complete the degree requirements for the dual-title in Operations Research, listed on the Operations Research Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/operations-research).

The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Energy and Mineral Engineering and must include at least one Graduate Faculty member from the Operations Research program. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. There will be a single qualifying examination, containing elements of both Energy and Mineral Engineering and Operations Research. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study, and therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of an Energy and Mineral Engineering and Operations Research dual-title Ph.D. student must include at least one member of the Operations Research Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in Operations Research, the member of the committee representing Operations Research must be appointed as co-chair. The Operations Research representative on the student’s dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their dissertation committee and reflects their original research and education in Energy and Mineral Engineering and Operations Research. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

**Integrated Undergrad-Grad Programs**

The John and Willie Leone Family Department of Energy and Mineral Engineering offers integrated B.S./M.S. programs that are designed to allow academically superior and research-focused undergraduate students in any of our five B.S. degree programs—Energy Business and Finance (EBF); Energy Engineering (ENENG); Environmental Systems Engineering (ENVSE); Mining Engineering (MNGE); and Petroleum and Natural Gas Engineering (PNGE)—also to obtain an M.S. degree in Energy and Mineral Engineering (EME) within five years of study. Students interested in the five-year Integrated Undergraduate-Graduate (IUG) program must apply for admission to The Graduate School and be admitted into the EME IUG program by the end of their junior year.

In the first three years IUG students will follow the course scheduling of the undergraduate major in the department (see the Undergraduate Bulletin (http://bulletins.psu.edu/undergraduate)). Students interested in the IUG program will, however, be encouraged to take upper-level classes, whenever appropriate. An admitted student will begin the senior year working towards the B.S./M.S. with an M.S. Advising Committee. The student will follow the course scheduling of the B.S. major while also taking 500-level courses, whenever appropriate, to satisfy the M.S. requirements. The student will also start work on a thesis designed to meet the requirements of the M.S. thesis. In the fifth year the student will continue to work towards satisfying all degree requirements for the B.S. and M.S. degrees including the M.S. thesis.

**Integrated B.S. in Energy Business and Finance and M.S. in Energy and Mineral Engineering**

Requirements listed here are in addition to requirements listed in GCAC-210 Integrated Undergraduate-Graduate (IUG) Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/integrated-undergraduate-graduate-degree-programs).

The integrated undergraduate-graduate (IUG) program between the Energy Business and Finance undergraduate program and the Energy and Mineral Engineering graduate program enables academically superior and research-focused EBF undergraduate students to also obtain an M.S. degree in Energy and Mineral Engineering in five years of study.

**Admission Requirements**

Undergraduate students from the John and Willie Leone Family Department of Energy and Mineral Engineering with sixth semester standing and minimum grade-point average of 3.5 who wish to complete the Integrated B.S./M.S. program may apply to the Graduate School and the EME IUG program before the end of their junior year. Three faculty letters of recommendation are required. A statement of purpose and a plan of study covering the five year period, prepared in consultation with an adviser, and approved by the program officers of the B.S. major and the EME graduate program must accompany the application. The
plan should be presented in person to the undergraduate and graduate program officers prior to being admitted into the program. Graduate Record Examination (GRE) scores may be submitted by IUG applicants but are not required. The application will be reviewed by the Admissions Committee of the EME Graduate program and acted upon by the EME Graduate Program Officer.

Degree Requirements
The degree requirements will be in accordance with the approved requirements of the Energy Business and Finance undergraduate degree program and the Energy and Mineral Engineering graduate program. However, 12 of the 500-level credits required for the master’s degree may be applied to both undergraduate and graduate degree programs. The undergraduate degree program officer will determine the specific undergraduate required courses for which the 500-level courses may be used to substitute to meet institutional and accreditation requirements.

Once admitted into the IUG program, students are bound by the same guidelines, credit requirements, and program procedures as all other students in the Energy and Mineral Engineering graduate program.

As many as 12 of the credits required for the master’s degree may be applied to both the B.S. and the M.S. degrees. A minimum of 6 credits counted for both the B.S. and M.S. degrees must be at the 500 level. To meet the number of 500 or above credit requirements, students will be advised to take the graduate courses and use them to substitute for the undergraduate courses.

Integrated B.S. in Energy Engineering and M.S. in Energy and Mineral Engineering
Requirements listed here are in addition to requirements listed in GCAC-210 Integrated Undergraduate-Graduate (IUG) Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/integrated-undergraduate-graduate-degree-programs).

The integrated undergraduate-graduate (IUG) program between the Energy Engineering undergraduate program and the Energy and Mineral Engineering graduate program enables academically superior and research-focused ENENG undergraduate students to also obtain an M.S. degree in Energy and Mineral Engineering in five years of study.

Admission Requirements
Undergraduate students from the John and Willie Leone Family Department of Energy and Mineral Engineering with sixth semester standing and minimum grade-point average of 3.5 who wish to complete the Integrated B.S./M.S. program may apply to the Graduate School and the EME IUG program before the end of their junior year. Three faculty letters of recommendation are required. A statement of purpose and a plan of study covering the five year period, prepared in consultation with an adviser, and approved by the program officers of the B.S. major and the EME graduate program must accompany the application. The plan should be presented in person to the undergraduate and graduate program officers prior to being admitted into the program. Graduate Record Examination (GRE) scores may be submitted by IUG applicants but are not required. The application will be reviewed by the Admissions Committee of the EME Graduate program and acted upon by the EME Graduate Program Officer.

Degree Requirements
The degree requirements will be in accordance with the approved requirements of the Energy Engineering undergraduate degree program and the Energy and Mineral Engineering graduate program. However, 12 of the 500-level credits required for the master’s degree may be applied to both undergraduate and graduate degree programs. The undergraduate degree program officer will determine the specific undergraduate required courses for which the 500-level courses may be used to substitute to meet institutional and accreditation requirements.

Once admitted into the IUG program, students are bound by the same guidelines, credit requirements, and program procedures as all other students in the Energy and Mineral Engineering graduate program.

As many as 12 of the credits required for the master’s degree may be applied to both the B.S. and the M.S. degrees. A minimum of 6 credits counted for both the B.S. and M.S. degrees must be at the 500 level. To meet the number of 500 or above credit requirements, students will be advised to take the graduate courses and use them to substitute for the undergraduate courses.

Integrated B.S. in Environmental Systems Engineering and M.S. in Energy and Mineral Engineering
Requirements listed here are in addition to requirements listed in GCAC-210 Integrated Undergraduate-Graduate (IUG) Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/integrated-undergraduate-graduate-degree-programs).

The integrated undergraduate-graduate (IUG) program between the Environmental Systems Engineering undergraduate program and the Energy and Mineral Engineering graduate program enables academically superior and research-focused ENVSE undergraduate students to also obtain an M.S. degree in Energy and Mineral Engineering in five years of study.

Admission Requirements
Undergraduate students from the John and Willie Leone Family Department of Energy and Mineral Engineering with sixth semester standing and minimum grade-point average of 3.5 who wish to complete the Integrated B.S./M.S. program may apply to the Graduate School and the EME IUG program before the end of their junior year. Three faculty letters of recommendation are required. A statement of purpose and a plan of study covering the five year period, prepared in consultation with an adviser, and approved by the program officers of the B.S. major and the EME graduate program must accompany the application. The plan should be presented in person to the undergraduate and graduate program officers prior to being admitted into the program. Graduate Record Examination (GRE) scores may be submitted by IUG applicants but are not required. The application will be reviewed by the Admissions Committee of the EME Graduate program and acted upon by the EME Graduate Program Officer.

Degree Requirements
The degree requirements will be in accordance with the approved requirements of the Environmental Systems Engineering undergraduate degree program and the Energy and Mineral Engineering graduate program. However, 12 of the 500-level credits required for the master’s degree may be applied to both undergraduate and graduate degree programs. The undergraduate degree program officer will determine the specific undergraduate required courses for which the 500-level courses may be used to substitute to meet institutional and accreditation requirements.

Once admitted into the IUG program, students are bound by the same guidelines, credit requirements, and program procedures as all other students in the Energy and Mineral Engineering graduate program.
As many as 12 of the credits required for the master’s degree may be applied to both the B.S. and the M.S. degrees. A minimum of 6 credits counted for both the B.S. and M.S. degrees must be at the 500 level. To meet the number of 500 or above credit requirements, students will be advised to take the graduate courses and use them to substitute for the undergraduate courses.

**Integrated B.S. in Mining Engineering and M.S. in Energy and Mineral Engineering**

Requirements listed here are in addition to requirements listed in GCAC-210 Integrated Undergraduate-Graduate (IUG) Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/integrated-undergraduate-graduate-degree-programs).

The integrated undergraduate-graduate (IUG) program between the Mining Engineering undergraduate program and the Energy and Mineral Engineering graduate program enables academically superior and research-focused MNG E undergraduate students to also obtain an M.S. degree in Energy and Mineral Engineering in five years of study.

**Admission Requirements**

Undergraduate students from the John and Willie Leone Family Department of Energy and Mineral Engineering with sixth semester standing and minimum grade-point average of 3.5 who wish to complete the Integrated B.S./M.S. program may apply to the Graduate School and the EME IUG program before the end of their junior year. Three faculty letters of recommendation are required. A statement of purpose and a plan of study covering the five-year period, prepared in consultation with an adviser, and approved by the program officers of the B.S. major and the EME graduate program must accompany the application. The application will be reviewed by the Admissions Committee of the EME Graduate Program and acted upon by the EME Graduate Program Officer.

**Degree Requirements**

The degree requirements will be in accordance with the approved requirements of the Petroleum and Natural Gas Engineering undergraduate degree program and the Energy and Mineral Engineering graduate program. However, 12 of the 500-level credits required for the master’s degree may be applied to both undergraduate and graduate degree programs. The undergraduate degree program officer will determine the specific undergraduate required courses for which the 500-level courses may be used to substitute to meet institutional and accreditation requirements.

Once admitted into the IUG program, students are bound by the same guidelines, credit requirements, and program procedures as all other students in the Energy and Mineral Engineering graduate program.

As many as 12 of the credits required for the master’s degree may be applied to both the B.S. and the M.S. degrees. A minimum of 6 credits counted for both the B.S. and M.S. degrees must be at the 500 level. To meet the number of 500 or above credit requirements, students will be advised to take the graduate courses and use them to substitute for the undergraduate courses.

**Integrated B.S. in Petroleum and Natural Gas Engineering and M.S. in Energy and Mineral Engineering**

Requirements listed here are in addition to requirements listed in GCAC-210 Integrated Undergraduate-Graduate (IUG) Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/integrated-undergraduate-graduate-degree-programs).

The integrated undergraduate-graduate (IUG) program between the Petroleum and Natural Gas Engineering undergraduate program and the Energy and Mineral Engineering graduate program enables academically superior and research-focused PNG E undergraduate students to also obtain an M.S. degree in Energy and Mineral Engineering in five years of study.

**Admission Requirements**

Undergraduate students from the John and Willie Leone Family Department of Energy and Mineral Engineering with sixth semester standing and minimum grade-point average of 3.5 who wish to complete the Integrated B.S./M.S. program may apply to the Graduate School and the EME IUG program before the end of their junior year. Three faculty letters of recommendation are required. A statement of purpose and a plan of study covering the five-year period, prepared in consultation with an adviser, and approved by the program officers of the B.S. major and the EME graduate program must accompany the application. The plan should be presented in person to the undergraduate and graduate program officers prior to being admitted into the program. Graduate Record Examination (GRE) scores may be submitted by IUG applicants but are not required. The application will be reviewed by the Admissions Committee of the EME Graduate Program and acted upon by the EME Graduate Program Officer.

**Degree Requirements**

The degree requirements will be in accordance with the approved requirements of the Petroleum and Natural Gas Engineering undergraduate degree program and the Energy and Mineral Engineering graduate program. However, 12 of the 500-level credits required for the master’s degree may be applied to both undergraduate and graduate degree programs. The undergraduate degree program officer will determine the specific undergraduate required courses for which the 500-level courses may be used to substitute to meet institutional and accreditation requirements.

Once admitted into the IUG program, students are bound by the same guidelines, credit requirements, and program procedures as all other students in the Energy and Mineral Engineering graduate program.

As many as 12 of the credits required for the master’s degree may be applied to both the B.S. and the M.S. degrees. A minimum of 6 credits counted for both the B.S. and M.S. degrees must be at the 500 level. To meet the number of 500 or above credit requirements, students will be advised to take the graduate courses and use them to substitute for the undergraduate courses.

**Student Aid**

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

Graduate students are supported by a variety of government and industry fellowships, and research and teaching assistantships. Stipends vary depending on the source.
Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Learning Outcomes
Master of Science (M.S.)
1. KNOW: Graduates will be able to demonstrate deep understanding and proficiency in project evaluation methods, optimization and application of mechanistic, thermodynamic, fluid flow, and kinetic analysis methods for integrative design of energy and mineral engineering systems.
2. CREATE: Graduates will demonstrate proficiency in designing and executing a research plan to address real-world problems in the field of energy and mineral engineering and economics.
3. CRITICAL THINKING: Graduates will be able to review and critically analyze work by others in the broad area of energy and mineral engineering and economics.
4. COMMUNICATE: Graduates will be able to effectively communicate their research findings to scholars in the field and broad audiences through formal presentations and written works.
5. PROFESSIONAL PRACTICE: Graduates will demonstrate a commitment to conduct themselves in accordance with the highest ethical standards and active engagement in service to the profession and society.

Doctor of Philosophy (Ph.D.)
1. KNOW: Graduates will demonstrate in-depth knowledge of the core theories and methods in the field of energy and mineral engineering as well as within one of the program options. This will include the application of physics, chemistry, advanced mathematics, economics and/or engineering principles to problems in energy and mineral engineering.
2. CREATE: Graduates will be able to creatively synthesize new ideas or hypotheses in energy and mineral engineering and economics, devise critical tests of hypotheses, and/or develop unique solutions to problems in energy and mineral engineering and economics.
3. APPLY: Graduates will be able to carry out independent and original research studies that address current problems in energy and mineral engineering synthesizing theory and/or experiments.
4. CRITICAL THINKING: Graduates will be able to review and critically analyze work by others in their field of specialty.
5. COMMUNICATE: Graduates will be able to convey ideas or arguments in clear, concise, well-organized proposals, papers and reports as well as in formal, oral presentations.
6. PROFESSIONAL PRACTICE: Graduates will demonstrate the ability to collaborate in a collegial and ethical manner with other professionals within their field and within diverse scientific backgrounds.

Contact
Graduate Program Head: Sanjay Srinivasan
Director of Graduate Studies/Professor-in-Charge: Luis Ayala

Primary Program Contact: Sue Hyde
Email: esh17@psu.edu
Mailing Address: 103 Hosler Building, University Park, PA 16802
Telephone: (814) 863-0373
Program Website: Energy and Mineral Engineering (http://www.eme.psu.edu/emegrad)

Energy, Environmental, and Food Economics
Graduate Program Head: Edward Jaenicke
Program Code: EEFE
Campus(es): University Park (Ph.D., M.S.)
Degrees Conferred:
- Master of Science (M.S.)
- Dual-Title Ph.D. and M.S. in Energy, Environmental, and Food Economics and Demography

The Graduate Faculty: View (https://secure.gradsch.psu.edu/gmp/index.cfm?searchType=fac&prog=EEFE)

The programs in Energy, Environmental, and Food Economics (EEFE) are designed to educate students as applied research economists in the fields of energy economics, environment and natural resource economics, and industrial organization in the food sector. The EEFE graduate program offers Master of Science (M.S.) and Doctor of Philosophy (Ph.D.) degrees. Through completion of advanced course work and rigorous skills training, the Ph.D. and M.S. programs will prepare students to conduct independent research in accordance with the highest ethical standards, scientific integrity, and interpersonal collegiality, and to effectively interpret and communicate the results of their research. The M.S. degree is a research-oriented degree. Thus, a strong component of the M.S. candidate’s program includes training in scientific methods as well as techniques of analysis applicable to the field. Additional depth and breadth of training required in the EEFE Ph.D. curriculum will prepare students to conduct original research that advances scientific knowledge in their fields of specialization. Students will also acquire the background and skills necessary to be effective teachers, mentors, and practitioners of economics. As an intercollege graduate program, EEFE faculty members reside in several Penn State departments and Colleges. Students in the program have access to and utilize resources of the participating departments (courses, faculties and facilities).

Admission Requirements
Applicants apply for admission to the program via the Graduate School application for admission (https://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (https://gradschool.psu.edu/graduate-education-policies).
Scores from the Graduate Record Examinations (GRE), or from a comparable substitute examination accepted by the graduate program, are required for admission. At the discretion of a graduate program, a student may be admitted provisionally (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/provisional-admission) for graduate study in a program without these scores. Letters of recommendation and an applicant's statement of purpose are also required.

Students admitted to the M.S. program are expected to have:

- At least 9 credits in economics, including intermediate undergraduate microeconomic theory and intermediate undergraduate macroeconomic theory.
- Introductory statistics and two semesters of calculus.
- A minimum 3.00 junior/senior GPA (on a 4.00 scale).

Promising students with special backgrounds, abilities, and interests who do not meet these requirements may be admitted provisionally (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/provisional-admission) at the discretion of the program. Students provisionally admitted (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/provisional-admission) to the program are required to acquire the necessary background skills in economics, mathematics and statistics once they join the program.

Students admitted to the Ph.D. program are in general expected, though not required, to have a master's degree in economics, agricultural economics, resource economics or other closely related field. Consistent with this general expectation, students admitted to the Ph.D. program should have course work in:

- Differential and integral calculus, and linear algebra.
- Master's-level economic theory.
- Master's-level statistics/econometrics.

Students admitted to the Ph.D. program are also expected to have a minimum 3.00 Grade Point Average (GPA) in master's-level course work (on a 4.00 scale). Exceptions to the minimum 3.00 GPA may be made for students with special backgrounds, abilities, and interests at the discretion of the program. Promising students who seek to enter the Ph.D. program but who have course work deficiencies may be admitted to the M.S. program and subsequently apply to the Ph.D. program after successfully eliminating the deficiencies. Completion of the M.S. degree is not required of students admitted to the Ph.D. program from the M.S. program. The expected time to completion of the Ph.D. for students without course work deficiencies is 3.5 to 4 years.

**Degree Requirements**

**Master of Science (M.S.)**

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

A minimum of 30 credits at the 500 and 600 level is required for the EEFE M.S. degree, including 6 credits of research (EEFE 600 or EEFE 610). Courses taken to remove deficiencies in preparation may extend the minimum number of credits required. A minor is not required. EEFE M.S. students are required to write a thesis and to pass a final oral examination as part of the requirements for the degree. The thesis must be accepted by the advisers and/or committee members, the head of the graduate program, and the Graduate School.

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<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<td>EEFE 510</td>
<td>Econometrics I</td>
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<tr>
<td>EEFE 511</td>
<td>Econometrics II</td>
<td>3</td>
</tr>
<tr>
<td>EEFE 512</td>
<td>Applied Microeconomic Theory I</td>
<td>3</td>
</tr>
<tr>
<td>EEFE 527</td>
<td>Quantitative Methods I</td>
<td>3</td>
</tr>
<tr>
<td>EEFE 529</td>
<td>Foundations of Economic Welfare Analysis</td>
<td>3</td>
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</table>

**Electives**

9 credits of field electives taught at the 500 level. These courses will be chosen in consultation with the student's academic adviser and cannot include readings or independent study courses (596s).

**Culminating Experience**

EEFE 600 
or EEFE 610

Total Credits: 30

M.S. degree students must complete Scholarship and Research Integrity (SARI) Training (10 hours).

**Doctor of Philosophy (Ph.D.)**

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

Students in the EEFE Ph.D. program will be required to complete 36 credits of course work at the 500- and 600-level, write and successfully defend a second year paper, write and successfully defend a Ph.D. dissertation, and pass a qualifying examination and a comprehensive examination. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

Course work requirements include 21 credits of core course work, at least 12 credits of field courses, and 3 credits of elective courses selected from a list of approved electives maintained by the program office.

<table>
<thead>
<tr>
<th>Code</th>
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<th>Credits</th>
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<td>ECON 502</td>
<td>Microeconomic Analysis ¹</td>
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<td>EEFE 510</td>
<td>Econometrics I</td>
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<td>EEFE 511</td>
<td>Econometrics II</td>
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<td>ECON 521</td>
<td>Advanced Microeconomic Theory</td>
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<td>EEFE 527</td>
<td>Quantitative Methods I</td>
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<tr>
<td>AEREC 533</td>
<td>Rural Development Research Methods and Topics</td>
<td>3</td>
</tr>
<tr>
<td>EEFE 529</td>
<td>Foundations of Economic Welfare Analysis</td>
<td>3</td>
</tr>
</tbody>
</table>

**Ph.D. Field Course Requirements**

Two fields consisting of a minimum of 6 credits each from designated courses.

- Energy Economics, Policy and Systems
  - ENNEC 540 Economic Analysis of Energy Markets
  - ENNEC 560 Mineral and Energy Finance I

- Environment and Natural Resource Economics
  - EEFE 519 Resource and Environmental Economics I
  - EEFE 541 Resource and Environmental Economics II

*Food Industrial Organization*
In addition to the general Graduate Council requirements for dissertation allowable.

examination may be delayed one semester beyond the normal period fulfill requirements for both areas of study and, therefore, the qualifying title graduate degree students may require an additional semester to
degree examination, containing elements of both EEFE and Demography. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

To qualify for the dual-title degree, students must satisfy the degree requirements of the Demography dual-title program. Refer to the Degree Requirements

Dual-Titles
Dual-Title M.S. and Ph.D. in Energy, Environmental, and Food Economics and Demography
Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

Admissions Requirements
Students must apply and be admitted to the graduate program in EEFE and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Demography dual-title program. Refer to the Admission Requirements section of the Demography Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/demography).

Doctoral students must apply for enrollment into the dual-title degree program in Demography prior to taking the qualifying examination in EEFE.

Degree Requirements
To qualify for the dual-title degree, students must satisfy the degree requirements for the degree they are enrolled in EEFE. In addition, students pursuing the dual-title Ph.D. in EEFE and Demography must complete the degree requirements for the dual-title in Demography, listed on the Demography Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/demography).

The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from EEFE and must include at least one Graduate Faculty member from the Demography program. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. There will be a single qualifying examination, containing elements of both EEFE and Demography. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of an EEFE and Demography dual-title doctoral degree student must include at least one member of Demography Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in Demography, the member of the committee representing Demography must be appointed as co-chair. The Demography representative on the student’s dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students enrolled in the dual-title program are required to write and orally defend a dissertation on a topic that reflects their original research and education in EEFE and Demography. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

Dual-Title M.S. and Ph.D. in Energy, Environmental, and Food Economics and Operations Research
Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

Admissions Requirements
Students must apply and be admitted to the graduate program in EEFE and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Operations Research dual-title program. Refer to the Admission Requirements section of the Operations Research Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/operations-research). Doctoral students must apply for enrollment into the dual-title degree program in Operations Research prior to taking the qualifying examination in EEFE.

Degree Requirements
To qualify for the dual-title degree, students must satisfy the degree requirements for the degree they are enrolled in EEFE. In addition, students pursuing the dual-title Ph.D. in EEFE and Operations Research must complete the degree requirements for the dual-title in Operations Research, listed on the Operations Research Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/operations-research).

The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from EEFE and must include at least one Graduate Faculty member from the Operations Research program. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. There will be a single qualifying examination, containing elements of both EEFE and Operations Research. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of an EEFE and Operations Research dual-title doctoral degree student must include at least one member of Operations Research Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in Operations Research, the member of the committee representing Operations Research must be appointed as co-chair. The Operations Research representative on the student’s dissertation committee
will develop questions for and participate in the evaluation of the comprehensive examination.

Students enrolled in the dual-title program are required to write and orally defend a dissertation on a topic that reflects their original research and education in EEF and Operations Research. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

### Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

### Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**Graduate Program Head:** Edward Jaenicke

**Primary Program Contact:** Dolores Pavliska

**Email:** dlp5189@psu.edu

**Mailing Address:** 111 Armsby Building

**Telephone:** (814)865-0456

**Program Website:** Energy, Environmental, and Food Economics (http://aese.psu.edu/graduateprograms/eefe)

### Engineering at the Nano-scale

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESC 412</td>
<td>Nanotechnology: Materials, Infrastructure, and Safety</td>
<td>3</td>
</tr>
<tr>
<td>ESC 520</td>
<td>Engineering at the Nano-scale</td>
<td>3</td>
</tr>
<tr>
<td>ESC 521</td>
<td>Pattern Transfer at the Nano-scale</td>
<td>3</td>
</tr>
<tr>
<td>ESC 522</td>
<td>Fabrication and Characterization for Top-down Nano-manufacturing</td>
<td>3</td>
</tr>
<tr>
<td>ESC 523</td>
<td>Fabrication and Characterization for Bottom-up Nano-manufacturing</td>
<td>3</td>
</tr>
<tr>
<td>ESC 596</td>
<td>Individual Studies (3 semesters of 1 credit each)</td>
<td>3</td>
</tr>
</tbody>
</table>

### Electives

**Culminating Experience**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESC 596</td>
<td>Individual Studies (3 semesters of 1 credit each)</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits 30

As the culminating experience, students must write a scholarly paper incorporating at least one area represented in the course work, upon successful completion of which 3 total credits of ESC 596 will be earned. The scholarly paper must demonstrate the student’s capability to integrate and apply concepts and techniques learned in the courses and thereby demonstrate the technical, environmental, ethical, and safety knowledge needed to practice engineering at the nano-scale. This scholarly paper should reflect the high quality of research required to meet the Engineering Science and Mechanics M.S. degree standards, as determined by the ESM Graduate Officer and the ESM Graduate Curriculum Committee. Students who need more time to complete the final paper may extend the submission due date after the third semester (summer). The degree will be granted after the paper has been reviewed.
and approved, and all degree requirements have been met. Students are not required to remain in residence while they complete the final paper.

Student Aid
Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School's website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact
Graduate Program Head: Judith Todd Copley
Director of Graduate Studies/Professor-in-Charge: Corina Drapaca
Primary Program Contact: Tammy Coval
Email: tlc21@psu.edu
Mailing Address: 212 Earth and Engineering Sciences Building, University Park, PA 16802
Telephone: (814)863-4586
Program Website: Engineering at the Nano-scale (http://www.esm.psu.edu)

Engineering Design
Graduate Program Head Sven G. Bilen
Program Code EDSGN
Campus(es) University Park (M.S., M.Eng.)
Degrees Conferred Master of Science (M.S.)
Master of Engineering (M.Eng.)
The Graduate Faculty View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=EDSGN)

Students may specialize in Engineering Product Design, Systems Design and Data-Driven Design. Engineering Product Design addresses the identification of consumer preferences and requirements, the evaluation of existing products and product families, and the development of innovative designs. Systems Design examines the role components play within systems and the optimization of systems as a whole. This includes defining and developing a variety of systems that satisfy user requirements. Data-Driven Design focuses on using data to motivate and inform design decisions and assess current product performance.

Admission Requirements
Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Applicants with at least a 3.00 junior/senior grade-point average (on a 4.00 scale) and appropriate course backgrounds may be considered for admission. Exceptions to the minimum 3.00 grade-point average may be made for students with special backgrounds, abilities, and interests.

All applicants must submit official transcripts from all post-secondary institutions attended (http://www.gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission); international applicants must submit official transcripts, degree, and diploma certificates in both English and their native language. Photocopies will not be accepted. Applicants must also submit scores from the GRE General Test, a statement of objectives, resume, and three letters of recommendation.

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. See GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

Applicants for fall admission who wish to be considered for financial aid should complete the application process prior to December 15 of the preceding year.

Degree Requirements
Master of Engineering (M.Eng.)
Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

The M.Eng. degree is a non-thesis professional master's degree that provides training for advanced professional practice. To receive the Master of Engineering degree in Engineering Design, a student must complete at least 32 credits beyond the baccalaureate degree, and a scholarly report based on an independent studies course (EDSGN 596); or a domestic (ENGR 595A) or international (ENGR 595I) internship experience, and an engineering design portfolio (ENGR 585). A minimum of 18 credits must be in the 500 series.

A minimum of 32 graduate credits is required as follows:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDSGN</td>
<td>Required Courses</td>
<td></td>
</tr>
<tr>
<td>581</td>
<td>Engineering Design Studio I</td>
<td>3</td>
</tr>
<tr>
<td>582</td>
<td>Engineering Design Studio II</td>
<td>3</td>
</tr>
<tr>
<td>585</td>
<td>Engineering Design Portfolio</td>
<td>1</td>
</tr>
<tr>
<td>590</td>
<td>Colloquium</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Focus Area Electives</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Students must select a minimum 12 credits of focus area electives from the following:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>EDSGN 401 Engineering Systems Design</td>
<td></td>
</tr>
<tr>
<td></td>
<td>EDSGN 479 Human Centered Product Design and Innovation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>EDSGN 547 Designing for Human Variability</td>
<td></td>
</tr>
</tbody>
</table>
Focus Area Electives

Students must select a minimum 12 credits of focus area electives from the following:

- EDSGN 401 Engineering Systems Design
- EDSGN 479 Human Centered Product Design and Innovation
- EDSGN 547 Designing for Human Variability
- EDSGN 548 Interaction Design
- EDSGN 549 Design Decision Making
- EDSGN 558 Systems Design

General Electives

Students must select 6 credits of general electives from the following:

- IE 418 Human/Computer Interface Design
- IE 460 Service Systems Engineering
- IE 470 Manufacturing System Design and Analysis
- IE 520 Multiple Criteria Optimization
- IE 557 Human-in-the-Loop Simulation
- IE 563 Computer-Aided Design for Manufacturing
- IST 413 Usability Engineering
- IST 520 Foundations in Human-Centered Design
- IST 521 Human-Computer Interaction: The User and Technology
- ME 561 Structural Optimization Using Variational and Numerical Methods
- ME 565 Optimal Design of Mechanical and Structural Systems
- MANGT 510 Project Management
- SYSEN 550 Creativity and Problem Solving I
- SYSEN 555 Invention and Creative Design

Culminating Experience

Students must select one of the following:

- EDSGN 600 Thesis Research 6
- or EDSGN 610 Thesis Research Off Campus

Total Credits 32

Or from a list of approved courses maintained by the program.

The M.S. in Engineering Design requires the completion of an M.S. thesis and the Engineering Design Portfolio.

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School's website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

International students must take AEOCPT and score between 250 and 300 in order to begin a teaching assistantship; students who require remediation may be assigned a teaching assistantship only after addressing the deficiencies identified by the test.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by
graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact
Graduate Program Head: Sven Bilen
Director of Graduate Studies/Professor-in-Charge: Matthew Parkinson
Primary Program Contact: Marie Laird
Email: mjk5287@psu.edu
Mailing Address: 213 Hammond Building, University Park, PA 16802
Telephone: (814)863-3026
Program Website: Engineering Design (http://sedtapp.psu.edu/design/graduate-program.aspx)

Engineering Leadership and Innovation Management
Graduate Program Head: Sven Bilen
Program Code: ELIM
Campus(es): University Park (M.Eng.)
Degrees Conferred: Master of Engineering (M.Eng.)
The Graduate Faculty: View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=ELIM)

The program is designed to develop the attributes required by today’s successful engineering leaders and executives. Specifically, these include increased technical competency, expanded professional skills, the ability to identify opportunities for improvement, and the acumen to work effectively in a globally connected engineering environment. Upon completion of the full one-year program, the successful student will have developed and demonstrated abilities enabling them to:

• Evaluate leadership and innovation management strategies for corporate innovation and identify opportunities for new products and businesses in alignment with an organization’s strengths and weaknesses within an existing business structure.
• Demonstrate an understanding of cultural and international boundaries, effectively considering the implications of cultural and international business differences on project implementation.
• Employ design thinking and project management strategies to lead engineering teams in solving complex engineering problems.
• Apply project management methods including the implementation of techniques for planning, scheduling, budgeting, and controlling project performance.
• Demonstrate proficiency in oral and written communication appropriate to engineering leadership and innovation management.
• Develop self-awareness of personal leadership attributes and areas for growth in fostering cultures of innovation and creativity in engineering teams.
• Explain corporate financial documents and develop financial projections for new innovations.

These learning outcomes will be achieved through a combination of lectures by faculty, invited guest lecturers, reading of key literature, individual and team projects (including international virtual-team projects), and practical involvement in an engineering capstone design/market development team.

Admission Requirements
Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Educational Background
The student cohort should reflect today’s international engineering environment, with selective admittance. The admission requirements include:

• Applicants must hold an undergraduate degree in engineering, science, or relevant discipline. Applicants must have a 3.0 minimum undergraduate GPA (or equivalent). Exceptions to the minimum 3.0 grade-point average may be made for students with special backgrounds, abilities, and interests at the discretion of the program. Applicants will be accepted up to the number of places available for new students.
• 1 year of professional experience in an engineering position (or equivalent). Students wishing to enter the program directly from an undergraduate degree can fulfill the 1 year requirement for engineering experience through summer internships, summer employment, or co-op experiences plus additional experience within professional societies. Justification for this experience should be included in the Personal Statement during the application process.

Core Application Packet
• Completed official online Graduate School application (http://www.gradschool.psu.edu/prospective-students/how-to-apply) and payment of nonrefundable application fee. The graduate application includes the following:
  • Personal statement: The Personal Statement should include a 2-3 page essay demonstrating your written communication skills with the following information: a) statement of purpose (career and educational goals), b) narrative describing your leadership and innovation experiences through summer internships, summer employment, co-op experiences, community engagement, professional societies, etc. and c) narrative describing your professional experience in an engineering position (or equivalent) to meet the 1 year requirement.
  • Vita or Résumé.
  • Three letters of recommendation that attest to your readiness for graduate study and document the requisite minimum of one year of work experience. Letters must be submitted through the online application. Within the online application you will be asked to enter the names and email addresses of three individuals who will be providing your recommendation. Those individuals will receive a note via email asking them to complete a brief form that will serve as your recommendation. Please inform all recommenders they must submit the form in order for your application to be complete.
• Official transcripts from all post-secondary institutions attended (http://www.gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission).
• Submission of official scores from the Graduate Record Examination General Test (GRE) or Graduate Management Admission Test (GMAT).

Applicants who are still completing their baccalaureate requirements at the time of application may be provisionally admitted to the Graduate School (http://gradschool.psu.edu/graduate-education-policies/gcac-300/provisional-admission) conditional on the awarding of the baccalaureate degree.

### Degree Requirements

#### Master of Engineering (M.Eng.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

Total required credits for the ELIM program is 30 credits.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGR 405</td>
<td>Project Management for Professionals</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 408</td>
<td>Leadership Principles</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 411</td>
<td>Entrepreneurship Business Basics</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 501</td>
<td>Engineering Leadership for Corporate Innovation</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 802</td>
<td>Engineering Across Cultures and Nations</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 804</td>
<td>Engineering Product Innovation</td>
<td>3</td>
</tr>
<tr>
<td><strong>Electives</strong>&lt;sup&gt;2&lt;/sup&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>500-level elective</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>500- or 800-level elective</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>400-, 500-, or 800-level elective</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td><strong>Culminating Experience</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ENGR 805</td>
<td>ELIM Capstone Project</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td></td>
<td><strong>30</strong></td>
</tr>
</tbody>
</table>

1 Students entering the program who have previously taken ENGR 405, ENGR 408 or ENGR 411 will be required to substitute alternate courses under the direction of the program director.

2 These electives (course options list available) will be chosen by the student, in consultation with their company (if they are associated with a sponsoring company) and the ELIM program director. Electives should be chosen to meet the needs and interests of the student and can be selected from across the university. The electives can utilize existing courses within the graduate curricula of the College of Engineering, as well as any courses that are open to students from across the university such as the Smeal College of Business, Psychology, or Organization Development and Change and Workforce Education and Development within the College of Education, allowing the student to expand his/her knowledge in a technical, business or psychology focus area. Students may also pursue a graduate certificate or minor through the completion of these elective credits. A list of recommended courses and potential certificates/minors that may be of interest to our students is maintained by the program office.

3 The Capstone course provides an opportunity to apply and integrate the knowledge and skills that were gained throughout the ELIM program with strategic management concepts. Capstone projects will target real world opportunities, problems, and challenges of an existing organization. Students who successfully complete this course will be able to:
  • identify and assess the impact of opportunities and threats in a company’s external environment, including its industry and its set of competitors;
  • identify and assess a company’s internal strengths and weaknesses, and match their with its opportunities and threats to suggest alternative strategies;
  • define the business-level strategies of a company;
  • define competitors, competitive rivalry, competitive behavior, and competitive dynamics;
  • and describe corporate-level strategy of the company as it relates to the capstone project.

#### Minor

Requirements listed here are in addition to requirements for minors in Graduate Council policies listed under GCAC-600 Research Degree Requirements (http://gradschool.psu.edu/graduate-education-policies) and GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

Successful engineers and technical experts are expected to be well versed not only in technical skills but also in professional skills such as communication, ethics, entrepreneurial thinking, and professionalism. These areas of leadership and innovation set technical experts apart and prepare them to be future global business leaders. This graduate minor is highly relevant to numerous graduate degrees associated with engineering, business, technical, or science related programs. This graduate minor consists of four 3-credit courses (12 credits) for master’s students and five 3-credit courses (15 credits) for doctoral students.

**Admission Requirements**

- Applicants must hold an undergraduate degree in engineering, science, or relevant discipline.
- Applicants must have a 3.0 minimum undergraduate GPA (or equivalent). Exceptions to the minimum 3.0 grade-point average may be made for students with special backgrounds, abilities, and interests, at the discretion of the program.
- Applicants must be accepted and/or currently enrolled in a graduate program at Penn State. Official requests to add a minor to a doctoral candidate’s academic record must be submitted to Graduate Enrollment Services prior to establishment of the dissertation committee and prior to scheduling the comprehensive examination.

**Minor Requirements**

In accordance with Graduate Council policy, a representative from the Graduate Faculty in Engineering Leadership and Innovation Management must be appointed to the dissertation committee of each student enrolled in the doctoral minor in Engineering Leadership and Innovation Management (ELIM).
Master’s Minor
The Engineering Leadership and Innovation Management (ELIM) minor (12-credits) is comprised of four courses:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGR 501</td>
<td>Engineering Leadership for Corporate Innovation</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 802</td>
<td>Engineering Across Cultures and Nations</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 804</td>
<td>Engineering Product Innovation</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 405</td>
<td>Project Management for Professionals</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits: 12

1 Related courses may be substituted for ENGR 405. Petitions for substitution may be made to the ELIM program office.

Doctoral Minor
The Engineering Leadership and Innovation Management (ELIM) doctoral minor (15-credits) is comprised of five courses:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGR 501</td>
<td>Engineering Leadership for Corporate Innovation</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 802</td>
<td>Engineering Across Cultures and Nations</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 804</td>
<td>Engineering Product Innovation</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 405</td>
<td>Project Management for Professionals</td>
<td>3</td>
</tr>
<tr>
<td>500-level elective in a related field</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

Total Credits: 15

1 Related courses may be substituted for ENGR 405. Petitions for substitution may be made to the ELIM program office.

2 For a doctoral minor a 500-level elective in a related field is required. Students must obtain approval for the elective course from their ELIM advisor in advance of registering.

Student Aid
Refer to the Tuition & Funding (http://gradschool.psu.edu/graduate-education-policies) section of The Graduate School’s website. Students in this program are not eligible for graduate assistantships.

Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact
Graduate Program Head: Sven Bilen
Director of Graduate Studies/Professor-in-Charge: Teresa Lang
Primary Program Contact: Marie Laird
Email: mjk5287@psu.edu
Mailing Address: 213 Hammond Building, University Park, PA 16802
Telephone: (814) 863-3026

Program Website: Engineering Leadership and Innovation Management (http://www.sedtapp.psu.edu/eld/graduate-degrees.aspx)

Engineering Management (Capital)
Graduate Program Head: Rafic Bachnak
Program Code: EM
Campus(es): Harrisburg (M.P.S.)
Degrees Conferred: Master of Professional Studies (M.P.S.)
The Graduate Faculty

The Master of Professional Studies (M.P.S.) Engineering Management degree program is a graduate professional degree program that integrates engineering with business and management principles. The program provides engineers with business and management perspectives and enhances their capabilities in the management of major projects, business initiatives, policies, and other activities in both the public and private sectors. Furthermore, it highlights the importance of technology strategy and intellectual properties management, and offers an environment for personal and professional networking that could hold significant future dividend.

The program is offered at Penn State Harrisburg as a partnership between the School of Science, Engineering, and Technology and the School of Business Administration, which is accredited at the undergraduate and graduate levels by AACSB International—the Association to Advance Collegiate Schools of Business International.

Admission Requirements
Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Applicants must have undergraduate degrees in engineering or technology from an accredited university and must have completed undergraduate course work in calculus and economics.

An undergraduate cumulative grade-point average of 3.0 or better on a 4.0 scale, and scores from the Graduate Management Admission Test (GMAT) or the Graduate Record Examination (GRE) are required for admission. Students demonstrating high potential but failing to meet the minimum GMAT or GRE score requirements may be considered on the basis of professional accomplishments and other criteria that may predict success in the program.

Applicants must submit the following:

- a complete Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply) with the nonrefundable application fee.
- official transcripts from all post-secondary institutions attended (http://gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission).
- three (3) letters of reference, especially from faculty who can evaluate academic potential.
• a personal statement of technical interest, goals, and experience
• test scores from the Graduate Management Admission Test (GMAT) or the Graduate Record Examination (GRE) [GRE scores are required for those indicating interest in an assistantship and to be eligible for many graduate fellowship opportunities.]

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. See GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

#### Degree Requirements

**Master of Professional Studies (M.P.S.)**

Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

All graduate students in Engineering Management are required to adhere to the requirements of Graduate Council, listed in the link above. These, however, are minimum requirements and the policies, procedures, and regulations listed below are additional and more specific for graduates students pursuing the M.P.S. degree in Engineering Management. Advisers will call pertinent regulations to the attention of their advisees, but it should be understood that it is the student’s personal responsibility to see that all requirements listed are satisfied.

The M.P.S. in Engineering Management is a 33-credit graduate program that integrates engineering with business and management principles. The multidisciplinary, broadly based M.P.S. program provides engineers with business and management perspectives to enhance capabilities in management of large projects. Of the 33 credits required for the degree, 30 must be earned in 500-level graduate courses.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 501</td>
<td>Financial Statement Analysis</td>
<td>3</td>
</tr>
<tr>
<td>EMCH 524A</td>
<td>Mathematical Methods in Engineering</td>
<td>3</td>
</tr>
<tr>
<td>ENGMT 511</td>
<td>Engineering for Energy and the Environment</td>
<td>3</td>
</tr>
<tr>
<td>FINAN 521</td>
<td>Corporate Finance</td>
<td>3</td>
</tr>
<tr>
<td>MNGMT 511</td>
<td>Organizational Behavior</td>
<td>3</td>
</tr>
<tr>
<td>MRKT 513</td>
<td>Marketing Management</td>
<td>3</td>
</tr>
<tr>
<td>SYSEN 505</td>
<td>Technical Project Management</td>
<td>3</td>
</tr>
</tbody>
</table>

**Electives**

The curriculum requires the completion of two free electives (6 credits) in any of the engineering disciplines. A list of these elective courses is maintained by the graduate program office.

**Culminating Experience**

All students are required to complete a culminating experience through a two-course capstone course sequence:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BUS 588</td>
<td>Strategic Management</td>
<td>3</td>
</tr>
<tr>
<td>MFGSE 550</td>
<td>Design for Manufacturability I</td>
<td>3</td>
</tr>
</tbody>
</table>

**Total Credits** 33

### Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School's website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

### Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

### Learning Outcomes

1. **KNOW.** Graduates will be able to demonstrate mastery of core principles in engineering management.

2. **CRITICAL THINKING.** Graduates will be able to critically and creatively conceptualize, evaluate and formulate engineering management problems, as well as perform the analyses required for problem definition.

3. **PROBLEM SOLVING.**
   a. Graduates will be able to apply business strategy to solve engineering management problems.
   b. Graduates will be able to apply project management to solve engineering management problems.

4. **COMMUNICATE.** Graduates will be able to effectively communicate project outcomes, such as ideas, requirements, business analyses, findings, and justification for decisions.

5. **ETHICS AND PROFESSIONALISM.** Graduates will be able to demonstrate an understanding of professional and ethical responsibility and conduct themselves accordingly.

### Contact

**Graduate Program Head:** Rafic Bachnak

**Director of Graduate Studies/Professor-in-Charge:** Scott Van Tonningen

**Primary Program Contact:** Donna Griffith

**Email:** dlg47@psu.edu

**Mailing Address:** W215 Olmsted - Penn State Harrisburg, 777 West Harrisburg Pike, Middletown, PA 17057

**Telephone:** (717)948-4344

**Program Website:** Engineering Management at Harrisburg Campus (https://harrisburg.psu.edu/science-engineering-technology/engineering-science-management/master-professional-studies-engineering-management)
Engineering Management (Great Valley)

Graduate Program Head: Colin J. Neill
Program Code: ENGMT
Campus(es): Great Valley (M.E.M.)
World Campus (M.E.M.)
Degrees Conferred: Master of Engineering Management (M.E.M.)
The Graduate Faculty: View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=ENGMT)

Admission Requirements
Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

The Master of Engineering Management is developed for students with a background in engineering or science. Applicants with a four year undergraduate degree in engineering, mathematics, physics, computer science, or a related discipline will be considered. Test scores from the GMAT or GRE exams are not required, but will be considered by the admissions committee if submitted. Jr/Sr GPA of 3.0 or better on a 4.0 scale is required. Students must have three years or more work experience in an engineering or engineering-related position. Applicants must submit a letter of reference, and a one page personal statement of relevant experience and goals.

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. See GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

Degree Requirements
Master of Engineering Management
Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

All students in the Master of Engineering Management program must complete a minimum of 33 credits.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGMT 501</td>
<td>Engineering Management Science</td>
<td>3</td>
</tr>
<tr>
<td>ENGMT 510</td>
<td>Economics and Financial Studies for Engineers</td>
<td>3</td>
</tr>
<tr>
<td>SYSEN 505</td>
<td>Technical Project Management</td>
<td>3</td>
</tr>
<tr>
<td>SYSEN 536</td>
<td>Decision and Risk Analysis in Engineering</td>
<td>3</td>
</tr>
<tr>
<td>SYSEN 550</td>
<td>Creativity and Problem Solving I</td>
<td>3</td>
</tr>
<tr>
<td>SYSEN 552</td>
<td>Creativity and Problem Solving II</td>
<td>3</td>
</tr>
<tr>
<td>Electives</td>
<td></td>
<td>12</td>
</tr>
<tr>
<td>Culminating Experience</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Student Aid
Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School's website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

World Campus students in graduate degree programs may be eligible for financial aid. Refer to the Tuition and Financial Aid section (http://www.worldcampus.psu.edu/tuition-and-financial-aid) of the World Campus website for more information.

Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Learning Outcomes
1. KNOW. Demonstrate knowledge of foundational principles of engineering management including technical, social, and economic factors as applied to projects and personnel.
2. CRITICAL THINKING. Evaluate the financial aspects of projects and integrate them with different technical and engineering components.
3. PROBLEM SOLVING. Understand and estimate risk and its impact on the decision making process.
4. COMMUNICATE. Demonstrate the ability to communicate project findings effectively in written, spoken, and visual presentations to project stakeholders and a variety of professional audiences.
5. TEAMWORK. Demonstrate the ability to work with multi-disciplinary teams.

Contact
Graduate Program Head: Colin Neill
Director of Graduate Studies/Professor-in-Charge: Nil Ergin
Primary Program Contact: Justine Chavez
Email: jrc460@psu.edu
Mailing Address: Penn State Great Valley, 30 East Swedesford Road, Malvern, PA 19355
Telephone: (610)648-3277
Program Website: Engineering Management at Great Valley (http://greatvalley.psu.edu/academics/masters-degrees/engineering-management)
Engineering Science

A program leading to the degree of Master of Engineering with a major in Engineering Science is offered at Penn State Harrisburg. The program is designed to provide a broad, advanced education in the engineering sciences with some specialization permitted in the area of the student's major interest. It is offered specifically to permit practicing engineers to pursue advanced studies through evening classes while in full-time employment in industry in the area. Courses offered for the program are all established and authorized by the resident departments at the University Park campus.

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Scores from the graduate Record Examinations (GRE) are not required for students holding baccalaureate degrees from accredited U.S. educational institutions. At the discretion of a graduate program, students may be admitted for graduate study in a program without these scores.

Students may be admitted to the program from a wide variety of disciplines. Students applying for admission are expected to have completed the following core courses:

1. physics through modern physics;
2. mathematics through differential equations;
3. one course in engineering thermodynamics;
4. one course in electrical circuits;
5. basic courses in engineering statics, dynamics, and strength of materials; and
6. computer programming.

Students with a 3.00 junior/senior grade-point average (on a 4.00 scale) and with appropriate course backgrounds will be considered for admission. The best-qualified applicants will be accepted up to the number of spaces that are available for new students. Exceptions to the minimum 3.00 grade-point average may be made for students with special backgrounds, abilities, and interests.

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. See GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

Completed International Application material must be submitted by the following deadlines:

- May 31 for the fall semester
- September 30 for the spring semester
- February 28 for the summer session

Applications received after these deadlines will be processed for the following semester.

Applicants should submit the following:

- A completed online Graduate School application (http://gradschool.psu.edu/prospective-students/how-to-apply) with the nonrefundable application fee;
- official transcripts from all post-secondary institutions attended (http://www.gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission);
- Three (3) letters of reference, especially those from faculty who can evaluate academic potential;
- A personal statement of technical interest, goals, and experience.

NOTE: Test scores from the Graduate Record Examination (GRE) are required ONLY for those applicants indicating interest in an assistantship.

Degree Requirements

Master of Engineering (M.Eng.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

The credit requirements in this major will be satisfied by an appropriate combination of core courses and elective courses. The core courses include offerings in mathematics and in several branches of engineering that have been selected because of their general character and breadth of applicability to all fields of engineering. A minimum of 30 credits is required, of which at least 18 must be at the 500 level. Of the 30 credits, 6 credits of mathematics and a scholarly written report (3 credits) must be completed.

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School's website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/grad/credit-loads-graduate-assistants) set by The Graduate School.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.
Contact

Graduate Program Head: Rafic Bachnak
Director of Graduate Studies/Professor-in-Charge: Scott Van Tonningen
Primary Program Contact: Donna Griffith
Email: dlg47@psu.edu
Mailing Address: W215 Olmsted Bldg, 777 W. Hbg Pike, Middletown, PA 17057
Telephone: (717) 948-4344
Program Website: Engineering Science at Harrisburg (http://harrisburg.psu.edu/science-engineering-technology/engineering-science-management/master-engineering-engineering-science)

Engineering Science and Mechanics

Graduate Program Head: Judith Todd
Program Code: EMCH (M.Eng.), ESMCH (Ph.D., M.S.)
Campus(es): University Park (Ph.D., M.S., M.Eng.)
Degrees Conferred:
- Doctor of Philosophy (Ph.D.)
- Master of Science (M.S.)
- Master of Engineering (M.Eng.)
- Integrated B.S. in Engineering Science and M.S. in Engineering Science and Mechanics
- Joint M.D./Ph.D. with the College of Medicine

The Graduate Faculty

View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=ESMCH)

Opportunities for graduate studies are available in interdisciplinary and multidisciplinary research areas including:

- Biomechanics;
- Composite materials;
- Continuum mechanics;
- Electrical, magnetic, electromagnetic, optical, thermal, and mechanical properties of thin films;
- Experimental mechanics;
- Failure analysis;
- Lithography;
- Microelectromechanical systems (MEMS) and microoptoelectromechanical systems (MOEMS);
- Micromechanics;
- Molecular beam epitaxy;
- Non-destructive evaluation and testing;
- Numerical methods;
- Photovoltaic materials and devices;
- Nanotechnology and nanobiotechnology;
- Properties of materials;
- Shock, vibration acoustics and nonlinear dynamics;
- Structural mechanics;
- Structural health monitoring;
- Wave-material interactions.

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/education-policies).

Applicants who hold a baccalaureate degree in engineering, the sciences, mathematics, engineering science, and materials who present at least a 3.00 grade-point average will be considered for admission. Exceptions to the minimum 3.00 grade-point average may be made for students with special backgrounds, abilities, and interests at the discretion of the program. Applicants will be accepted up to the number of places available for new students.

Scores from the Graduate Record Examination (GRE) are required for admission. At the discretion of the Graduate Officer, a student may be granted provisional admission (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/provisional-admission) pending receipt of acceptable GRE scores.

Degree Requirements

Master of Engineering (M.Eng.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

At least 31 credits at the 400, 500, or 800 must be earned, with at least 18 at the 500 or 800 level, and at least 6 at the 500 level. Of these, 22 must be from lecture/laboratory courses approved by the department.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESC 514</td>
<td>Engineering Science and Mechanics Seminar</td>
<td>1</td>
</tr>
<tr>
<td>or EMCH 514</td>
<td>Engineering Science and Mechanics Seminar</td>
<td></td>
</tr>
<tr>
<td>Select 3 credits in each of the following areas:</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>Analysis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fields</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Motion</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Materials Performance/Reliability or Materials Processing/Structure/Characterization</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Select 3 additional credits from any one of the four categories above</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Electives</td>
<td></td>
<td>12</td>
</tr>
<tr>
<td>Culminating Experience</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ESC 596</td>
<td>Individual Studies</td>
<td>3</td>
</tr>
<tr>
<td>or EMCH 596</td>
<td>Individual Studies</td>
<td></td>
</tr>
<tr>
<td>Total Credits</td>
<td></td>
<td>31</td>
</tr>
</tbody>
</table>

A scholarly written report on a developmental study involving at least one area represented in the course work must be written while enrolled in either ESC 596 or EMCH 596. This scholarly paper should reflect the high quality of research required to meet the Engineering Science and Mechanics M.Eng. degree standards, as determined by the ESM Graduate Officer and the ESM Graduate Curriculum Committee.
A 3.0 minimum grade point average is required to maintain good academic standing and for graduation.

**Master of Science (M.S.)**
Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. ([http://gradschool.psu.edu/graduate-education-policies](http://gradschool.psu.edu/graduate-education-policies))

**Thesis Track**
At least 32 credits at the 400, 500, 600, or 800 level must be earned, with at least 18 credits at the 500 and 600 levels combined, and 24 credits must be from 400- and 500-level lecture/laboratory courses approved by the department. No more than 6 credits may be earned from 400-level courses.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESC 596</td>
<td>Individual Studies</td>
<td>3</td>
</tr>
</tbody>
</table>

The student is required to complete an independent research experience resulting in a scholarly paper, for which 3 credits of ESC 596 or EMCH 596 will be earned. This scholarly paper should reflect the high quality of research required to meet the Engineering Science and Mechanics M.S. degree standards, as determined by the ESM Graduate Officer and the ESM Graduate Curriculum Committee.

A 3.0 minimum grade-point average is required to maintain good academic standing and for graduation.

**Doctor of Philosophy (Ph.D.)**
Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. ([http://gradschool.psu.edu/graduate-education-policies](http://gradschool.psu.edu/graduate-education-policies))

Students may enter the Ph.D. program after completing an M.S. degree or directly from the B.S. degree. The student must have completed an appropriate baccalaureate or master’s degree prior to admission. In addition:

- at least 18 credits must be earned in 400- and 500-level lecture/laboratory courses approved by the department; and,
- 3 credits of a graduate seminar (EMCH 514 or ESC 514) must be earned beyond the master’s degree requirements.

The student must demonstrate English competency, and pass a qualifying examination, a comprehensive examination, and a final oral examination. A doctoral dissertation on an appropriate topic is required. It must be a well-organized account of research undertaken by the student and show initiative and originality. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School. A minimum grade-point average of 3.00 for work done at the University is required for admission to the qualifying examination, the comprehensive examination, and the final oral examination, and for graduation.

**Integrated Undergrad-Grad Programs**

**Integrated B.S. in Engineering Science And M.S. in Engineering Science and Mechanics**
Requirements listed here are in addition to requirements listed in GCAC-210 Integrated Undergraduate-Graduate (IUG) Degree Programs ([http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/integrated-undergraduate-graduate-degree-programs](http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/integrated-undergraduate-graduate-degree-programs)).

The flexibility and strength in fundamentals of the Engineering Science curriculum provides an opportunity for Engineering Science undergraduate students to participate in the ESM Integrated Undergraduate Graduate (IUG) program. The IUG program promotes the interchange of ideas across all branches of the scientific and engineering disciplines from both a theoretical and experimental perspective. Students in the integrated degree program are expected to pursue interdisciplinary studies in areas that encompass nano- and bionanotechnology, advanced materials, electromagnetic, mechanics, microelectronics, nanoelectronics and bioelectronics, neural engineering, photonics and photovoltaics (among others) and they are expected to embrace multidisciplinary perspectives across departmental, College, and University boundaries.
Application for IUG status may be made in the fifth or subsequent semesters. Students must apply to the program via the Graduate School application for admission (http://www.gradschool.psu.edu/prospective-students/how-to-apply), and must meet all the admission requirements of the Graduate School and the Engineering Science and Mechanics graduate program for the Master of Science degree. Students must be admitted to the IUG program no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree. Students must be admitted to the program prior to taking the first course they intend to count towards the graduate degree.

In consultation with an adviser, students must prepare a plan of study appropriate to this integrated program, and must present their plan of study in person to the head of the graduate program or the appropriate committee overseeing the integrated program prior to being admitted to the program. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser as the student advances through the program.

To earn the Master of Science degree in Engineering Science and Mechanics, students in the IUG program must complete all of the degree requirements for the M.S. degree. If students accepted into the IUG program are unable to complete the M.S. degree, they are still eligible to receive their undergraduate degree if all the undergraduate degree requirements have been satisfied.

Students must apply to the Graduate School (http://www.gradschool.psu.edu/prospective-students/how-to-apply) for admission to the graduate program. Applicants holding undergraduate degrees in engineering, the mathematical sciences, mathematics, engineering science, and materials science and engineering who present a minimum 3.5 grade-point average will be considered for admission. Exceptions to the minimum 3.5 grade-point average may be made at the discretion of the program for students with special backgrounds, abilities, and interests. Applicants will be accepted up to the number of places available for new students.

Scores from the Graduate Record Examination (GRE) are required for admission. At the discretion of the Graduate Officer, a student may be granted provisional admission (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/provisional-admission) pending receipt of acceptable GRE scores.

All program-specific documents for admission (e.g., transcripts, letters of recommendation, etc.) must be submitted by all applicants.

Degree Requirements
The Joint M.D./Ph.D. Program in Engineering Science and Mechanics (M.D./Ph.D., ESMCH) will form the basis for an interdisciplinary, transformational program that will educate a new generation of Physician Engineering Scientists, working at the frontiers of clinical and translational research. This Joint Degree Program responds to the national call to expedite the incorporation of clinical and translational research into improved healthcare.

Students in the Joint M.D./Ph.D. Program in Engineering Science and Mechanics will complete 4 years of medical studies (designated years M1 through M4) at the Medical School, College of Medicine, and 3 or more years of Graduate Study (designated years G1 through G3 or G4) in the Engineering Science and Mechanics (ESM) Department.

After successful completion of the first 2 years of medical school, including all required rotations and Step 1 of the United States Medical Licensing Examination (USMLE), the candidate will apply for admission to the Ph.D. program in Engineering Science and Mechanics.

Students will complete all degree requirements for the Ph.D. Degree in Engineering Science and Mechanics, including SARI (Scholarship and Research Integrity) training for the Responsible Conduct of Research (RCR) that must be met by students admitted to the program with either a baccalaureate or a master’s degree, with the following exceptions:

- students admitted to the program with a baccalaureate degree will be allowed to double count 14 professional credits toward graduate course credit for the Ph.D. degree; and,
- students admitted to the program with a master’s degree will be allowed to double count 7 professional credits toward graduate course credit for the Ph.D. degree.

Students will complete all requirements for the M.D. Degree that must be met by students admitted to the program with either a baccalaureate or master’s degree, with the following exceptions:

- baccalaureate degree holders will be allowed to double count 10 research credits (ESC 600/EMCH 610) toward professional credits for the M.D. degree; and,
- master’s degree holders will be allowed to double count 5 research credits (ESC 600/EMCH 610) applied to the Ph.D. ESMCH degree toward professional credits for the M.D. degree.

Joint Degrees
Joint M.D./Ph.D. with the College of Medicine
Requirements listed here are in addition to requirements listed in GCAC-211 Joint Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/joint-degree-programs).

Admission Requirements
All students must process an application via the American Medical College Application Service and be accepted for admission by the M.D./Ph.D. admissions committee. Admission to the program requires a minimum GPA of 3.5 and a Medical College Admission Test (MCAT) score of 32. Exceptions to the minimum requirements may be made at the discretion of the program for students with special backgrounds, abilities, and interests. Applicants will be accepted up to the number of places available for new students. Students must successfully complete Years M1 and M2 and Step 1 of the United States Medical Licensing Examination (USMLE) before entering the graduate degree program. All requirements for the Ph.D. degree must be completed prior to Year M3 of medical studies.

Students must apply to the Graduate School (http://www.gradschool.psu.edu/prospective-students/how-to-apply) for admission to the graduate program. Applicants holding undergraduate degrees in engineering, the mathematical sciences, mathematics, engineering science, and materials science and engineering who present a minimum 3.5 grade-point average will be considered for admission. Exceptions to the minimum 3.5 grade-point average may be made at the discretion of the program for students with special backgrounds, abilities, and interests. Applicants will be accepted up to the number of places available for new students.

Scores from the Graduate Record Examination (GRE) are required for admission. At the discretion of the Graduate Officer, a student may be granted provisional admission (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/provisional-admission) pending receipt of acceptable GRE scores.

All program-specific documents for admission (e.g., transcripts, letters of recommendation, etc.) must be submitted by all applicants.

Degree Requirements
The Joint M.D./Ph.D. Program in Engineering Science and Mechanics (M.D./Ph.D., ESMCH) will form the basis for an interdisciplinary, transformational program that will educate a new generation of Physician Engineering Scientists, working at the frontiers of clinical and translational research. This Joint Degree Program responds to the national call to expedite the incorporation of clinical and translational research into improved healthcare.

Students in the Joint M.D./Ph.D. Program in Engineering Science and Mechanics will complete 4 years of medical studies (designated years M1 through M4) at the Medical School, College of Medicine, and 3 or more years of Graduate Study (designated years G1 through G3 or G4) in the Engineering Science and Mechanics (ESM) Department.

After successful completion of the first 2 years of medical school, including all required rotations and Step 1 of the United States Medical Licensing Examination (USMLE), the candidate will apply for admission to the Ph.D. program in Engineering Science and Mechanics.

Students will complete all degree requirements for the Ph.D. Degree in Engineering Science and Mechanics, including SARI (Scholarship and Research Integrity) training for the Responsible Conduct of Research (RCR) that must be met by students admitted to the program with either a baccalaureate or a master’s degree, with the following exceptions:

- students admitted to the program with a baccalaureate degree will be allowed to double count 14 professional credits toward graduate course credit for the Ph.D. degree; and,
- students admitted to the program with a master’s degree will be allowed to double count 7 professional credits toward graduate course credit for the Ph.D. degree.

Students will complete all requirements for the M.D. Degree that must be met by students admitted to the program with either a baccalaureate or master’s degree, with the following exceptions:

- baccalaureate degree holders will be allowed to double count 10 research credits (ESC 600/EMCH 610) toward professional credits for the M.D. degree; and,
- master’s degree holders will be allowed to double count 5 research credits (ESC 600/EMCH 610) applied to the Ph.D. ESMCH degree toward professional credits for the M.D. degree.

Joint Degrees
Joint M.D./Ph.D. with the College of Medicine
Requirements listed here are in addition to requirements listed in GCAC-211 Joint Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/joint-degree-programs).

Admission Requirements
All students must process an application via the American Medical College Application Service and be accepted for admission by the M.D./Ph.D. admissions committee. Admission to the program requires a minimum GPA of 3.5 and a Medical College Admission Test (MCAT) score of 32. Exceptions to the minimum requirements may be made at the discretion of the program for students with special backgrounds, abilities, and interests. Applicants will be accepted up to the number of places available for new students. Students must successfully complete Years M1 and M2 and Step 1 of the United States Medical Licensing Examination (USMLE) before entering the graduate degree program. All requirements for the Ph.D. degree must be completed prior to Year M3 of medical studies.
Students may take the qualifying examination after completing 18 credits of approved graduate course work.

- master’s degree holders accepted into the Joint M.D./Ph.D. program may take the qualifying examination in the Spring Semester of Year G1, but no later than the Fall Semester of G2.
- baccalaureate degree holders accepted into the Joint M.D./Ph.D. program may take the qualifying examination within 3 semesters of entry into the Ph.D. program (expected to be the Fall Semester of G2).

Following completion of the Ph.D. dissertation, students will return to medical school to complete Years M3 and M4 of the professional M.D. degree.

**Student Aid**

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding [section](http://gradschool.psu.edu/graduate-funding) of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits [set by The Graduate School](http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) and the Tuition & Funding website. Students on graduate assistantships must also adhere to the course load limits [set by The Graduate School](http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) and the Tuition & Funding website.

Research and Teaching Assistantships (half time) are granted to a majority of graduate students in good academic standing. Financial support is ordinarily limited to three semesters for full-time master’s degree students, and six semesters for full-time Ph.D. students.

In addition to the fellowships, traineeships, graduate assistantships, or other forms of financial aid described in the link above, the following awards typically have been available to graduate students in this program.

**Theodore Holden Thomas Jr., Memorial Scholarship**

Available to undergraduate or graduate students who display outstanding ability and have enrolled in the Department of Engineering Science and Mechanics. Apply to the Department of Engineering Science and Mechanics, 212 Earth-Engineering Sciences Building. Deadline is February 1.

**Sabih and Guler Hayek Graduate Scholarship in Engineering Science and Mechanics**

Provides recognition and financial assistance to outstanding graduate students enrolled or planning to enroll in the Department of Engineering Science and Mechanics, 212 Earth-Engineering Sciences Building. Deadline is February 1.

**Dr. Richard Llorens Graduate Award in Engineering Science and Mechanics**

Provides recognition and financial assistance to graduate students pursuing a degree in Engineering Science and Mechanics who have achieved academic excellence. Apply to the Department of Engineering Science and Mechanics, 212 Earth-Engineering Sciences Building. Deadline is February 1.

**Richard P. McNitt Scholarship in Engineering Science and Mechanics**

Available to undergraduate or graduate students enrolled in the Department of Engineering Science and Mechanics who have achieved superior academic records or who manifest promise of outstanding academic success. Apply to the Department of Engineering Science and Mechanics, 212 Earth-Engineering Sciences Building. Deadline is February 1.

**Courses**

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**Contact**

**Graduate Program Head:** Judith Todd Copley  
**Director of Graduate Studies/Professor-in-Charge:** Corina Drapaca  
**Primary Program Contact:** Tammy Coval  
**Email:** tlc21@psu.edu  
**Mailing Address:** 212 EES Building, Pennsylvania State University, University Park, PA 16802  
**Telephone:** (814) 863-4586  
**Program Website:** [Engineering Science and Mechanics](http://www.esm.psu.edu)

**English**

**Graduate Program Head**  
Mark Morrisson  
**Program Code** ENGL  
**Campus(es)** University Park (Ph.D., M.A., M.F.A.)  
**Degrees Conferred** Doctor of Philosophy (Ph.D.)  
Master of Arts (M.A.)  
Master of Fine Arts (M.F.A.)  
Dual-Title Ph.D. in English and African American and Diaspora Studies  
Dual-Title Ph.D. in English and Visual Studies  
Dual-Title Ph.D. and M.A. in English and Women’s Studies  
Integrated B.A. in English and M.A. in English  
**The Graduate Faculty**  
View [https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=ENGL](https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=ENGL)

Candidates for the M.A., M.F.A., and Ph.D. in English may choose from a variety of courses in English literature and language, rhetoric and composition, and theory/cultural studies. The M.F.A. in English helps prepare candidates for professional careers as writers of fiction, poetry, or nonfiction, or for careers in academia.

The department offers a strong college-level teacher-training program, and most graduate students in English have the opportunity to serve as teaching assistants. Students usually begin by teaching basic composition courses, but there are opportunities for advanced students to teach courses in business writing, technical writing, fiction writing,
poetry writing, literature, and humanities, and to serve as tutors in the Writing Center.

### Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospectives-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Applicants should have a junior/senior grade-point average of 3.50 (on a 4.00 scale), although exceptions may be made for students with special backgrounds, abilities, and interests. Scores from the Graduate Record Examinations (GRE) Aptitude Tests (verbal and quantitative) are required for admission. Applicants must also submit three letters of recommendation, a writing sample indicating their ability to do analytical or original work, and a statement of their professional goals.

For admission, M.A. students should have strong backgrounds in English courses: 18 credits beyond freshman composition are a minimum, but the department prefers at least 24 credits.

For admission into the M.F.A. program, students must have a baccalaureate degree (with substantial work in English), a portfolio of publishable student writing, and the intention to pursue a career as a professional writer.

To be considered for the doctoral program, students must have completed an M.A. in English, M.F.A. or its equivalent. The records of potential students should indicate promise of superior work in doctoral study.

### Degree Requirements

#### Master of Fine Arts (M.F.A.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

M.F.A. candidates are required to take 48 credits, distributed as follows:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 501</td>
<td>Materials and Methods of Research</td>
<td>3</td>
</tr>
<tr>
<td>12 credits of the following, at least 9 of which must be in the student's area of specialization:</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>ENGL 512</td>
<td>The Writing of Fiction</td>
<td></td>
</tr>
<tr>
<td>ENGL 513</td>
<td>The Writing of Poetry</td>
<td></td>
</tr>
<tr>
<td>ENGL 515</td>
<td>The Writing of Nonfiction</td>
<td></td>
</tr>
<tr>
<td>Electives</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9 credits in electives (400 or 500-level courses)</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>12 credits in literature at the 500-level</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>Culminating Experience</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ENGL 596</td>
<td>Individual Studies (for the final project)</td>
<td>2</td>
</tr>
<tr>
<td>Total Credits</td>
<td></td>
<td>48</td>
</tr>
</tbody>
</table>

1. ENGL 512, ENGL 513, and ENGL 515 can be repeated for credit.
2. Or at least 6 credits of ENGL 596 and 6 credits of English Department graduate seminars. Candidates will complete a book-length manuscript of publishable quality in their area of specialization.

#### Culminating Experience

- ENGL 596: Individual Studies (in which students complete their culminating master’s paper) - 6 credits

Total Credits: 48

In addition, M.A. candidates must demonstrate reading knowledge of one of the following languages: French, German, Italian, Russian, Spanish, Latin, and Classical Greek. Other languages may be substituted with the approval of the Graduate Studies Committee.

#### Doctor of Philosophy (Ph.D.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

The Ph.D. degree does not require a specific number of credits although all students are required to have completed:

- ENGL 501 (or the equivalent),
- one course in rhetoric or theory,
- two courses in periods before 1800,
- and two courses in periods after 1800.

With the help of departmental graduate advisers, students select a program of seminars or reading courses. To complete their programs, students must pass a Ph.D. qualifying examination and pass a comprehensive examination (consisting of both written and oral components); and write a doctoral dissertation. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School, and the student must pass a final oral examination.

#### Dual-Titles

#### Dual-Title Ph.D. in English and African American and Diaspora Studies

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

**Admission Requirements**

Students must apply and be admitted to the graduate program in English and the Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of...
the African American and Diaspora Studies dual-title program. Refer to the Admission Requirements section of the African American and Diaspora Studies Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/african-american-diaspora-studies). Doctoral students must be admitted into the dual-title degree program in African American and Diaspora Studies prior to taking the qualifying examination in their primary graduate program.

In addition to the admission requirements set forth by the Graduate Council and the Department of English, students will be admitted to the dual-title degree program in African American and Diaspora Studies by an admissions committee of African American and Diaspora Studies faculty. Students enrolled in the English Department can apply for admission to the dual-title degree prior to taking the qualifying exam.

Degree Requirements
To qualify for the dual-title degree, students must satisfy the degree requirements for the Ph.D. in English. In addition, students must complete the degree requirements for the dual-title in African American and Diaspora Studies, listed on the African American and Diaspora Studies Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/african-american-diaspora-studies).

Foreign Language Requirements
As required by the Department of English, students must demonstrate reading proficiency in at least one foreign language no later than the third semester of residency (not including summer semester).

Qualifying Examination
The dual-title field must be fully integrated into the qualifying exam for the doctoral program. The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from English and must include at least one Graduate Faculty member from the African American and Diaspora Studies program. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. In addition, students in the dual-title Ph.D. in African American and Diaspora Studies must be appointed as co-chair.

Because students must first be admitted to a graduate major program of study before they may apply to and be considered for admission into a dual-title graduate degree program, dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

Dissertation Committee Composition
In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of an English and African American and Diaspora Studies dual-title Ph.D. student must include at least one member of the African American and Diaspora Studies Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. If the chair of the committee representing English is not also a member of the Graduate Faculty in African American and Diaspora Studies, then the committee member representing African American and Diaspora Studies must be appointed as co-chair.

Comprehensive Exam
The African American and Diaspora Studies Graduate Faculty member on the student’s dissertation committee is responsible for developing and administering the African American and Diaspora Studies portion of the student’s comprehensive exam. The exam must incorporate written and oral components in African American and Diaspora Studies based on the student’s thematic or regional area of interest and specialization in African American and Diaspora Studies. The African American and Diaspora Studies portion of the exam will include the following components:

• broad history of the field,
• contemporary theory and debates,
• and either sexual and gender politics or a topic related to the student’s specific area of interest.

Dissertation and Final Oral Examination
The candidate must complete a dissertation on a topic that reflects their original research and education in both English and African American and Diaspora Studies. In order to earn the dual-title Ph.D. degree, the dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School, and the student must pass a final oral examination.

Dual-Title Ph.D. in English and Visual Studies
Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

Admission Requirements
Students must apply and be admitted to the graduate program in English and the Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Visual Studies dual-title program. Refer to the Admission Requirements section of the Visual Studies Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/visual-studies). Doctoral students must be admitted into the dual-title degree program in Visual Studies prior to taking the qualifying examination in their primary graduate program.

Degree Requirements
To qualify for the dual-title degree, students must satisfy the degree requirements for the Ph.D. in English. In addition, students must complete the degree requirements for the dual-title in Visual Studies. In order to earn the dual-title Ph.D. degree, the graduate program.

Dissertation and Final Oral Examination
The dual-title field will be fully integrated into the qualifying exam for the doctoral program. The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from English and must include at least one Graduate Faculty member from the Visual Studies program. Faculty members who hold appointments in both

Foreign Language Requirements
As required by the Department of English, students must demonstrate reading proficiency in at least one foreign language no later than the third semester of residency (not including summer semester).

Qualifying Examination
The dual-title field will be fully integrated into the qualifying exam for the doctoral program. The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from English

The dual-title field will be fully integrated into the qualifying exam for the doctoral program. The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from English and must include at least one Graduate Faculty member from the Visual Studies program. Faculty members who hold appointments in both
programs’ Graduate Faculty may serve in a combined role. In addition, students in the dual-title Ph.D. in Visual Studies will be required to present to their committee a portfolio of work in Visual Studies, including:

- a statement of the student's interdisciplinary research interests,
- a program plan,
- and samples of writing that indicate the student's interest in questions related to the Visual Studies.

Because students must first be admitted to a graduate major program of study before they may apply to and be considered for admission into a dual-title graduate degree program, dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

**Dissertation Committee Composition**

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of an English and Visual Studies dual-title Ph.D. student must include at least one member of the Visual Studies Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. If the committee chair does not represent Visual Studies, the committee member representing Visual Studies must be appointed as co-chair.

**Comprehensive Exam**

The Visual Studies Graduate Faculty member on the student’s committee is responsible for developing and administering the Visual Studies portion of the student’s comprehensive exam. The exam must incorporate components addressing Visual Studies based on the student’s areas of interest and specialization in the Visual Studies.

**Dissertation**

The candidate must complete a dissertation on a topic that reflects his or her original research and education in both English and in Visual Studies in order to earn the dual-title Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the student’s program, and the Graduate School, and the student must pass a final oral examination.

**Dual-Title M.A. and Ph.D. in Women's Studies**

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

**Admissions Requirements**

Students must apply and be admitted to the graduate program in English and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Women’s Studies dual-title program. Refer to the Admission Requirements section of the Women’s Studies Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/womens-studies). Doctoral students must be admitted into the dual-title degree program in Women’s Studies prior to taking the qualifying examination in their primary graduate program.

**Degree Requirements**

To qualify for the dual-title degree, students must satisfy the degree requirements for the degree they are enrolled in English. In addition, students must complete the degree requirements for the dual-title in Women’s Studies, listed on the Women’s Studies Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/womens-studies).

The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from English and must include at least one Graduate Faculty member from the Women’s Studies program. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. There will be a single qualifying examination, containing elements of both English and Women’s Studies. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of and English and Women’s Studies dual-title Ph.D. student must include at least two members of the Women’s Studies Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in Women’s Studies, a member of the committee representing Women’s Studies must be appointed as co-chair. The Women’s Studies representative on the student’s dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their dissertation committee and reflects their original research and education in English and Women’s Studies. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

**Integrated Undergrad-Grad Programs**

**Integrated B.A. in English and M.A. in English**

Requirements listed here are in addition to requirements listed in GCAC-210 Integrated Undergraduate-Graduate (IUG) Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/integrated-undergraduate-graduate-degree-programs).

The English B.A./M.A. Integrated Undergraduate Degree Program (ENGL IUG) is a five-year program designed for highly-qualified and motivated students seeking to improve their writing skills significantly. The integrated B.A./M.A. degree offers talented undergraduates a chance to acquire both a B.A. in English and an M.A. in English in five years of study. The first two years of undergraduate course work include the University General Education and Liberal Arts requirements in addition to introductory course work in the English major. Students typically will apply to the B.A./M.A. during their 5th or 6th semester and begin graduate studies in their fourth year. In the third year students are expected to take upper-level course work in English in literature, rhetoric, or creative writing. In the fourth year, students will complete the capstone course for the English major, ENGL 487, and enroll exclusively in 400-level and graduate-level courses in creative writing. The fifth and final year of the integrated program consists entirely of graduate-level seminars. The program culminates with the submission of a master’s paper that consists of the best creative work that the student has produced in his
or her primary creative genre—either poetry or prose, and includes a scholarly research component.

**Time of Admission to the Program**

Students shall be admitted to the English IUG program no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree, as specified in the proposed IUG plan of study.

Application to the English IUG would typically occur in the junior year after a student has completed 60 credits, enrolled in the English major, and completed two English courses in creative writing.

**Admission Requirements**

Students must apply to and meet admission requirements of the Graduate School, as well as the admission requirements for the M.A. in English, listed on the Admission Requirements tab.

Admission to the integrated B.A./M.A. program will be based on the submission of a portfolio of creative work and a plan of study to the department’s Director of Graduate Studies (DGS) and the Director of the B.A./M.A. program. Applications typically will be filed during the 5th or 6th semesters of study, and applicants must have achieved a minimum of 60 credits and a 3.3 overall GPA and 3.6 GPA in English to begin the program. The English DGS will ensure that the applicant meets the minimum credit and GPA requirements for the program. The Director of the B.A./M.A. program will evaluate the quality of the student’s creative work and the applicant’s plan for fulfilling the requirements of the M.A. in English. The Director of the B.A./M.A. program, in consultation with the Creative Writing faculty, will have final approval for what constitutes an acceptable level of creative work and an acceptable plan for the completion of the M.A.

The application procedure requires submission of the following:

1. Support letters from faculty and administrators (addressed to the department’s Director of Graduate Studies and the Director of the B.A./M.A. program)
2. A personal statement
3. Portfolio of creative work
4. A Plan of Study
5. A transcript and degree audit printed from the student information system
6. A current resume or curriculum vita
7. A copy of the completed on-line Graduate School Application (GRE scores are not required).

**Plan of Study and Advising**

Prior to the application process, students should communicate their intent to enroll in the IUG to the English B.A. adviser and the Director of the B.A./M.A. program. The Director of the B.A./M.A. will help each student identify an appropriate series of English courses to properly prepare each student for the 500-level M.A. workshops and 500-level literature courses.

Students will be expected to maintain a minimum overall GPA of 3.3 for all undergraduate course work and a GPA of 3.6 in English (ENGL) courses throughout the IUG program of study. Failure to do so will result in the student being advised that he/she must regain a GPA of 3.3 within one semester. If the GPA is not 3.3 or higher in general undergraduate course work and 3.6 or higher in English course work after that term, the student will be dropped from the IUG.

Each student enrolled in the B.A./M.A. will meet at the beginning of each term with the Director of the B.A./M.A. to discuss his or her progress through the M.A. degree and to make sure that he or she is following the plan established upon his or her admission to the B.A./M.A. program.

If the student decides not to continue on in the IUG, the student may, contingent on fulfilling all other requirements for the B.A in English, graduate with a B.A. in English.

**Degree Requirements**

Students must fulfill all requirements for each degree in order to be awarded that degree, subject to the double-counting of credits as outlined below. Degree requirements for the B.A. in English are listed in the Undergraduate Bulletin (http://bulletins.psu.edu/undergraduate). Degree requirements for the M.A. degree are listed on the Degree Requirements tab. Up to 12 credits may be double-counted towards the degree requirements for both the graduate and undergraduate degrees; a minimum of 50% of the double-counted courses must be at the 500 or 800 level. Credits associated with the culminating experience for the graduate degree cannot be double-counted.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 412</td>
<td>Advanced Fiction Writing</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 413</td>
<td>Advanced Poetry Writing</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 415</td>
<td>Advanced Nonfiction Writing</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 512</td>
<td>The Writing of Fiction</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 513</td>
<td>The Writing of Poetry</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 515</td>
<td>The Writing of Nonfiction</td>
<td>3</td>
</tr>
</tbody>
</table>

**Student Aid**

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School's website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

In addition to the fellowships, traineeships, graduate assistantships, and other forms of financial aid described in the link above, the following awards typically have been available to graduate students in English graduate programs:

**Edwin Erle Sparks Fellowship in the Humanities**

Available to beginning and continuing graduate students in one of the following graduate programs:

- Comparative Literature
- English
- French
- German
- History
- Linguistics
- Philosophy
- Spanish

Apply to department before February 1.
Katey Lehman Fellowship
Provides approximately $13,000 plus tuition for a year’s study in poetry or fiction writing leading toward the B.A./M.A. in English or the M.F.A. in English. The Lehman Fellow will teach one course during the fellowship year. Fellowship holders are eligible for graduate assistantships with a similar stipend and tuition grant during the second year of study.

Wilma Ebbit Award
Funding to support research in rhetoric. Number and amount of awards to be determined.

Ben Euwema Memorial Scholarship
Travel funding for graduate degree candidates; consideration will be given to all currently enrolled graduate students in English. Preference will be given to students at the Ph.D. thesis stage, particularly those who need to travel to complete their research; number of awards and amount of each will be determined each year.

Folger Institute Fellowships
Penn State is a member of the Folger Institute of Renaissance and Eighteenth-Century Studies. Graduate students in English are eligible for Folger Institute Fellowship to study in seminars and workshops at the Folger Library, Washington, D.C.

Philip Young Memorial Award
Funding to support research in American Literature. Number and amount of awards will be determined.

Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Learning Outcomes
1. Graduate students will develop a basic familiarity with the tools, methods, techniques, and critical conversations in the various subfields.
2. Graduate students will use professional standards of the field of English studies in order to sustain an argument, develop and carry out an ambitious research plan, and to communicate the importance of that research in spoken and written forms.
3. Graduate students will be able to analyze literary or rhetorical texts or objects using a particular theoretical or methodological approach.
4. Graduate students will demonstrate effective skills in undergraduate teaching, in their research area, in the writing classroom, and as generalists.
5. Graduate students will be able to demonstrate an in-depth knowledge of tools, methods, techniques, and critical conversations in their chosen subfield(s) as well as an ability to engage substantively with those critical conversations.

Contact
Graduate Program Head: Mark Morrisson

Enterprise Architecture and Business Transformation

Graduate Program Head: Mary Beth Rosson
Program Code: EABT
Campus(es): World Campus (M.P.S.)
Degrees Conferred: Master of Professional Studies (M.P.S.)
The Graduate Faculty View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=EABT)

The Master of Professional Studies Program in Enterprise Architecture and Business Transformation (MPS/EABT) is a unique program designed for professionals aspiring to advance to roles with enterprise wide scope and authority, such as that embodied by an enterprise architect. The MPS/EABT provides a comprehensive educational experience in the principles and practice of enterprise architecture (EA) and integrates both business and enterprise technical knowledge. The program includes courses in:

- enterprise architecture foundations,
- business architecture,
- information technology architecture,
- enterprise security and risk architecture,
- organizational leadership,
- strategic management, and
- financial management.

Admission Requirements
Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Since the program is multidisciplinary in nature, students from many disciplines may be acceptable for entry into the program. The most qualified applicants will be accepted in the program until all available spaces for new students are filled.

Consideration for admission into the program will be granted to individuals who meet one of the following sets of criteria:

- An approved baccalaureate degree with a minimum grade point average of 2.75 or above, (on a 4.0 scale) a minimum of five years of
relevant work experience, three letters of reference, and a 1-3 page personal statement of relevant experience and goals.

- An approved baccalaureate degree with a minimum of a 3.00 (on a 4.00 scale) grade point average, a minimum of two years of relevant work experience, three letters of reference, and a 1-3 page personal statement of relevant experience and goals.
- A graduate degree, a minimum of one year of relevant work experience, three letters of reference, and a 1-3 page personal statement of relevant experience and goals.
- An approved baccalaureate degree, successful completion of three courses in the program with a minimum of a 3.50 (on a 4.00 scale) grade point average as a non-degree graduate student, at least two years of relevant work experience, and a 1-3 page personal statement of relevant experience and goals.

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. See GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

**Degree Requirements**

**Master of Professional Studies (M.P.S.)**

Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

The Master of Professional Studies in Enterprise Architecture and Business Transformation (MPS/EABT) program requires a minimum of 33 credits at the 400, 500, or 800 level. At least 18 credits must be at the 500 or 800 level, with at least 6 credits at the 500-level. A student will take 27 credits of required courses. The remaining 6 credits are selected from a list of approved elective courses. The courses are delivered online through Penn State World Campus. The program is highly flexible and is designed to meet the different needs of students and organizations. With online delivery, the professional master program can easily fit into the work schedule of professionals from around the globe.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>EA 871</td>
<td>Enterprise Architecture Foundations I</td>
<td>3</td>
</tr>
<tr>
<td>EA 873</td>
<td>Enterprise Modeling</td>
<td>3</td>
</tr>
<tr>
<td>EA 874</td>
<td>Enterprise Information Technology Architecture</td>
<td>3</td>
</tr>
<tr>
<td>EA 876</td>
<td>Architecting Enterprise Security and Risk Analysis</td>
<td>3</td>
</tr>
<tr>
<td>MBADM 816</td>
<td>Managing and Leading People in Organizations</td>
<td>3</td>
</tr>
<tr>
<td>MBADM 820</td>
<td>Financial Management</td>
<td>3</td>
</tr>
<tr>
<td>MBADM 571</td>
<td>Global Strategic Management</td>
<td>3</td>
</tr>
<tr>
<td>BA 888</td>
<td>Strategic Leading and Identity</td>
<td>3</td>
</tr>
</tbody>
</table>

**Electives**

Elective concentrations are available in Supply Chain, Security Architecture, Business Architecture, and Project Management. A list of courses required for each concentration is maintained by the graduate program office.

**Culminating Experience**

Each degree candidate must complete a capstone project on a topic related to enterprise architecture and agreed upon between the candidate and faculty member-in-charge while enrolled in EA 594.

**Student Aid**

World Campus students in graduate degree programs may be eligible for financial aid. Refer to the Tuition and Financial Aid section (http://www.worldcampus.psu.edu/tuition-and-financial-aid) of the World Campus website for more information.

**Courses**

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**Learning outcomes**

1. **KNOW** Demonstrate knowledge of effective Enterprise Architecture concepts that align with business strategy.
2. **APPLY/CREATE** Design, develop and apply an effective risk strategy across the enterprise.
3. **COMMUNICATE** Communicate the value of Enterprise Architecture with business and technology stakeholders.
4. **THINK** Graduates will be able to think analytically and critically about the application of concepts and methods in enterprise architecture frameworks.
5. **PROFESSIONAL PRACTICE** Understand the importance of effective modeling and project portfolio management in the Enterprise Architecture process.

**Contact**

**Graduate Program Head:** Mary Beth Rosson

**Director of Graduate Studies/Professor-in-Charge:** David Fusco

**Primary Program Contact:** Sherry Hartman

**Email:** slr8@psu.edu

**Mailing Address:** E397 Westgate Building, The Pennsylvania State University, University Park, PA 16802

**Telephone:** (814) 863-9451

**Program Website:** Enterprise Architecture (https://www.worldcampus.psu.edu/degrees-and-certificates/penn-state-online-enterprise-architecture-business-transformation-masters-degree/overview)
Entomology

Graduate Program Head

Gary W. Felton
ENT
University Park (Ph.D., M.S.)
Doctor of Philosophy (Ph.D.)
Master of Science (M.S.)
Dual-Title Ph.D. and M.S. in Entomology and Comparative and International Education
Dual-Title Ph.D. and M.S. in Entomology and International Agriculture and Development
Dual-Title Ph.D. and M.S. in Entomology and Operations Research

The Graduate Faculty

View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=ENT)

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Scores from the Graduate Record Examinations (GRE) are required for admission.

For admission a student should have a strong background in biological sciences. Courses in chemistry through organic, physics, mathematics through calculus, statistics, and computer application are recommended.

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. See GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

Degree Requirements

Master of Science (M.S.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

The Master of Science degree in Entomology is an intermediate degree leading toward the development of special knowledge in entomology. It provides training for prospective doctoral candidates. A minimum of 30 credits (400 and 500 level) is required, with at least 20 credits earned in residence. At least 18 credits in the 500 and 600 series must be included in the program. A minimum of 12 credits in coursework (400 and 500) must be completed in the major program.

Required Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENT 432</td>
<td>Insect Biodiversity and Evolution</td>
<td>4</td>
</tr>
<tr>
<td>ENT 518</td>
<td>Insect Natural History</td>
<td>2</td>
</tr>
<tr>
<td>ENT 522</td>
<td>Critical Thinking and Professional Development in Entomology</td>
<td>6</td>
</tr>
<tr>
<td>ENT 530</td>
<td>Seminar in Insect Science</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>3 credits of 400- to 500-level ENT courses</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>3 credits of statistics (i.e., STAT 501, STAT 502, STAT 541, AG 400, or equivalent)</td>
<td>3</td>
</tr>
<tr>
<td>ENT 590</td>
<td>Colloquium</td>
<td>1</td>
</tr>
</tbody>
</table>

Electives

Additional courses may be selected by the student in consultation with his/her graduate committee.

Culminating Experience

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENT 600</td>
<td>Thesis Research</td>
<td>6</td>
</tr>
</tbody>
</table>

Total Credits

30

Each master’s student is expected to serve as a teaching assistant for 3 credits (ENT 602); however, these 3 credits cannot be counted towards the minimum credits required for the degree.

Each student must present the results of thesis research at a departmental seminar, and the student may register for 1 credit of ENT 590 that semester. A thesis equivalent to 6 credits (ENT 600) is required. A final oral examination covering the general field of entomology, with emphasis in the student’s area of specialization, is required by the department. This is to be administered by the student’s committee. A favorable vote of a two-thirds majority is necessary for passing.

Committees for master’s degree candidates should be formed during the first semester, and are suggested jointly by the student and adviser, with approval by the Department Head. Masters committees have a minimum of three members. One of these should be from another degree program, particularly if the student plans to minor in that area. Adjunct faculty members cannot constitute a majority of the committee. The student and committee shall meet early in the process to plan the student’s program and approve a thesis project. Refer to the Graduate School’s Thesis and Dissertation Guide (http://gradschool.psu.edu/current-students/etd/thesisdissertationguidepdf).
Doctor of Philosophy (Ph.D.)
Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

The degree of Doctor of Philosophy signifies high scholastic achievement and demonstrated capability in independent research. Although there is no formal credit requirement at the Ph.D. level, five academic years of full time graduate work beyond the bachelor’s degree are normally required. Some of the work may be completed off campus or on a part-time basis, but between admission to the Ph.D. program and completion of the Ph.D. program, the student must spend two academic sessions in residence within a twelve-month period. The program requires all students to take:

<table>
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<tr>
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<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENT 432</td>
<td>Insect Biodiversity and Evolution</td>
<td>4</td>
</tr>
<tr>
<td>ENT 518</td>
<td>Insect Natural History</td>
<td>2</td>
</tr>
<tr>
<td>ENT 522</td>
<td>Critical Thinking and Professional Development in Entomology</td>
<td>6</td>
</tr>
<tr>
<td>ENT 530</td>
<td>Seminar in Insect Science</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>3 credits of 400- or 500-level ENT courses</td>
<td></td>
</tr>
</tbody>
</table>

Other course requirements are dependent on the student’s program of study. Each Ph.D. student is expected to serve as a teaching assistant for 6 credits (ENT 602). The results of the dissertation research must be presented at a departmental seminar. In addition, students must take and pass a comprehensive and final oral examination. Students commencing a doctoral program may have a provisional committee appointed as soon as the adviser is selected. A favorable vote by two-thirds of the qualifying examination committee members is necessary to pass the qualifying examination.

The official dissertation committee is approved by the Department Head and is appointed by the Dean of the Graduate School through the office of Graduate Enrollment Services after the student has passed the qualifying exam. Dissertation committees for students in the Entomology program include at least three members from the department, at least one member from a related field outside Entomology, and a total of no fewer than four members; five members are recommended. Typically, committee members are chosen in consultation with the adviser. If the student has a formal minor, a representative of the minor field must be on the committee.

The student and committee should meet early in the degree process to plan the student’s Ph.D. program and approve a dissertation project. A student may change adviser or committee members without prejudice. The dissertation committee guides and monitors the student’s progress, administers the comprehensive and final oral examinations, and evaluates the dissertation. Students are not formally admitted to doctoral candidacy until they have passed the comprehensive examination.

A student in the Doctor of Philosophy degree program is required to demonstrate high-level competence in the use of the English language, including reading, writing, and speaking, as part of the language and communication requirements for the Ph.D. Entomology assesses and works to improve competence of both domestic and international students. Assessments to evaluate competency prior to the qualifying exam include pieces of original writing required as part of ENT 522. Oral communication competency is evaluated during the qualifying examination. Students needing assistance are directed to appropriate remedial activities. International students should note that passage of the minimal TOEFL or IELTS requirement does not demonstrate the level of competence expected of a Ph.D. from Penn State.

There is no foreign language requirement for the Ph.D. degree. However, depending on the nature of the dissertation research and with the advice and consent of the dissertation committee, competency in a foreign language may be required as a part of the doctoral studies of certain students.

Dual-Titles
Dual-Title M.S. and Ph.D. in Entomology and Comparative and International Education
Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

Graduate students with research and educational interests in international education may apply to the Entomology/CIED dual-title degree program. The goal of the dual-title degree Entomology and CIED graduate program is to enable graduate students from Entomology to acquire the knowledge and skill of their primary area of specialization in Entomology, while at the same time gaining the perspective and methods of comparative and international education. Graduate dual-title degree program in Entomology and CIED study in this program seeks to prepare students to assume leadership roles in science, science education, outreach, and project management anywhere in the world. Students are required to write research proposals and expected to write grants to support their research activities, reflecting the dual-title degree. As part of their professional development, presentations, publication of research articles, and active participation in professional societies is expected. Emphasis is placed upon the professional development of the student. Students are able to specialize in the research program areas of chemical ecology, disease ecology and biology, pollinator ecology and biology, ecology, genomic, and pest management. Additional specialization is available to students performing research with insects in the inter-college degree programs in genetics, ecology, and plant biology. At the same time they will acquire a broad perspective about how to apply their research findings in the context of the broader international community. Thus, the dual-title will allow students to master their field of specialization from an international perspective so that they can compare practices and outcomes between countries and regions.

Admission Requirements
For admission to the dual-title degree under this program, a student must first apply and be admitted to the Entomology graduate program. Once accepted into the Entomology program, the student can apply to the Admissions Committee on the Comparative and International Education program. The CIED admissions committee reviews applications and recommends students for admission to the dual-title degree program to the Graduate School. Scores from the Graduate Records Examinations (GRE) are required for admission. In addition, students are to provide a written personal statement indicating the career goals they hope to accomplish by earning a dual-title Entomology/CIED degree. Refer to the Admission Requirements section of the CIED Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/comparative-international-education). Doctoral students must be admitted into the dual-title degree program in CIED prior to taking the qualifying examination in their primary graduate program.
Degree Requirements

To qualify for a dual-title degree, students must satisfy the requirements of the Entomology program in which they are primarily enrolled. In addition, students must complete the degree requirements for the dual-title in CIED, listed on the CIED Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/comparative-international-education). Within this framework, final course selection is determined by the student, their CIED adviser, and their Entomology program adviser.

Upon a student's acceptance by the CIED admissions committee, the student will be assigned a CIED academic adviser in consultation with the CIED program chair. As students develop specific scholarly interests, they may request that a different CIED faculty member serve as their adviser. The student and adviser will discuss a program of study that is appropriate for the student's professional objectives and that is in accord with the policies of Graduate Council, the Entomology program, and the CIED program.

Requirements for the Dual-Title M.S.

The master's in Entomology and CIED is a dual-title degree awarded only to students who are admitted to the Entomology master's program and admitted to the dual-title degree in CIED. Some courses may satisfy both the graduate primary program requirements and those of the CIED program. Final course selection is determined by the students in consultation with their CIED advisers and their major program advisers. Students and advisers should maintain the CIED Master's Degree Plan of Study, which must be submitted to the CIED program office two months before the student files the "Intent to Graduate" via LionPATH.

Dual-title M.S. students must write a master's thesis on a topic that reflects both the graduate program in Entomology and the dual-title offering in Comparative and International Education. The thesis committee for the dual-title M.S. degree will consist of two Graduate Faculty members from Entomology and one graduate faculty member from CIED.

Dual-title master's degree students in Entomology and CIED will also be required to pass a final oral examination covering the general field of Entomology and CIED, with emphasis on the student's area of specialization. The oral exam (thesis defense) is to be administered by the student's thesis committee. A favorable vote of a two-thirds majority is necessary for passing.

Requirements for the Dual-Title Ph.D.

The doctoral degree in Entomology and CIED is a dual-title degree awarded only to students who are admitted to the Entomology doctoral program and admitted to the dual-title degree in CIED. To qualify for the dual-title degree, students must satisfy the degree requirements for the degree they are enrolled in Entomology, listed in the Degree Requirements section. In addition, students must complete the degree requirements for the dual-title in CIED, listed on the CIED Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/comparative-international-education).

Particular courses may satisfy both the Entomology Department requirements and those in the Comparative and International Education program. Final course selection is determined by the student in consultation with their CIED advisers and their major program advisers. Students who already hold a master's degree from another institution may petition to have equivalent course credits accepted.

The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Entomology and must include at least one Graduate Faculty member from the CIED program. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. There will be a single qualifying examination, containing elements of both Entomology and CIED. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of an Entomology and CIED dual-title Ph.D. student must include at least one member of the CIED Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in CIED, the member of the committee representing CIED must be appointed as co-chair. The CIED representative on the student's dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their dissertation committee and reflects their original research and education in Entomology and CIED. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

Dual-Title M.S. and Ph.D. in Entomology and International Agriculture and Development

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

Graduate students with research and educational interests in international agriculture and development may apply to the Entomology/INTAD Dual-Title Degree Program. The goal of the dual-title degree Entomology and INTAD graduate program is to enable graduate students from Entomology to acquire the knowledge and skills of their primary area of specialization in Entomology, while at the same time gaining the perspective and methods needed for work in the international agriculture. Graduate study in this program seeks to prepare students to assume leadership roles in science, science education, outreach, and project management anywhere in the world. Students are required to write research proposals and expected to write grants to support their research activities, reflecting the dual-title degree. As part of their professional development presentations, publication of research articles and active participation in professional societies is expected. Emphasis is placed upon the professional development of the student. Students are able to specialize in the research program areas of chemical ecology, disease ecology and biology, pollinator ecology and biology, ecology, genomics, and pest management. Additional specialization is available to students performing research with insects in the inter-college degree programs in genetics, ecology, and plant biology. At the same time they will acquire a broad perspective about how to apply their research findings in the context of the broader international community. Thus, the dual-title will allow students to master their field of specialization from an international perspective so that they can compare practices and outcomes between countries and regions.
Admission Requirements
For admission to the dual-title doctoral degree under this program, a student must first apply and be admitted to the Entomology graduate program. Once accepted into the Entomology program, the student can then submit an application to the INTAD Academic Program Committee for the dual-title degree program. The application consists of a written personal statement indicating the career goals that a student hopes to accomplish by earning a dual-title ENT/INTAD degree. For admission a student should have a strong background in biological sciences. Courses in chemistry through organic, physics, mathematics through calculus, statistics, and computer application are recommended. Refer to the Admission Requirements section of the INTAD Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/international-agriculture-development). Doctoral students must be admitted into the dual-title degree program in INTAD prior to taking the qualifying examination in their primary graduate program.

Degree Requirements
To qualify for a dual-title degree, students must satisfy the requirements of the Entomology program in which they are primarily enrolled. In addition, students must complete the degree requirements for the dual-title in INTAD, listed on the INTAD Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/international-agriculture-development). Degree Committee forms should be filed upon selection of the dual-title master’s degree in Entomology and INTAD, with emphasis on the student’s area of interest.

Requirements for the Dual-Title M.S.
The dual-title master’s in Entomology and INTAD is awarded only to students who are admitted to the Entomology master’s program and admitted to the dual-title degree in INTAD. Some courses may satisfy both the graduate primary program requirements and those of the INTAD program. Final course selection is determined by the students in consultation with their INTAD advisers and their Entomology program advisers. Permission from a student’s academic adviser, in consultation with the program chair, is required to substitute a 400-level course for a 500-level course; however, the requirement for 18 INTAD credits at the 500 or 800 level must still be met, in total, across both the major and the dual-title courses of study. Particular courses may satisfy both the Entomology Department requirements and those in the INTAD program. Final course selection is determined by the student in consultation with their INTAD advisers and their Entomology program advisers. Students who already hold a master’s degree from another institution may petition to have equivalent course credits accepted.

Graduates of the dual-title INTAD master’s degree program who wish to pursue an INTAD doctoral degree must re-apply to the INTAD program for admission. INTAD master’s degree credits may be carried over to the doctoral program. Six additional INTAD credits will be required. INTAD master’s degree graduates who pursue an INTAD Ph.D. are required to take the INTAD 820 International Agricultural Development Seminar a second time.

Qualifying Examination
The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Entomology and must include at least one Graduate Faculty member from the INTAD program. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. There will be a single qualifying examination, containing elements of both Entomology and INTAD. Qualifying examination procedures will be based on the procedures of the major department and will have an international dimension. Although not encouraged, the dual-title degree student may require an additional semester or more to fulfill requirements for the dual-title degree program. Therefore, under exceptional circumstances, the qualifying exam may be delayed at the discretion of the student’s adviser in consultation with the INTAD program coordinators.

Dissertation Committee Composition
In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of an Entomology and INTAD dual-title Ph.D. student must include at least one member of the INTAD Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in INTAD, the member of the committee representing INTAD must be appointed as co-chair.

Comprehensive Exam
At the end of the course work, students in the dual-title doctoral degree program in Entomology and INTAD will be required to pass an oral comprehensive examination based on their thesis proposal and area of specialization in entomology, while reflecting their dual-title curriculum. A separate comprehensive examination is not required by the INTAD program, but international agriculture must be one of the key areas of the exam and the INTAD representative on the student's dissertation committee must have input into the development of and participation in the evaluation of the comprehensive examination.

Dissertation and Dissertation Defense
Ph.D. students enrolled in the dual-title degree program are required to write and orally defend a dissertation on a topic that reflects their original research and education in both Entomology and International Agriculture and Development. The dissertation should contribute to the body of knowledge in international agriculture. A public oral presentation of the dissertation is required. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.
Dual-Title M.S. and Ph.D. in Entomology and Operations Research

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

Graduate students with research and educational interests in operations research may apply to the Entomology/OR Dual-Title Degree Program. The goal of the dual-title degree Entomology and OR graduate program is to enable graduate students from Entomology to acquire the knowledge and skill of their primary area of specialization in Entomology, while at the same time attain and be identified with the tools, techniques, and methodology of operations research. Operations research is the analysis—usually involving mathematical treatment—of a process, problem, or operation to determine its purpose and effectiveness and to gain maximum efficiency. Graduate Dual-Title degree program in Entomology and OR study in this program seeks to prepare students to assume leadership roles in science, science education, outreach, and project management anywhere in the world. Students are required to write research proposals and expected to write grants to support their research activities, reflecting the dual-title degree. As part of their professional development, presentations, publication of research articles, and active participation in professional societies is expected. Emphasis is placed upon the professional development of the student. Students are able to specialize in the research program areas of chemical ecology, disease ecology and biology, pollinator ecology and biology, ecology, genomics, and pest management. Additional specialization is available to students performing research with insects in the inter-college degree programs in genetics, ecology, and plant biology. At the same time they will acquire a broad perspective about how to apply their research findings in the context of operations research. Thus, the dual-title will allow students to master their field of specialization from an operations research perspective.

Admission Requirements

For admission to the dual-title degree under this program, a student must first apply and be admitted to the Entomology graduate program. Once accepted into the Entomology program, the student can apply to the Admissions Committee of the Operations Research program. The OR admissions committee reviews applications and recommends students for admission to the dual-title degree program to the Graduate School. Scores from the Graduate Record Examinations (GRE) are required for admission. Refer to the Admission Requirements section of the OR Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/operations-research). Doctoral students must be admitted into the dual-title degree program in OR prior to taking the qualifying examination in their primary graduate program.

Degree Requirements

To qualify for a dual-title degree, students must satisfy the requirements of the Entomology program in which they are primarily enrolled. In addition, students must complete the degree requirements for the dual-title in OR, listed on the OR Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/operations-research). Within this framework, final course selection is determined by the student, their OR adviser, and their Entomology program adviser.

The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Entomology and must include at least one Graduate Faculty member from the OR program. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. There will be a single qualifying examination, containing elements of both Entomology and OR. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of an Entomology and OR dual-title Ph.D. student must include at least one member of the OR Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in OR, the member of the committee representing OR must be appointed as co-chair. The OR representative on the student’s dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their dissertation committee and reflects their original research and education in Entomology and OR. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Learning Outcomes

Master of science (M.S.)

1. Know: Graduates will demonstrate in depth knowledge of the core theories and methods as well as within one or more sub-specialties in the field of entomology. The core demonstration will include the application of insect ecology, physiology, systematics, and natural history, to problems in agriculture, chemical ecology, pollinator ecology, biotechnology, and integrated pest management.

2. Create: Graduates will be able to creatively synthesize theory and current literature to generate new ideas or hypotheses in the entomological sciences, devise critical tests of hypotheses, and/or develop unique solutions to entomological problems.
3. Apply: Graduates will be able to carry out independent and original research studies that address current problems in the field of entomology.

4. Critical thinking: Graduates will be able to critically analyze work by others in their field of specialty.

5. Communicate: Graduates will be able to convey ideas or arguments in clear, concise, well-organized papers and proposals as well as in formal, oral presentations.

6. Professional practice: Graduates will demonstrate the ability to collaborate in a collegial and ethical manner with other professionals within their field or with diverse scientific backgrounds. Graduates will demonstrate the PSU core values of Integrity, Respect, Responsibility, Discovery, Excellence, and Community.

Doctor of Philosophy (Ph.D.)

1. Know: Graduates will demonstrate in depth knowledge of the core theories and methods as well as within one or more sub-specialties in the field of entomology. The core demonstration will include the application of insect ecology, physiology, systematics, and natural history, to problems in agriculture, chemical ecology, pollinator ecology, biotechnology, and integrated pest management.

2. Create: Graduates will be able to creatively synthesize theory and current literature to generate new ideas or hypotheses in the entomological sciences, devise critical tests of hypotheses, and/or develop unique solutions to entomological problems.

3. Apply: Graduates will be able to carry out independent and original research studies that address current problems in the field of entomology.

4. Critical thinking: Graduates will be able to critically analyze work by others in their field of specialty.

5. Communicate: Graduates will be able to convey ideas or arguments in clear, concise, well-organized papers and proposals as well as in formal, oral presentations.

6. Professional practice: Graduates will demonstrate the ability to collaborate in a collegial and ethical manner with other professionals within their field or with diverse scientific backgrounds. Graduates will demonstrate the PSU core values of Integrity, Respect, Responsibility, Discovery, Excellence, and Community.

Contact

Graduate Program Head: Gary Felton

Director of Graduate Studies/Professor-in-Charge: John Tooker

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Email: ldw5@psu.edu

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Telephone: (814) 865-3077

Program Website: Entomology (http://ento.psu.edu/graduateprograms)

Environmental Engineering (Capital)

Graduate Program Head: Rafic Bachnak

Program Code: ENVE

Campus(es): Harrisburg (M.Eng.)

Degrees Conferred: Master of Engineering (M.Eng.)

Integrated B.S. in Civil Engineering and M.Eng. in Environmental Engineering

The Graduate Faculty

View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=ENVE)

This program, offered at the Harrisburg campus, is intended for the engineer who wishes to pursue, either full-time or part-time, further training in the environmental field with a focus toward understanding the theory behind the design of environmental systems. Prospective students who do not have an undergraduate engineering degree, but rather hold a baccalaureate degree in a related scientific field (such as chemistry, microbiology, environmental science) may be admitted to the program but may need to take several prerequisite undergraduate engineering courses. This degree program builds on the Civil Engineering undergraduate program and complements the Environmental Pollution Control graduate programs (M.E.P.C. and M.S. in EPC) offered by the same faculty.

A variety of civil and environmental engineering courses are regularly offered, as well as specialty courses in environmental policy, other engineering areas, computer science, and other policy-related areas.

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Applicants are strongly encouraged to present an undergraduate degree in engineering from an ABET-accredited program. ABET (http://bulletins.psu.edu/graduate/programs/majors/environmental-engineering-capital/www.abet.org) is the accrediting body for engineering programs. However, those who possess an undergraduate degree in a related scientific field or unaccredited engineering program may be considered for admission; those students will need to take additional engineering courses at the undergraduate level in order to be adequately prepared.

All students are expected to have an undergraduate junior/senior grade-point average of 3.0 on a 4.0-point system. Exceptions to this minimum may be made for students with special backgrounds or abilities, or other qualifications.

All applicants must provide official transcripts from all post-secondary institutions attended (http://www.gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission). In addition, applicants must supply a statement of objectives and three letters of recommendation.

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. See GCAC-305 Admission Requirements for International Students.
Degree Requirements

Master of Engineering (M.Eng.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

A minimum of 30 credits is required for the degree. Courses in the degree program may be taken at the 400 or 500 level, but a minimum of 18 credits must be at the 500 level.

All candidates are required to take core courses that provide a foundation and context for pursuing and successfully completing a master’s program in environmental engineering. The following are the required core courses.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENVE 450</td>
<td>Colloquium</td>
<td>1</td>
</tr>
<tr>
<td>ENVE 591</td>
<td>Research Methods in Environmental Engineering</td>
<td>1</td>
</tr>
<tr>
<td>CE 592</td>
<td>Environmental Engineering &amp; Science Topics</td>
<td>1</td>
</tr>
</tbody>
</table>

Electives

Select 15-16 credits of the following (at least one course from each 15-16 core area): 2

Core 1 (Chemistry)

- CE 475 Water Quality Chemistry
- or CE 570 Environmental Aquatic Chemistry

Core 2 (Process Engineering)

- ENVE 411 Water Supply and Pollution Control
- ENVE 550 Chemical Fate and Transport
- CE 571 Physical-Chemical Treatment Processes
- CE 572 Biological Treatment Processes 3
- CE 577 Treatment Plant Design

Core 3 (Biology)

- ENVE 540 Biodegradation and Bioremediation
- CE 572 Biological Treatment Processes 3
- CE 579 Environmental Pollution Microbiology

Core 4 (Water Resources)

- ENVE 415 Hydrology 4
- CE 561 Surface Hydrology 4
- CE 462 Open Channel Hydraulics
- CE 555 Groundwater Hydrology: Analysis and Modeling
- CE 580 Hydrodynamic Mixing Processes

Core 5 (Policy)

- ENVE 460 Environmental Law
- ENVE 569 Environmental Risk Assessment

Select 8-9 additional credits 5

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENVE 594</td>
<td>Research Topics 1</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits 30

1. This program does require that all students complete a scholarly master’s paper. The seminar and the paper count toward the 500-level requirement. It is expected that students will upload their master’s papers to be available publically via ScholarSphere (https://scholarsphere.psu.edu).

2. In addition to the requirements listed above, students must take one course (3 or 4 credits per course) in each of the following five core areas of environmental engineering theory and design, and environmental policy: Chemistry, Process Engineering, Biology, Water Resources; and Environmental Policy. Students must take at least one course from each core area (as shown in the table below) for a total of 15-16 credits. All courses are 3 credits except for CE 475.

3. CE 572 is listed as approved for both Cores 2 and 3. Once the course is successfully completed, the course may count for one of the two core areas. An additional course is required in either Core 2 or 3, depending on the student’s interest.

4. Because of similarity of the content (both are introductory hydrology courses), students will not be allowed to take both ENVE 415 and CE 561 for credit in the master’s program.

5. The remaining 8 or 9 credits may be used by the student to specialize in an area of environmental engineering by taking classes offered not only by the Environmental Engineering Program but also from Mechanical Engineering and Civil Engineering. (e.g., CE 578) In addition, certain courses from the Schools of Business and Public Administration may be approved on a course-by-course basis.

Course that meet the core area requirements include, but are not limited to, the courses in the table above. Courses that deviate from this tabulated list will require pre-approval from the student’s adviser. If these courses were taken to meet degree requirements for a baccalaureate degree, they cannot be counted toward the graduate degree.

Integrated Undergrad-Grad Programs

Integrated B.S. in Civil Engineering and M.Eng. in Environmental Engineering

Requirements listed here are in addition to requirements listed in GCAC-210 Integrated Undergraduate-Graduate (IUG) Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/integrated-undergraduate-graduate-degree-programs).

The Civil Engineering undergraduate and Environmental Engineering graduate programs offers a limited number of academically superior Bachelor of Science candidates the opportunity to enroll in an integrated, continuous program of study leading to both the Bachelor of Science in Civil Engineering and the Master of Engineering in Environmental Engineering. The ability to coordinate as well as concurrently pursue the two degree programs enables the student to earn the two degrees in five years.

Students must apply to the program via the Graduate School application for admission (http://www.gradschool.psu.edu/prospective-students/how-to-apply), and must meet all the admission requirements of the Graduate School and the Environmental Engineering graduate program for the Master of Engineering degree, listed in the Admission Requirements section. Students shall be admitted to an IUG program no
forms of student aid are described in the Tuition & Funding Graduate assistantships available to students in this program and other Student Aid for the Bachelor of Science degree by the end of their fourth year. Assuming all the undergraduate degree requirements have been met, a student admitted to the IUG program is unable to continue in the Bachelor of Science C E degree program due to the courses that count toward the Master of Engineering degree.

Students who have not maintained a collective GPA of 3.3 or better in courses designated MATH, CHEM, CE, or ENVE.

Students will be admitted on a provisional basis (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/provisional-admission) late in their 6th semester so that they may be advised appropriately for the IUG 7th semester courses. Formal acceptance is contingent upon maintaining the 3.0 cumulative GPA throughout the 6th semester, and a collective GPA of 3.3 or better in courses designated MATH, CHEM, CE, or ENVE.

Student performance will be monitored on an on-going basis. In addition, a formal evaluation of student academic performance will be performed when the student has completed 114 to 115 credits, the end of the first semester of the senior year for a typical student in the program. Students who have not maintained a collective 3.3 GPA in courses designated MATH, CHEM, CE, or ENVE will be transferred to a probationary status. Students who have not maintained a collective GPA of 3.3 or better in courses designated MATH, CHEM, CE, or ENVE by the end of their eighth semester will be dropped from the graduate program but will continue in the Bachelor of Science C E degree program.

If for any reason a student admitted to the IUG program is unable to complete the requirements for the Master of Engineering degree, the student will be permitted to receive the Bachelor of Science degree, assuming all the undergraduate degree requirements have been completed satisfactorily. Students who successfully complete the courses listed in the recommended schedule will satisfy the requirements for the Bachelor of Science degree by the end of their fourth year.

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Learning Outcomes

1. Graduates will demonstrate advanced knowledge of the theory and design of environmental engineering unit processes.
2. Graduates will understand environmental issues related to air, water, and soil pollution and how these issues are addressed by engineering.
3. Graduates will apply their knowledge of environmental unit processes to the design of a multi-step, integrated environmental treatment or natural resources system.
4. Graduates will demonstrate the application of environmental systems theory to the solution of real-world problems in Pennsylvania, the Chesapeake Bay watershed, and beyond.
5. Graduates will demonstrate an understanding of and will embody the professional ethics of the protection of health and safety first.
6. Graduates will communicate their research activities in a concise manner, both written and orally, and will be able to place their research into the broader context of environmental engineering.

Contact

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Director of Graduate Studies/Professor-in-Charge: Shirley Clark

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Telephone: (717) 948-6124

Program Website: Environmental Engineering at Harrisburg (https://harrisburg.psu.edu/science-engineering-technology/civil-structural-engineering/master-engineering-environmental-engineering)
Environmental Engineering
(Engineering)

Graduate Program Head
Patrick Fox
Program Code
ENV_E
Campus(es)
University Park (Ph.D., M.S., M.Eng.)

Degrees Conferred
Doctor of Philosophy (Ph.D.)
Master of Science (M.S.)
Master of Engineering (M.Eng.)
Dual-Title Ph.D. in Environmental Engineering and Biogeochemistry

The Graduate Faculty
View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=ENV_E)

This specialty prepares students for careers in:
- the design of treatment facilities,
- environmental monitoring,
- process development for water quality control,
- industrial waste treatment,
- management of hazardous and toxic substances,
- monitoring and management of environmental quality,
- air pollution control,
- and water resource systems.

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Applicants should possess a baccalaureate degree from a regionally accredited institution. Students in engineering, physical sciences, or mathematics with a 3.00 grade-point average (on a 4.00 scale) may be considered for admission. Exceptions to the minimum 3.00 grade-point average may be made for students with special backgrounds, abilities, and interests. Students without a baccalaureate degree in engineering would be admitted on a provisional basis (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/provisional-admission) pending successful completion of entrance requirements (completed concurrently with degree requirements).

All applicants must submit official transcripts from all post-secondary institutions attended (http://www.gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission), a statement of objectives, and three references for letters of recommendation when applying to the program. In addition, all applicants must submit scores from the Graduate General Record Examinations Aptitude Test (verbal, quantitative, and analytical). For the M.Eng. degree, the GRE requirement will be waived for students who have graduated with a degree from the College of Engineering at The Pennsylvania State University with a cumulative grade-point average of greater than 3.30.

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. See GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

Application Deadlines

M.Eng.: Complete applications including required supplementary materials (e.g., official transcripts, reference letters) should be submitted by March 15th of the calendar year for admission in Fall semester. International students are strongly encouraged to submit complete applications early to allow sufficient time for visa processing.

M.S. and Ph.D.: Complete applications including required supplementary materials (e.g., official transcripts, reference letters) should be submitted by September 15th for admission in Spring semester and by December 15th for admission in Fall semester. International students are strongly encouraged to submit complete applications early to allow sufficient time for visa processing.

Degree Requirements

Master of Engineering (M.Eng.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

The M.Eng. degree is a non-thesis professional master’s degree. The program provides training for advanced professional practice. A minimum of 31 credits (400, 500, and 800 level) of course work are required. At least 18 credits must be earned in graduate courses (500 level). At least 12 credits must be earned in courses with the CE prefix. At least 20 credits must be earned at an established graduate campus of the University. All students are required to take CE 535 to fulfill the requirement for a culminating experience. Specific core courses are also required. All students are required to take the 1-credit CE 590 and complete all requirements for Scholarship and Research Integrity (SARI) training. The M.Eng. degree is designed as a two-semester master's degree program and students are required to start their degree in the Fall semester. The preferred plan of study is as follows:
- Fall semester: Fifteen credits of course work plus one credit of CE 590
- Spring semester: Fifteen credits of course work, including CE 535

Continuous registration is required for all M.S. and Ph.D. graduate students until the thesis (M.S.) or dissertation (Ph.D.) has been approved or course requirements have been satisfied (M.Eng.).

Master of Science (M.S.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

The M.S. degree program is strongly oriented toward research. A thesis is required, and at least 6 credits of thesis research (CE 600 or CE 610) must be included in the student’s academic course plan. A minimum of 31 credits (400, 500, 600, and 800 level) are required, of which 20 must be earned at an established graduate campus of the University. A minimum of 24 credits of course work are required. A minimum of 12 credits of course work (400 and 500 level) must be completed in the major (courses prefixed CE). At least 18 credits in the 500 and 600 levels, combined, must be included in the program. Specific core courses are also required. All students are required to take the 1-credit CE 590 and complete all requirements for Scholarship and Research Integrity (SARI) training.
Students are not permitted to count audited credits toward the minimum credits required for the degree.

Continuous registration is required for all M.S. and Ph.D. graduate students until the thesis (M.S.) or dissertation (Ph.D.) has been approved or course requirements have been satisfied (M.Eng.).

**Doctor of Philosophy (Ph.D.)**

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

For the Ph.D. degree, a minimum of 21 credits of course work (400, 500, 600, and 800) is required beyond the M.S. degree, or 15 credits beyond the M.S. in Environmental Engineering from Penn State. Specific core courses are also required. All students are required to take the 1-credit CE 590 and complete all requirements for Scholarship and Research Integrity (SARI) training. Students are not permitted to count audited credits toward the minimum credits required for the degree. A candidate for the Ph.D. degree must pass the English proficiency and qualifying examinations, prepare and defend the dissertation proposal as part of the oral comprehensive examination, and pass the final oral examination (dissertation defense). Prior to completion of the Ph.D. program, the student must spend at least two consecutive semesters as a registered full-time student.

Continuous registration is required for all M.S. and Ph.D. graduate students until the thesis (M.S.) or dissertation (Ph.D.) has been approved or course requirements have been satisfied (M.Eng.).

**Dual-Titles**

**Dual-title Ph.D. in Environmental Engineering and Biogeochemistry**

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

Graduate students with research and educational interests in biogeochemistry may apply to the Biogeochemistry dual-title degree program. Students must apply and be admitted to the graduate program in Environmental Engineering and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Biogeochemistry dual-title program. Refer to the Admission Requirements section of the Biogeochemistry Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/biogeochemistry). Doctoral students must be admitted into the dual-title degree program in Biogeochemistry prior to taking the qualifying examination in their primary graduate program.

Students in the Biogeochemistry Dual Title program are required to have two advisers from separate disciplines:

1. one individual serving as a primary adviser in their major degree program
2. and a secondary adviser in an area within a field covered by the dual-title program and a member of the Biogeochemistry faculty.

To qualify for the dual-title degree, students must satisfy the degree requirements for the degree they are enrolled in Environmental Engineering, listed in the Degree Requirements section. In addition, students must complete the degree requirements for the dual-title in Biogeochemistry, listed on the Biogeochemistry Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/biogeochemistry).

All students must pass a qualifying examination that includes an assessment of their potential in the field of biogeochemistry. A single candidacy examination that includes biogeochemistry will be administered for admission into the student’s Ph.D. program, as well as the biogeochemistry dual-title. The structure and timing of this exam will be determined jointly by the dual-title and major program. The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Environmental Engineering and must include at least one Graduate Faculty member from the Biogeochemistry program. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of an Environmental Engineering and Biogeochemistry dual-title Ph.D. student must include at least one member of the Biogeochemistry Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in Biogeochemistry, the member of the committee representing Biogeochemistry must be appointed as co-chair. The Biogeochemistry representative on the student’s dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their dissertation committee and reflects their original research and education in Environmental Engineering and Biogeochemistry. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

**Student Aid**

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School's website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

International applicants who wish to be considered for a teaching assistantship must present an acceptable score (250-300 or 55-60) on the Test of Spoken English (TSE). The TSE can be taken in many countries, or at Penn State after arrival. The Department offers a number of graduate fellowships.

**Courses**

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up
deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact
Graduate Program Head: Patrick Fox
Director of Graduate Studies/Professor-in-Charge: William Burgos
Primary Program Contact: Judy Heltman
Email: jle5@psu.edu
Mailing Address: Civil & Environmental Engineering, 216 Sackett Bldg., University Park, PA 16802
Telephone: (814) 863-3085
Program Website: Environmental Engineering (https://www.cee.psu.edu/academics/graduate/degrees-and-requirements.aspx)

Environmental Pollution Control
Graduate Program Head: Rafic Bachnak
Program Code: EPC
Campus(es): Harrisburg (M.S., M.E.P.C.), University Park (M.S., M.E.P.C.)
Degrees Conferred: Master of Science (M.S.), Master of Environmental Pollution Control (M.E.P.C.)
The Graduate Faculty View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=EPC)

This intercollegiate master's degree program, available at Penn State Harrisburg and Penn State University Park, deals with the various aspects of air, land, and water pollution control. Graduate instruction is under the direction of an interdisciplinary faculty committee and the departments participating in the program. The EPC faculty have teaching and research interests in the area of environmental pollution control, and where projects are being funded, support opportunities may be available. Currently, faculty from sixteen departments in four colleges are participating in the program at University Park and faculty from four graduate programs participate at Penn State Harrisburg. A student is affiliated with one of these departments on the basis of his/her specific area of interest and is advised by an EPC faculty member in that department. Maximum flexibility is maintained by the program in an effort to meet both the needs of the individual student and the pollution control activity in which he/she wants to participate.

Admission Requirements
Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

The EPC program is designed for students with backgrounds in science or engineering. Admission will be granted if the applicant has the necessary program prerequisites and a faculty member in the student's interest area agrees to serve as adviser. Normal admission requirements include mathematics through integral calculus plus two courses each in both general chemistry and physics.

Students with a 3.00 junior/senior average and with appropriate backgrounds in mathematics and science will be considered for admission. The best-qualified applicants will be admitted up to the number of places that are available for new students. Applicants to the Environmental Pollution Control program are required to provide a statement of objectives, three letters of recommendation, and scores from the Graduate Record Examination (GRE) Aptitude Test (verbal, quantitative, analytical) to complete the admission process.

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. See GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

Entering graduate students in the Environmental Pollution Control program for whom English is not their first language are required to have a score of at least 560 on the paper-based TOEFL (Test of English as a Foreign Language) examination.

Degree Requirements
Master of Environmental Pollution Control (M.E.P.C.)
Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

All candidates are required to take a core course in each of four environmental areas:

1. air,
2. water,
3. solid waste,
4. hazardous waste management,
5. and policy/risk

and 1 credit of the EPC 590 seminar for a minimum core requirement of 12 credits. All but 6 of the total 30 credits required must be selected from a recommended course list. The M.E.P.C. EPC degree requires submission of a scholarly master's paper.

Master of Science (M.S.)
Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

All candidates are required to take a core course in each of four environmental areas:

1. air,
2. water,
3. solid waste,
4. hazardous waste management,
5. and policy/risk

and 1 credit of the EPC 590 seminar for a minimum core requirement of 12 credits. All but 6 of the total 30 credits required must be selected from a recommended course list. If the option to prepare a thesis is selected, students must schedule at least 12 credits at the 500 level, take at least 6 credits of 600-level thesis research in their thesis adviser's...
academic department, and write a thesis on an area concerned with environmental pollution. Only 6 credits of 600-level course work may count toward the 30-credit minimum degree requirement. Students who select the nonthesis option must schedule at least 18 credits at the 500 level, which may include 1 credit of EPC 590 and a maximum of 3 paper-writing credits.

**Watershed Stewardship Option**

The Graduate Option in Watershed Stewardship is a graduate option intended to provide enhanced educational opportunities for students with an interest in water resources management who are enrolled in a graduate degree program in Environmental Pollution Control at the University Park campus. The objective of the Graduate Option in Watershed Stewardship is to educate students to facilitate team-oriented, community-based watershed management planning directed at natural resources conservation and environmental problems encountered in Pennsylvania communities, especially non-point source water pollution. The Graduate Option in Watershed Stewardship requires 22 credits of graduate course work:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>FOR 591A &amp; FOR 591B or LARCH 510</td>
<td>Seminar in Watershed Stewardship Issues and Seminar in Watershed Stewardship Planning or Graduate Seminar in Landscape Architecture</td>
<td>2</td>
</tr>
<tr>
<td>Select one of the following sequences:</td>
<td></td>
<td>8</td>
</tr>
<tr>
<td>FOR 570 &amp; FOR 571</td>
<td>Watershed Stewardship Practicum I and Watershed Stewardship Practicum II</td>
<td></td>
</tr>
<tr>
<td>LARCH 817 &amp; LARCH 550</td>
<td>Grad Studio III and Master of Landscape Architecture Project Studio</td>
<td></td>
</tr>
<tr>
<td>Total Credits</td>
<td></td>
<td>22</td>
</tr>
</tbody>
</table>

1. Breadth courses will consist of three graduate credits of course work from each of four subject matter areas:
   1. water resources science,
   2. social science, public policy and economics,
   3. humanities, and
   4. communications and design.

In the watershed stewardship practicum courses students work in teams with community, government and business leaders to analyze and understand natural resources and environmental pollution problems and creatively synthesize appropriate solutions in the form of a written watershed management plan.

A list of acceptable breadth courses from each category is provided in the Graduate Option in Watershed Stewardship Handbook. Students will be allowed to petition to the Center for Watershed Stewardship to substitute higher level or equivalent courses in a major field to suit their specific backgrounds and goals. Courses taken for the Graduate Option in Watershed Stewardship may be used to satisfy other EPC degree requirements with concurrence of their adviser and graduate committee and only if such courses are approved EPC core requirements or are on the currently approved list of additional 400- and 500-level course for the EPC major. The graduate committee for a student enrolled in the Option in Watershed Stewardship must include a faculty representative from the Center for Watershed Stewardship.

Students enrolled in M.E.P.C. or M.S. degree program within Environmental Pollution Control may apply to participate in the Graduate Option in Watershed Stewardship. EPC students may prepare their thesis or paper on a topic related to their watershed management plan, but the thesis or paper must reflect independent thought and scholarly effort above and beyond the requirements of FOR 570 and FOR 571 or LARCH 817 and LARCH 550.

**Student Aid**

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

**Courses**

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**Learning Outcomes**

1. Graduates will demonstrate advanced knowledge of the theory of environmental pollution and its control.
2. Graduates will understand environmental issues related to air, water, and soil pollution and how these issues are addressed by environmental scientists.
3. Graduates will apply their knowledge of environmental pollution fate, transport, and control to the theoretical design of an integrated environmental treatment or natural resources system.
4. Graduates will demonstrate the application of environmental theory to the solution of real-world problems in Pennsylvania, the Chesapeake Bay watershed, and beyond.
5. Graduates will demonstrate an understanding of and will embody the professional ethics of the protection of health and safety first.
6. Graduates will communicate their research activities in a concise manner, both written and orally, and will be able to place their research into the broader context of environmental science and pollution control.

**Contact**

**Graduate Program Head:** Rafic Bachnak

**Director of Graduate Studies/Professor-in-Charge:** Shirley Clark

**Primary Program Contact:** Justine Yelk

**Email:** jes5437@psu.edu

**Mailing Address:** Penn State Harrisburg, 777 W. Harrisburg Pike, W236 Olmsted, Middletown, PA 17057

**Telephone:** (717) 948-6124

**Program Website:**
Epidemiology

Graduate Program Head
Duanping Liao

Program Code
EPID

Campus(es)
Hershey (Ph.D.)

Degrees Conferred
Doctor of Philosophy (Ph.D.)

View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=EPID)

Epidemiology is the discipline for the study of the distribution and determinants of health-related states or events (including diseases) in specified human populations, and the application of this study to the prevention and control of health problems. Epidemiology is the primary source of the knowledge that underlies public health policy and practice. As such, well-trained epidemiologists develop and evaluate hypotheses about the effects of various factors (risk factors) on human health and develop the knowledge basis for disease prevention and control programs.

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Applicants must complete prior to admission:

1. An M.S. or M.P.H. degree with a focus on epidemiology or biostatistics.
2. A two-semester graduate level course in Epidemiology, comparable to PHS 550 and PHS 551.
3. A two-semester graduate level course in Biostatistics, comparable to PHS 520 and PHS 521.

Prospective applicants must demonstrate:

1. Completion of an undergraduate bachelor degree program at an accredited U.S. college or university, or its equivalent in another country, with a GPA of 3.0 or higher. Official transcripts from all post-secondary institutions attended are required. (http://gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission)
2. Completion of the Graduate School application, which includes three (3) letters of recommendation and a Curriculum Vita or resume.
3. Payment of the nonrefundable application fee.

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. See GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

Degree Requirements

Doctor of Philosophy (Ph.D.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

Students enrolled in the Epidemiology Ph.D. program must successfully complete a minimum of 28 credits, including:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHS 554</td>
<td>Statistical Methods in Public Health I</td>
<td>3</td>
</tr>
<tr>
<td>PHS 555</td>
<td>Statistical Methods for Public Health II</td>
<td>3</td>
</tr>
<tr>
<td>PHS 510</td>
<td>Grant Writing for Clinical Research</td>
<td>3</td>
</tr>
<tr>
<td>PHS 500</td>
<td>Research Ethics for Clinical Investigators</td>
<td>1</td>
</tr>
<tr>
<td>A minimum of 12 credits in Substantive Epidemiology courses 1</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>A minimum of 6 credits in either Substantive Epidemiology courses or other Biostatics courses 1</td>
<td>6</td>
<td></td>
</tr>
</tbody>
</table>

Total Credits 28

1 The list of courses that will fulfill these requirements is maintained by the graduate program office.

Additionally, Epidemiology Ph.D. students are required to fulfill the following requirements:

- Epidemiology and biostatistics seminar series: Students are required to attend. Each student is required to present at least one seminar each year.
- Pass a qualifying examination which may be given after at least 18 credits have been earned in graduate courses beyond the baccalaureate, and must be taken within three semesters (excluding summer sessions) of entry into the doctoral program.
- Pass a comprehensive examination which will be a defense of the dissertation research proposal, administered by the entire dissertation committee after the student has substantially completed all course work.
- To earn the Ph.D. degree, doctoral candidates must write a dissertation that is accepted by the dissertation committee, the head of the graduate program, and the Graduate School.
- Pass a final oral examination (the dissertation defense).

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up
deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact
Graduate Program Head: Duanping Liao
Director of Graduate Studies/Professor-in-Charge: x
Primary Program Contact: Marjorie Sawyer
Email: mds21@psu.edu
Telephone: (717) 531-7178
Program Website: Epidemiology (https://med.psu.edu/epidemiology-phd)

Facilities Engineering and Management
Graduate Program Head M. Kevin Parfitt
Program Code FEM
Campus(es) University Park (M.Eng.)
Degrees Conferred Master of Engineering (M.Eng.)
The Graduate Faculty View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=FEM)

The Facilities Engineering and Management Masters of Engineering is a master’s degree program designed to prepare professionals in the field of facilities management. The program is designed to address the critical need for professionals with relevant expertise in facilities management. It provides broad coverage of topics related to facilities management while providing in-depth coverage of elective topics of the students choosing. Students will take a number of core program courses that provide an in-depth understanding of the role of facilities engineer and facilities manager. A capstone project will be required of all students which will serve to combine the material learned and provide a cumulative educational experience within a semester long project.

Admission Requirements
Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies). For admission, an applicant must hold either (1) a bachelor’s degree from a U.S. regionally accredited institution with an architectural engineering degree or other cognate discipline or (2) bachelor’s degree in an unrelated field with significant experience in facilities management or (3) a postsecondary degree that is equivalent to a U.S. baccalaureate degree earned from an officially recognized degree-granting international institution. Applications will be evaluated by the Facilities Engineering and Management admission committee based on the applicants’ technical qualifications for the program relative to their previous educational and professional experience and English language proficiency. In general, successful applicants are expected to have earned a GPA of at least 3.0 on a 4.0 scale.

Degree Requirements
Master of Engineering (M.Eng.)
Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

The Facilities Engineering and Management degree is conferred upon students who earn a minimum of 30 credits at the 400, 500, or 800 level, of which 20 must be earned at the campus/center where the degree program is offered, while maintaining an average grade-point average of 3.0 or better in all course work, including at least 18 credits in graduate courses (500 series), and who complete a quality culminating capstone project in consultation with a graduate adviser. The program curriculum includes:

- 15 credits of core courses,
- 12 credits of electives,
- and a 3-credit capstone project.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AE 881</td>
<td>Effective Facility Management and Planning</td>
<td>3</td>
</tr>
<tr>
<td>AE 880</td>
<td>Facility Energy Management</td>
<td>3</td>
</tr>
<tr>
<td>AE 581</td>
<td>Facilities Management Information Systems</td>
<td>3</td>
</tr>
<tr>
<td>AE 531</td>
<td>Legal Aspects of Engineering and Construction</td>
<td>3</td>
</tr>
<tr>
<td>AE 572</td>
<td>Project Development and Delivery Planning</td>
<td>3</td>
</tr>
</tbody>
</table>

Elective Courses
A list of elective courses is maintained by the program office

Culminating Experience
AE 596 Individual Studies (Capstone Project) 3

Substitutions for the above prescribed courses, either with resident-education courses, alternate online courses, or courses from other institutions, will be considered on a case-by-case basis, and must be
petitioned and approved by the Academic Program Chair, with input from the student’s adviser.

**Student Aid**

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

**Courses**

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**Contact**

Graduate Program Head: M. Kevin Parfitt  
Primary Program Contact: Richelle Weiger  
Email: rbw11@psu.edu

Mailing Address: 104 Engineering Unit A, University Park, PA 16802  
Telephone: (814) 865-6664

Program Website: Facilities Engineering and Management (https://www.ae.psu.edu/academics/graduate/meng-facilities-engineering-management.aspx)

**Finance**

Graduate Program Head: James Nemes  
Program Code: FINAN  
Campus(es): Great Valley (M.Fin.), World Campus (M.Fin.)  
Degrees Conferred: Master of Finance (M.Fin.)  
The Graduate Faculty: View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=FINAN)

The Master of Finance (M.Fin.) program offered by the School of Graduate Professionals at Penn State Great Valley is a graduate degree program designed for intensive and focused study in finance. As part of the School’s Management Division, the program is included under the specialized professional accreditation received from the Association to Advance Collegiate Schools of Business International (AACSBI). Students enroll in the program as a cohort and proceed through courses together in a prescribed sequence. Classes are taught in a schedule convenient for working professionals who have demanding time commitments. The time required to complete the program is fifteen months.

The program provides an advanced and specialized graduate education in finance for individuals with career interests as finance professionals in financial management, or investment management. The curriculum reflects a balanced combination of advanced financial theory and practical business applications. Major emerging concepts and practices in the finance field are introduced and discussed throughout the program. The program is designed to help graduates to become proficient in technical and analytical skills in finance and to develop expertise in financial problem solving and financial decision-making preparing them to advance their finance careers in organizations such as investment and commercial banking firms, mutual funds, other financial firms, non-financial businesses, consulting firms, government agencies and non-profit organizations. In addition, students will find a substantial number of courses in the M.Fin. program to be helpful in preparing for tests required for various professional certifications in finance, such as the Chartered Financial Analyst (CFA).

**Admission Requirements**

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. See GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300-admission-requirements-international-students) for more information.

Applicants should:

1. Have a 3.0 or better (on a 4.0 scale) junior/senior grade-point average.
2. Submit a completed online application.
3. Submit a GMAT or GRE score. Applicants holding an M.B.A., J.D., Ph.D., C.P.A., or C.F.A. or doctoral degree are not required to submit standardized test scores.
4. Submit a statement of intent or career path objective (one page).
5. Submit two confidential evaluation form letters.
6. Submit official transcripts from all post-secondary institutions attended (http://gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission). International applicants must submit official university records (transcripts/marksheets and diploma if date conferred does not appear on transcripts/marksheets), with attested English translations if the record is not in English. Notarized copies are not sufficient.
7. Submit a current resume.
8. Submit a visa application document if they are in the U.S. on a student or work visa.
9. Complete an admissions interview (by telephone or in person).

Admission decisions are based on the quality of the applicant’s credentials and an interview in relation to those of other applicants who meet the requirements for admission outlined above.

Application Filing Dates: Applications to the Penn State Great Valley's Master of Finance program are reviewed on a rolling basis. New students are admitted to a cohort and begin their studies in early January.

**Pre-Program Requirements**

Applicants are expected to have a working knowledge of a spreadsheet program financial management, statistics and microeconomics. These pre-program requirements may be satisfied with academic work prior to
matriculation in the M.Fin. program through college-level course credits in the following areas:

1. Financial Management/Corporate Finance: Topics include time value of money, basic theories of bond and stock valuation, capital budgeting, capital asset pricing model, market efficiency, and capital structure

2. Introductory Business Statistics: Topics include: probability theory, sampling, inference, quality assurance, regression, forecasting, and simulation

3. Microeconomics: Topics include: allocation of resources and distribution of income with various market structures

The professor-in-charge of the Master of Finance program will examine academic transcripts of each applicant to determine if and how pre-program requirements are met. If a requirement is not met, the deficiency must be corrected through earned credit. Credits earned to remediate deficiencies cannot be applied towards requirements for the M.Fin. degree.

Degree Requirements

Master of Finance (M.Fin.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

Thirty (30) credits are required to complete the M.Fin. degree. The course work includes:

- six required core courses (18 credit hours) which provide a body of knowledge in finance;
- three elective courses (9 credit hours) designed to help students develop additional expertise in corporate finance or investments;
- and a capstone course (3 credit hours) which provides a culminating experience for students.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ACCTG 512</td>
<td>Financial Accounting and Reporting</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Problems</td>
<td></td>
</tr>
<tr>
<td>BUSAD 525</td>
<td>Quantitative Methods in Finance</td>
<td>3</td>
</tr>
<tr>
<td>BUSAD 826</td>
<td>Current Issues in Corporate Finance</td>
<td>3</td>
</tr>
<tr>
<td>FIN 805</td>
<td>Multinational Managerial Finance</td>
<td>3</td>
</tr>
<tr>
<td>FIN 808</td>
<td>Analysis of Financial Markets</td>
<td>3</td>
</tr>
<tr>
<td>FIN 813</td>
<td>Speculative Markets</td>
<td>3</td>
</tr>
</tbody>
</table>

Electives

Select 3 elective courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BUSAD 585</td>
<td>Research in Security Valuation</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits 30

The required capstone course, BUSAD 585, provides a culminating experience for students to develop their analytical ability, their synthesis of material, and their ability to identify strategies that enhance value creation, building upon their knowledge acquired from the core courses.

Students may enroll in the Master of Finance program at the Great Valley Campus, taking courses in a face-to-face and blended format. Or students may enroll in the online Master of Finance program. A one-week residency at Great Valley is required as part of the online program.

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

There are a limited number of scholarships, fellowships, and graduate assistantships available. For more information on these, contact the Financial Aid Office at Penn State Great Valley via email (studentaid@gv.psu.edu) or visit the website (http://www.sgps.psu.edu/Admissions/FinancialAid/default.html). (http://www.sgps.psu.edu/prospective/tuition/financial_aid/default.ashx)

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Learning Outcomes

- Learning Goal 1: The students will demonstrate enhanced analytical and critical thinking skills. They will be able to:
  - Apply quantitative and analytical knowledge to financial analysis
  - Identify financial risk exposure and manage financial risks with appropriate financial derivative instruments
- Learning Goal 2: The students will understand the impact of global influences on financial decision-making. They will be able to:
  - Demonstrate a knowledge of global financial and foreign exchange markets, and their impact on multinational enterprises
- Learning Goal 3: The students will be effective financial decision makers. They will be able to:
  - Recognize and resolve ethical issues in financial decision making
- Learning Goal 4: The students will be effective communicators in finance. They will be able to:
  - Make an effective presentation of analytical results
  - Prepare a written report on financial issues

Contact

Graduate Program Head: James Nemes

Director of Graduate Studies/Professor-in-Charge: Qiang Qiang

Primary Program Contact: Leanne Wallace
Students are generally admitted directly to a master’s program unless they have previously earned an M.S. degree in food science or an appropriate related area; in such cases, admission can be made directly to the doctoral program by approval of the graduate program committee.

Degree Requirements
Master of Science (M.S.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

A minimum of 30 credits at the 400, 500, 600 or 800 level is required, with at least 18 credits in the 500 and 600 series, combined. There are 24 credits required in the following core courses:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>FDSC 500A</td>
<td>Fundamentals of Food Science - Microbiology</td>
<td>1</td>
</tr>
<tr>
<td>FDSC 500B</td>
<td>Fundamentals of Food Science - Engineering</td>
<td>1</td>
</tr>
<tr>
<td>FDSC 500C</td>
<td>Fundamentals of Food Science - Chemistry</td>
<td>1</td>
</tr>
<tr>
<td>FDSC 500D</td>
<td>Fundamentals of Food Science - Nutrition</td>
<td>1</td>
</tr>
<tr>
<td>FDSC 501</td>
<td>Research Methods in Food Science</td>
<td>2</td>
</tr>
</tbody>
</table>

6 credits of other 500-level FDSC courses (3 credits of the requirement can be satisfied by 400-level Food Science courses with permission of the adviser)

6 credits of 400- or 500-level courses - must include Statistics (STAT 500 or equivalent)

Electives

The remaining 6 credits may be chosen from a list of approved electives maintained by the program office.

Culminating Experience

The M.S. degree also requires the formation of a master’s committee, the writing of a satisfactory thesis accepted by the master’s committee, the head of the graduate program, and the Graduate School, and the passing of a final oral examination.

Doctor of Philosophy (Ph.D.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

A minimum of 18 credits is required for the Ph.D. degree; Ph.D. students who did not complete the M.S. in Food Science at Penn State must complete 6 additional credits, for a minimum of 24 credits:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>FDSC 500A</td>
<td>Fundamentals of Food Science - Microbiology</td>
<td>1</td>
</tr>
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<td>Fundamentals of Food Science - Engineering</td>
<td>1</td>
</tr>
<tr>
<td>FDSC 500C</td>
<td>Fundamentals of Food Science - Chemistry</td>
<td>1</td>
</tr>
<tr>
<td>FDSC 500D</td>
<td>Fundamentals of Food Science - Nutrition</td>
<td>1</td>
</tr>
<tr>
<td>Course Code</td>
<td>Course Title</td>
<td>Credits</td>
</tr>
<tr>
<td>-------------</td>
<td>--------------</td>
<td>---------</td>
</tr>
<tr>
<td>FDSC 501</td>
<td>Research Methods in Food Science</td>
<td>2</td>
</tr>
</tbody>
</table>

6 credits of other 500-level FDSC courses (3 credits of the requirement can be satisfied by 400 level Food Science courses with permission of the adviser.)

12 credits of additional 400- or 500-level courses

Students must have satisfactorily completed at least one 400 or 500-level course in statistics (i.e., STAT 500 Applied Statistics or equivalent), during their undergraduate or graduate program.

**Total Credits**: 24

1 Not needed if student received credit for these courses during master's degree program at Penn State.

In addition, Ph.D. students are required to complete 2 credits of FDSC 602; however, these 2 credits cannot be counted towards the minimum credits required for the degree.

Except in special cases, an M.S. in Food Science is earned before pursuing a Ph.D. degree. Although most applicants to the Ph.D. program have already obtained a master's degree in Food Science or a related program, the M.S. degree is not a prerequisite for entrance into the doctoral program. For students entering the Ph.D. program without having earned an M.S. degree in Food Science, there are two additional course requirements:

- FDSC 600, 6 credits
- Additional 400 or 500-level FDSC courses, 6 credits

All doctoral students must pass a qualifying examination, a comprehensive written and oral examination, and a final oral examination (the dissertation defense). To earn the Ph.D. degree, doctoral students must also write a dissertation that is accepted by the dissertation committee, the head of the graduate program, and the Graduate School. In addition, all Food Science Ph.D. candidates are assessed for English competency. International students who plan to be teaching assistants must also take the American English Oral Communicative Proficiency Test (AEOCPCT).

**Dual-Titles**

**Dual-Title Ph.D. in Food Science and Clinical and Translational Sciences**

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

Students must apply and be admitted to the graduate program in Food Science and the Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the CTS dual-title program. Refer to the Admission Requirements section of the CTS Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/clinical-translational-sciences). Doctoral students must be admitted into the dual-title degree program in CTS prior to taking the qualifying examination in their primary graduate program.

An admissions committee comprised of faculty affiliated with the dual-title program will evaluate applicants. Applicants must have a graduate GPA of at least 3.5. Prospective dual-title program students must include in their application a statement of purpose that addresses the ways in which their research and professional goals will be enhanced by an interdisciplinary course of study in clinical and translational sciences.

The Dual-Title Ph.D. in Food Science and Clinical and Translational Sciences emphasizes interdisciplinary scholarship at the interface of basic sciences, clinical sciences, and human health. Students in the dual-title program are required to have two advisers from separate disciplines: one individual serving as the primary mentor from the Graduate Program in Food Science and another individual serving as the secondary mentor from an area covered by the dual-title program who is a member of the Clinical and Translational Sciences faculty.

**Degree Requirements**

To qualify for the dual-title degree in Food Science and Clinical and Translational Sciences, students must satisfy the Food Science Ph.D. degree requirements listed in the Degree Requirements section. In addition, students must complete the degree requirements for the dual-title CTS, listed on the CTS Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/clinical-translational-sciences). Approximately 6 credits of course work may overlap with elective courses required by the Ph.D. program in Food Science.

For students in the dual-title program, the qualifying examination consists of the standard Food Science qualifying exam with one modification. A member of the CTS Graduate Faculty will join the standing FDSC qualifying examination committee during the normal FDSC exam and assess the student's CTS knowledge. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. This occurs by assigning the student a paper that has clinical relevance, or by asking the student questions that require him or her to extend the assigned paper into a clinical/translational context. This examination must be completed before the end of the second year, within four semesters (summer sessions do not count) of entry into the doctoral program.

The student's dissertation committee will include Graduate Faculty from Food Science and Graduate Faculty from Clinical and Translational Science. In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of a Food Science and CTS dual-title doctoral degree student must include at least one member of the CTS Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. If the chair of the dissertation committee representing Food Science is not also a member of the Graduate Faculty in CTS, the member of the committee representing CTS must be appointed as co-chair.

The fields of food science and clinical and translational sciences will be integrated in the student's comprehensive examination. The CTS representative on the student's dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.

All dual-title students are required to conduct dissertation research that contributes fundamentally to the fields of food science and clinical and translational sciences. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.
Dual-Title M.S. and Ph.D. in Food Science and International Agriculture and Development

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-208/dual-title-graduate-degree-programs).

Graduate students with research and educational interests in international agriculture and development may apply to the dual-title degree program in Food Science and INTAD. The goal of the dual-title degree program in Food Science and INTAD is to enable graduate students from Food Science to acquire the knowledge and skills of their primary area of specialization in Food Science, while at the same time gaining the perspective and methods needed for work in international agriculture. Graduate study in this program seeks to prepare students to assume leadership roles in science, science education, outreach, and project management anywhere in the world. Students are required to write research proposals and expected to write grants to support their research activities, reflecting the dual-title degree. As part of their professional development presentations, publication of research articles and active participation in professional societies is expected. Emphasis is placed upon the professional development of the student. Students are able to specialize in the research program areas of:

- food chemistry,
- food microbiology,
- food engineering,
- effects of processes on nutrition,
- sensory science,
- bioactive components,
- human gut microbiome,
- food processing, and
- extension education.

At the same time they will acquire a broad perspective about how to apply their research findings in the context of the broader international community. Thus, the dual-title will allow students to master their field of specialization from an international perspective so that they can compare practices and outcomes between countries and regions.

Admission Requirements

For admission to the dual-title graduate degree under this program, a student must first apply and be admitted to the Food Science graduate program and the Graduate School. Once accepted into the Food Science program, the student can then submit an application to the INTAD Academic Program Committee for admission to the dual-title degree program. The student must obtain consent from their Food Science adviser prior to applying to the INTAD program. Refer to the Admission Requirements section of the INTAD Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/international-agriculture-development). Ph.D. students must apply and be admitted to the dual-title degree program in International Agriculture and Development prior to taking the qualifying exam.

Degree Requirements for the Dual-Title M.S.

To qualify for this dual-title degree, students must satisfy the requirements of the Food Science Master of Science degree program, described under Degree Requirements. In addition, they must satisfy INTAD program requirements for the dual-title master's degree (http://bulletins.psu.edu/graduate/programs/majors/international-agriculture-development). Some courses may satisfy both Food Science program requirements and those of the INTAD program. Final course selection must be approved by the student’s advisory committee.

Degree Requirements for the Dual-Title Ph.D.

To qualify for this dual-title degree, students must satisfy the requirements of the Food Science Ph.D. program, described under Degree Requirements. In addition, they must satisfy INTAD program requirements for the dual-title Ph.D. degree (http://bulletins.psu.edu/graduate/programs/majors/international-agriculture-development). Some courses may satisfy both Food Science program requirements and those of the INTAD program. Final course selection must be approved by the student's dissertation committee.

The Qualifying Examination committee for the dual-title degree will be composed of Graduate Faculty from Food Science and INTAD and include at least one Graduate Faculty member from the INTAD program. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. There will be a single qualifying examination, containing elements of both Food Science and INTAD. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of a dual-title doctoral degree student must include at least one member of the INTAD Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. If the chair of the committee representing Food Science is not also a member of the Graduate Faculty in INTAD, the member of the committee representing INTAD must be appointed as co-chair. The INTAD representative on the student’s dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students enrolled in the dual-title program are required to write and orally defend a dissertation on a topic that reflects their original research and education in Food Science and INTAD. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.
Learning Outcomes

Master of Science (M.S.)

1. Know. Graduates will develop a deep conceptual understanding of food chemistry, microbiology, engineering, nutrition.
2. Critical thinking. Graduates will be able to solve practical problems in the Food Science field.
3. Research. Graduates will demonstrate the ability to design scientific approaches to solve practical problems and to select appropriate methods of data analysis.
4. Communicate. Graduates will be able to accurately report the results of research data in field of food science through written and oral presentations.
5. Professional practice. Graduates will conduct themselves in an ethical and professional manner.

Doctor of Philosophy (Ph.D.)

1. Know. Graduates will develop a deep conceptual understanding of food chemistry, microbiology, engineering, nutrition.
2. Critical thinking. Graduates will be able to apply their knowledge to independently identify and define original research problems.
3. Research. Graduates will demonstrate the ability to design scientific approaches to solve unanswered question and to select appropriate methods of data analysis.
4. Communicate. Graduates will be able to accurately report the results of research data in field of food science through written and oral presentations.
5. Professional practice. Graduates will conduct themselves in an ethical and professional manner.

Contact

Graduate Program Head: Robert Roberts

Director of Graduate Studies/Professor-in-Charge: Gregory Ziegler

Primary Program Contact: Svend Pedersen (sep14@psu.edu)

Program Email: foodsci@psu.edu

Mailing Address: 207 Food Science Building, University Park, PA 16802

Telephone: (814) 863-4827

Program Website: Food Science (http://foodscience.psu.edu)

Forensic Science

Graduate Program Head: Scott Selleck

Program Code: FRNSC

Campus(es): University Park (M.P.S.)

Degrees Conferred: Master of Professional Studies (M.P.S.)

The Graduate Faculty

View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType= fac&prog=FRNSC)

The Master of Professional Studies (M.P.S.) in Forensic Science is an inter-college degree program housed in the Eberly College of Science and includes ties with Departments of Anthropology, Biochemistry and Molecular Biology, Chemistry, Entomology, Psychology, and Sociology. The program is offered by Penn State Graduate Faculty members, with enrichment by mentors from the academic faculty, public crime laboratories, and private forensic laboratories. The curriculum is designed to provide students with innovative, hands-on, and multidisciplinary learning approaches to educate and train them in crime scene investigation, the science behind forensics, courtroom proceedings, and the ethical and social issues that they will be exposed to when they join the forensic community. In addition, the program will develop teamwork and communication skills, which will be important when working actual cases in a crime laboratory.

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

The master’s degree in Forensic Science is appropriate for students with a baccalaureate degree in the biological sciences, chemistry, or a related field of study. Applicants are required to have a minimum cumulative GPA of 3.00 (on a 4.00 scale) in their undergraduate degree. GRE scores are required, with a score of 1100 (old system) or 306 (new system) to be competitive. In addition, each applicant is asked to provide a personal statement of interests and objectives, a statement of their definition of the word “ethics” and two letters of reference. Letters of reference can be submitted by the student’s undergraduate adviser, research adviser, and/or an instructor for an upper level course taken as part of their major. An applicant may be asked to go through an interview process conducted by members of the forensic science faculty. Admission to the program is based upon a thorough review of all applicant qualifications, and the best-qualified applicants will be accepted up to the number of spaces available for new students.

Degree Requirements

Master of Professional Studies (M.P.S.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

Chemistry Emphasis

A minimum of 41 credits are required for completion of the program, with at least 19 credits from courses at the 500 and 800-level, and at least 6 credits at the 500 level. Students are required to take 27 credits from the core courses listed below and 11 additional credits of Chemistry coursework. Elective credits are from courses which are determined based on interest and career track. FRNSC 801 will serve as the capstone course for completion of the M.P.S. in Forensic Science.

Biology Emphasis

A minimum of 42 credits are required for completion of the program, with at least 20 credits from courses at the 500 and 800-level, and at least 6 credits at the 500 level. Students are required to take 27 credits from the core courses listed below and 12 additional credits of Biology coursework. Elective credits are from courses which are determined based on interest and career track.
based on interest and career track. FRNSC 801 will serve as the capstone course for completion of the M.P.S. in Forensic Science.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Required Courses</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FRNSC 400</td>
<td>Courtroom Proceedings and Testimony</td>
<td>1</td>
</tr>
<tr>
<td>FRNSC 410</td>
<td>A Scientific Approach to Crime Scene Investigation</td>
<td>2</td>
</tr>
<tr>
<td>FRNSC 411</td>
<td>Criminalistics: Trace and Impression Evidence</td>
<td>3</td>
</tr>
<tr>
<td>FRNSC 413</td>
<td>Criminalistics: Biology</td>
<td>3</td>
</tr>
<tr>
<td>FRNSC 415</td>
<td>Laboratory in Crime Scene Investigation</td>
<td>2</td>
</tr>
<tr>
<td>FRNSC 475</td>
<td>Forensic Science Seminar</td>
<td>1</td>
</tr>
<tr>
<td>FRNSC 532</td>
<td>Drug Chemistry and Toxicology</td>
<td>3</td>
</tr>
<tr>
<td>FRNSC 541</td>
<td>Forensic Seminar Series</td>
<td>1</td>
</tr>
<tr>
<td>FRNSC 561</td>
<td>Ethics in forensic Science</td>
<td>1</td>
</tr>
<tr>
<td>FRNSC 894</td>
<td>Research Projects in Forensic Science</td>
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</tr>
<tr>
<td>Additional Courses</td>
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<td>Select one of the following emphases:</td>
<td></td>
<td>11-12</td>
</tr>
<tr>
<td><strong>Forensic Chemistry Emphasis</strong></td>
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<td></td>
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<tr>
<td>CHEM 425W</td>
<td>Chromatography and Electrochemistry</td>
<td></td>
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<tr>
<td>CHEM 500</td>
<td>Seminar in Chemistry</td>
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<td>FRNSC 427</td>
<td></td>
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<tr>
<td>FRNSC 831</td>
<td>Forensic Chemistry II</td>
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<tr>
<td><strong>Forensic Biology Emphasis</strong></td>
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<tr>
<td>BMB 400</td>
<td>Molecular Biology of the Gene</td>
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<td>BMBB 590</td>
<td>Colloquium</td>
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<td>FRNSC 421</td>
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<td></td>
</tr>
<tr>
<td>FRNSC 821</td>
<td>Forensic Molecular Biology II</td>
<td></td>
</tr>
<tr>
<td>Electives</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Select at least 3 credits of the following:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CRIM 406</td>
<td>Sociology of Deviance</td>
<td></td>
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<tr>
<td>CRIM 423</td>
<td>Sexual and Domestic Violence</td>
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<td>CRIM 425</td>
<td>Organized Crime</td>
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<tr>
<td>CRIM 432</td>
<td>Crime and the American Court System</td>
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<tr>
<td>CRIM 453</td>
<td>Women and the Criminal Justice System</td>
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<tr>
<td>PSYCH 471</td>
<td>Psychology of Adjustment and Social Relationships</td>
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</tbody>
</table>

| Culminating Experience                                |                     |         |
| FRNSC 801    | Criminalistics III                             | 4       |
| Total Credits                                       |                     | 41-42   |

1 FRNSC 801 serves as the capstone course for completion of the M.P.S. in Forensic Science.

**Student Aid**

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School's website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

**Courses**

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**Contact**

Graduate Program Head: Scott Selleck

Director of Graduate Studies/Professor-in-Charge: Jack Hietpas

Primary Program Contact: Maria Long

Email: mrd1@psu.edu

Mailing Address: 107 Whitmore Laboratory, University Park, PA 16802

Telephone: (814) 867-2465

Program Website: Forensic Science (http://forensics.psu.edu)

**Forest Resources**

Graduate Program Head: Michael G. Messina

Program Code: FORR

Campus(es): University Park (Ph.D., M.S.)

Degrees Conferred

- Doctor of Philosophy (Ph.D.)
- Master of Science (M.S.)
- Dual-Title Ph.D. and M.S. in Forest Resources and Human Dimensions of Natural Resources and the Environment
- Dual-Title Ph.D. and M.S. in Forest Resources and International Agriculture and Development
- Dual-Title Ph.D. and M.S. in Forest Resources and Operations Research

The Graduate Faculty View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=FORR)

The Doctor of Philosophy and the Master of Science degree programs are oriented toward research, education, and scientific technology in the professions of forest products and forestry.

Faculty expertise, laboratories, and outdoor facilities are available to support specialization in a variety of fields. Possibilities for specialization are indicated in part by the courses listed under wood products, forestry, and wildlife and fisheries, and by related courses in:

- agricultural economics,
- agronomy,
- animal nutrition,
- biology,
- business administration,
- chemical engineering,
- computer science,
- ecology,
- economics,
- entomology.
• environmental pollution control,
• environmental resource management,
• genetics,
• horticulture,
• industrial engineering,
• landscape architecture,
• meteorology,
• physiology,
• plant pathology,
• polymer sciences,
• recreation and parks,
• regional planning,
• statistics.

**Admission Requirements**

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Scores from the Graduate Record Examinations (GRE) are required for admission. A student may be admitted at the discretion of the program without GRE scores.

For admission, an applicant should have at least a 2.75 grade-point average, a 3.00 junior/senior average (on a 4.00 scale), and courses that are basic to the individual's field of specialization. Ordinarily, these include:

- 12 credits in communication;
- 12 credits in social sciences and humanities;
- 10 credits in quantification, including calculus and statistics;
- 8 credits in chemistry and/or physics;
- 8 credits in biological sciences; and
- 18 credits in forest products, forestry, fish, wildlife, or related courses.

Three reference letters and a brief statement describing the applicant's academic goals, career interests, and special qualifications are required. The best-qualified applicants will be accepted up to the number of spaces available. Exceptions to admission requirements may be made for students with special backgrounds, abilities, and interests, at the discretion of the program.

Admission to the Ph.D. program in Forest Resources requires a master's degree in Forest Resources or a closely related field, or a bachelor's degree with a minimum grade-point average of 3.30 and demonstrated research ability.

**Degree Requirements**

**Master of Science (M.S.)**

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

A minimum of 30 credits at the 400, 500, 600, or 800 level is required, with at least 18 credits at the 500 and 600 level, combined. The department requires 12 credits of 400- or 500-level formal courses in Forestry (FOR) of which 6 must be 500-level. At least 6 credits of 400- or 500-level courses (usually STAT) are required in courses that cover topics such as analysis-of-variance, correlation, regression, and design of experiments; the courses that will satisfy this requirement must be approved by the student's committee. Participation in at least one colloquium course each semester is expected and students must complete at least 1 credit of colloquium (FOR 590). In addition, specific courses and requirements will be determined by the faculty adviser and advisory committee.

A thesis based on field or laboratory research is required for the M.S. degree and at least 6 credits in thesis research (FOR 600 or FOR 610) must be taken in conjunction with completing the thesis. The thesis must be accepted by the advisers and/or committee members, the head of the graduate program, and the Graduate School, and the student must pass a thesis defense.

**Doctor of Philosophy (Ph.D.)**

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

While a minimum number of courses for the degree is not specified, the dissertation committee has the responsibility of specifying courses and credits essential for the education and development of the student. Students are expected to be educated in depth in a specific subfield of Forestry (FOR) and to have a perspective of the general field. Normally, students will have 50 to 60 credits in formal course work beyond the B.S. degree.

Doctoral students are required to participate regularly in a departmental colloquium and to register for at least 1 credit of Colloquium (FOR 590) during the Ph.D. program. Ph.D. students are required to complete two separate semesters of Supervised Experience in College Teaching (FOR 602) for 2 credits total; however, these 2 credits cannot be counted towards the degree requirements. Doctoral students must pass a qualifying examination, a comprehensive written and oral examination, and a final oral examination (the dissertation defense). To earn the Ph.D. degree, doctoral students must also write a dissertation that is accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

**Dual-Titles**

**Dual-Title M.S. and Ph.D. in Forest Resources and Human Dimensions of Natural Resources and the Environment**

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

**Admission Requirements**

Students must apply and be admitted to the graduate program in HDNRE and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the HDNRE dual-title program. Refer to the Admission Requirements section of the HDNRE Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/human-dimensions-natural-resources-environment). Doctoral students must be admitted into the dual-title degree program in HDNRE prior to taking the qualifying examination in their primary graduate program.
Degree Requirements for the Dual-Title M.S.

To qualify for the dual-title degree, students must satisfy the degree requirements for the M.S. degree in Forest Resources, listed on the Degree Requirements tab. In addition, students must complete the degree requirements for the dual-title in HDNRE, listed on the HDNRE Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/human-dimensions-natural-resources-environment).

Degree Requirements for the Dual-Title Ph.D.

To qualify for the dual-title degree, students must satisfy the degree requirements for the Ph.D. degree in Forest Resources, listed on the Degree Requirements tab. In addition, students must complete the degree requirements for the dual-title in HDNRE, listed on the HDNRE Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/human-dimensions-natural-resources-environment).

The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Forest Resources and must include at least one Graduate Faculty member from the HDNRE program. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. There will be a single qualifying examination, containing elements of both Forest Resources and HDNRE. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of a Forest Resources and HDNRE dual-title Ph.D. student must include at least one member of the HDNRE Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in HDNRE, the member of the committee representing HDNRE must be appointed as co-chair. The HDNRE representative on the student's dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their dissertation committee and reflects their original research and education in Forest Resources and HDNRE. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

Dual-Title M.S. and Ph.D. in Forest Resources and International Agriculture and Development

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degrees-programs).

Graduate students with research and educational interests in international agriculture and development may apply to the dual-title degree program in Forest Resources and International Agriculture and Development. The goal of the dual-title degree FORR and INTAD graduate program is to enable graduate students from FORR to acquire the knowledge and skills of their primary area of specialization in FORR, while at the same time gaining the perspective and methods needed for work in the international agriculture. Graduate study in this program seeks to prepare students to assume leadership roles in science, engineering, outreach, and project management anywhere in the world. Students acquire a broad perspective on how to apply their research findings in the context of the broader international community. Thus, the dual-title will allow students to master their field of specialization from an international perspective so that they can effectively engage in agricultural development activities within various countries and regions.

Admission Requirements

Students must apply and be admitted to the graduate program in FORR and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the INTAD dual-title program. Refer to the Admission Requirements section of the INTAD Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/international-agriculture-development). Doctoral students must be admitted into the dual-title degree program in INTAD prior to taking the qualifying examination in their primary graduate program.

Degree Requirements for the Dual-Title M.S.

To qualify for the dual-title degree, students must satisfy the degree requirements for the M.S. degree, listed on the Degree Requirements tab. In addition, students must complete the degree requirements for the dual-title M.S. in INTAD, listed on the INTAD Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/international-agriculture-development). Up to 6 credits of INTAD approved courses can be applied to fulfilling FORR program requirements. Final course selection must be approved by the student's advisory committee.

Degree Requirements for the Dual-Title Ph.D.

To qualify for the dual-title degree, students must satisfy the degree requirements for the Ph.D. degree, listed on the Degree Requirements tab. In addition, students must complete the degree requirements for the dual-title Ph.D. in INTAD, listed on the INTAD Bulletin page. (http://bulletins.psu.edu/graduate/programs/majors/international-agriculture-development) Some courses may satisfy both FORR program requirements and those of the INTAD program. Up to 6 credits of INTAD approved courses can be applied to fulfilling FORR program requirements. Final course selection must be approved by the student's dissertation committee.

The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from FORR and must include at least one Graduate Faculty member from the INTAD program. Faculty members who hold appointments in both programs' Graduate Faculty may service in a combined role. There will be a single qualifying examination, containing elements of both FORR and INTAD. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed on semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of a FORR and INTAD dual-title Ph.D. student must include at least one member of the INTAD Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may service in a combined role. If the chair of the dissertation committee is not also a member of the INTAD Graduate Faculty, Faculty members who hold appointments in both programs' Graduate Faculty may service in a combined role. The chair of the dissertation committee is not also a member of the Graduate Faculty in INTAD, the member of the committee representing INTAD must be appointed as co-chair. The INTAD representative on the student's dissertation committee will develop
Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their dissertation committee and reflects their original research and education in FORR and INTAD. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

**Dual-Title M.S. and Ph.D. in Forest Resources and Operations Research**

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

**Admission Requirements**

Students must apply and be admitted to the graduate program in Operations Research and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Operations Research dual-title program. Refer to the Admission Requirements section of the Operations Research Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/operations-research). Doctoral students must be admitted into the dual-title degree program in Operations Research prior to taking the qualifying examination in their primary graduate program.

**Degree Requirements for the Dual-Title M.S.**

To qualify for the dual-title degree, students must satisfy the degree requirements for the M.S. degree in Forest Resources, listed on the Degree Requirements tab. In addition, students must complete the degree requirements for the dual-title in Operations Research, listed on the Operations Research Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/operations-research).

**Degree Requirements for the Dual-Title Ph.D.**

To qualify for the dual-title degree, students must satisfy the degree requirements for the Ph.D. degree in Forest Resources, listed on the Degree Requirements tab. In addition, students must complete the degree requirements for the dual-title in Operations Research, listed on the Operations Research Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/operations-research).

The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Forest Resources and must include at least one Graduate Faculty member from the Operations Research program. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in Operations Research, the member of the committee representing Operations Research must be appointed as co-chair. The Operations Research representative on the student’s dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their dissertation committee and reflects their original research and education in Forest Resources and Operations Research. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

**Student Aid**

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

**Courses**

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**Learning Outcomes**

**Master of science (M.S.)**

1. **KNOW:** Graduates in these three masters programs will have obtained knowledge of core theories and methods as demonstrated by courses completed and grades earned at the bachelor’s level. Graduates will exhibit breadth and depth of understanding in their respective disciplines in courses completed at the master’s level.

2. **APPLY/CREATE:** Graduates in these three masters programs will be able to clearly synthesize literature and theories in their disciplinary areas and/or in their specialized thesis topics. Such synthesis will help generate new ideas or methods to develop unique solutions to the problems in the three disciplinary programs.

3. **COMMUNICATE:** Graduates in these three masters programs will effectively communicate ideas, arguments, and rationales in clear, concise, well-organized publications (abstracts, papers, proposals) and presentations (conferences, seminars, and research meetings).

4. **THINK:** Graduates in these three masters programs will be able to critically analyze the work of others in their field of specialty. Such analyses will help graduate students to demonstrate proficiency in designing a research strategy to answer important questions and to improve their own work.

5. **PROF. PRACTICE:** Graduates in these three masters programs will demonstrate the highest ethical standards and core values (including Penn State Core Values) within their discipline and other diverse scientific backgrounds.
Doctor of Philosophy (Ph.D.)

1. **KNOW**: Graduates in these three doctoral programs will have obtained the knowledge of the core theories and methods at the bachelors and/or master’s levels. Graduates will exhibit breadth and depth of understanding in their respective disciplines in courses completed at the doctoral level.

2. **APPLY/CREATE**: Graduates in these three doctoral programs will be able to clearly synthesize literature and theories in their disciplinary areas and/or in their specialized thesis/dissertation topics. Such synthesis will help generate new ideas or methods to develop unique solutions to the problems in the three disciplinary doctoral programs.

3. **COMMUNICATE**: Graduates in these three doctoral programs will effectively communicate ideas, arguments, and rationales in clear, concise, well-organized publications (abstracts, papers, proposals) and presentations (conferences, seminars, and research meetings).

4. **THINK**: Graduates in these three doctoral programs will be able to critically analyze the work of others in their field of specialty. Such analyses will help graduate students to demonstrate proficiency in designing a research strategy to answer important questions and to improve their own work.

5. **PROF. PRACTICE**: Graduate students in these three doctoral programs will demonstrate the highest ethical standards and core values (including Penn State Core Values) within their discipline and other diverse scientific backgrounds.

**Contact**

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**French and Francophone Studies**

- **Graduate Program Head**: Benedicte Monicat
- **Program Code**: FR
- **Campus(es)**: University Park (Ph.D., M.A.)
- **Degrees Conferred**: Doctor of Philosophy (Ph.D.), Master of Arts (M.A.), Dual-Title Ph.D. in French and Francophone Studies and African Studies, Dual-Title Ph.D. in French and Francophone Studies and Visual Studies, Dual-Title Ph.D. and M.A. in French and Francophone Studies and Women’s Studies

**The Graduate Faculty**

Graduate programs in French and Francophone Studies generate and analyze culture and society and literature. For example, programs of study can concentrate on such topics as genres, themes, periods, cultural anthropology, philosophy, socio-cultural and literary history, stylistics, urbanism, visual studies, and women’s and gender studies. Through varied sites of analysis (city, library, archive, classroom, stage, environment, among others), the program explores past and current issues and theoretical debates. Our interdisciplinary approach to French and Francophone Studies currently gravitates around three major poles: race and gender; cultures and literatures in contact; and aesthetics/poetics.

The M.A. is a general humanistic degree that helps prepare students for a variety of situations, including teaching in private high schools or community colleges, or further graduate work. The Ph.D. is a more specialized degree. The Ph.D. in French and Francophone Studies can be combined with a minor in a field such as social thought. Other potential combinations include our dual-title Ph.D. programs in French and Francophone Studies and Women’s, Gender and Sexuality Studies, French and Francophone Studies and African Studies, or French and Francophone Studies and Visual Studies.

Only the faculty members and courses officially associated with the Department of French and Francophone Studies are listed here. Faculty members and courses in other departments are also available to French and Francophone students to help them progress in their training.

**Admission Requirements**

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Scores from the Graduate Record Examinations (GRE) are generally required of all students educated (high school and college) in the continental United States. The language of instruction at Penn State is English (however, courses in French and Francophone Studies are typically taught in French). English proficiency test scores (TOEFL/IELTS) may be required for international applicants. Consult the English Proficiency section of the Graduate Bulletin Application and Admission Procedures page (http://bulletins.psu.edu/graduate/generalinformation/admission2) for more information.

Minimum qualifications for admission to the program typically include a B.A. in French or the equivalent, a minimum of 3.20 grade-point average (on a 4.0 scale), and the ability to speak and write in both French and English. A speech sample demonstrating the applicant’s ability to speak extemporaneously and coherently about his/her study and career goals in French for Anglophones, in English for Francophones, and in French and English for speakers of other foreign languages is required. A written text on a literary or cultural topic also must be submitted in French for Anglophones, in English for Francophones, and in French and English for speakers of other foreign languages is required. A written text on a literary or cultural topic also must be submitted in French for Anglophones, in English for Francophones, and in French and English for speakers of other foreign languages is required. A written text on a literary or cultural topic also must be submitted in French for Anglophones, in English for Francophones, and in French and English for speakers of other foreign languages is required. A written text on a literary or cultural topic also must be submitted in French for Anglophones, in English for Francophones, and in French and English for speakers of other foreign languages is required. A written text on a literary or cultural topic also must be submitted in French for Anglophones, in English for Francophones, and in French and English for speakers of other foreign languages is required. A written text on a literary or cultural topic also must be submitted in French for Anglophones, in English for Francophones, and in French and English for speakers of other foreign languages is required. A written text on a literary or cultural topic also must be submitted in French for Anglophones, in English for Francophones, and in French and English for speakers of other foreign languages is required.
Degree Requirements

Master of Arts (M.A.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

Candidates for the master's degree in French and Francophone Studies must complete a minimum of 33 credits at the 400, 500, 600, or 800 level, either 33 credits plus a master’s paper or 27 credits plus 6 credits for a thesis. A reading knowledge of a second foreign language plus oral and written examinations are also required.

The M.A. degree (or equivalent) is normally a prerequisite to apply to the doctoral program. Students who complete a thesis must take at least 6 credits in thesis research (FR 600 or FR 610). The thesis must be accepted by the advisers and/or committee members, the head of the graduate program, and the Graduate School, and the student must pass a thesis defense. Students who complete a master’s paper do so by building on ideas or concepts from one of their graduate courses, including a faculty member’s feedback and suggestions for further developing a final paper.

Doctor of Philosophy (Ph.D.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

The Ph.D. degree prepares students for careers in teaching and research at the college or university level. Between 33 and 36 credits beyond the M.A. in French and Francophone Studies (or equivalent) is required in course work at the 400, 500, 600, or 800 level. Students who have not taken these courses while completing their M.A. at Penn State must take FR 571 French Literary Theory and Criticism (3), FR 580 Approaches to French Civilization (3), FR 581 Theory and Techniques of Teaching French (1-6), FR 501A Pro-Seminar in French Studies I (1.5), and FR 501B Pro-Seminar in French Studies II (1.5). Credits must be distributed in one of two areas of specialization: culture and society or literature.

Doctoral students must demonstrate either an advanced knowledge of one foreign language other than French or a reading ability of two foreign languages other than French (equivalent to the 12-credit level). The foreign language requirement must be completed prior to scheduling the qualifying exam. All doctoral students must pass a qualifying examination, a comprehensive written and oral examination, and a final oral examination. To earn the Ph.D. degree, doctoral students must also write a dissertation that is accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

Dual-Titles

Dual-Title Ph.D. in French and Francophone Studies and African Studies

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

French and Francophone Studies doctoral students who have research and educational interests in African studies may apply to the dual-title doctoral degree program in African Studies. The goal of the program is to enable doctoral students from French and Francophone Studies to complement their knowledge and skills in their primary discipline with in-depth knowledge of prevailing theories on and problem-solving approaches to thematic, regional, or national issues pertaining to African development and change.

The dual-title doctoral degree program will provide interested French and Francophone Studies doctoral students with a multidisciplinary approach that will enhance their analytical capabilities for addressing key issues in African Studies.

Admission Requirements

Students must apply and be admitted to the graduate program in French and Francophone Studies and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the African Studies dual-title program. Refer to the Admission Requirements of the African Studies Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/african-studies). Applicants interested in the dual-title degree program may make their interest in the program known clearly on their applications to French and Francophone Studies and include remarks in their statement of purpose that address the ways in which their research and professional goals in the primary department reflect an interest in African Studies-related research.

To be enrolled in the dual-title doctoral degree program in African Studies, a student must have the approval of the French and Francophone Studies Department and then submit a letter of application and transcript, which will be reviewed by and African Studies Admissions committee. An applicant must have a minimum grade-point average of 3.0 (on a 4.0 scale) to be considered for enrollment in the dual-title degree program. Students must be admitted into the dual-title degree program in African Studies prior to taking the qualifying examination in French and Francophone Studies.

Degree Requirements

To qualify for the dual-title degree, students must satisfy the requirement of the French and Francophone Studies doctoral program in which they are primarily enrolled. In addition, they must satisfy the requirements described below, as established by the African Studies Program. Within this framework, course selection is determined by the student with the approval in advance of the African Studies Director of Graduate Studies.

Upon acceptance by the African Studies admissions committee, the African Studies director will assign the student an African Studies academic adviser in consultation with the African Studies admissions committee. As a student develops specific scholarly interests, s/he may request a different African Studies from the one assigned by the African Studies admissions committee. The student and the French and Francophone Studies and African Studies academic advisers
will establish a program of study that is appropriate for the student’s professional objectives and that is in accordance with the policies of the Graduate Council, the French and Francophone Studies graduate program, and the African Studies Program.

The Ph.D. in French and Francophone Studies and African Studies is awarded to students who are admitted to the French and Francophone Studies doctoral program and admitted subsequently into the dual-title degree in African Studies. The minimum course requirements for the dual-title Ph.D. degree in French and Francophone Studies and African Studies are as follows.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AFR 501</td>
<td>Key Issues in African Studies</td>
<td></td>
</tr>
</tbody>
</table>

A minimum of 6 credits from a list of courses maintained by the African Studies program chair.

The choice of courses in African Studies is to be proposed by the student, subject to approval in advance by the French and Francophone Studies academic advisers. The suite of selected courses should have an integrated, intellectual thrust that probes thematic, national, or regional issues and be complementary to the student’s specialty in French and Francophone Studies.

- Up to 6 of the 18 credits may come from French and Francophone Studies, as approved by the student’s French and Francophone Studies and African Studies Program academic advisers.
- The remaining credits can be taken in African Studies or in any department other than French and Francophone Studies.
- Of the 18 credits, no more than 6 credits may be taken at the 400-level and no more than 3 combined credits may come from 596 and 599 listings.

Language Requirement
Fulfillment of the foreign language requirement will meet the existing French and Francophone Studies requirements.

The foreign language requirement at the doctoral level is designed to provide students with a skill that will aid them in research and in securing employment. The French and Francophone Studies department feels that the majority of students would profit most from four-skill proficiency in another language. However, some students would benefit most from a reading knowledge of two languages.

Qualifying Examination
The dual-title degree will be guided by the qualifying examination procedure of the French and Francophone Studies graduate program. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable. There will be a single qualifying examination, containing elements of both French and Francophone Studies and African Studies.

The qualifying examination committee for the dual-title degree will be composed of Graduate Faculty from French and Francophone Studies and must include at least one Graduate Faculty member from the African Studies Program. The designated dual-title faculty member may be appointed from French and Francophone Studies if that person holds a formal affiliation with the African Studies program.

Doctoral Committee Composition
In addition to the general Graduate Council requirements for dissertation committees, the dissertation committee of a French and Francophone Studies and African Studies dual-title Ph.D. student must include at least one member of the African Studies Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. If the chair of the committee representing French and Francophone Studies is not also a member of the Graduate Faculty in African Studies, the member of the committee representing African Studies must be appointed as co-chair.

Comprehensive Examination
The Comprehensive Examination consists of a series of content-intensive examinations and the doctoral dissertation proposal. The African Studies representative on the student’s dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.

Dissertation and Final Oral Examination
Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. Students enrolled in the dual-title program are required to write and orally defend a dissertation on a topic that reflects their original research and expertise in French and Francophone Studies and African Studies. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

Dual-Title Ph.D. in French and Francophone Studies and Visual Studies
Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

French and Francophone Studies graduate students who have research and educational interests in global visual culture may apply to the dual-title doctoral program in Visual Studies. The program aims to (a) provide students with the conceptual and methodological tools they will use to interpret literature, culture and society in French, Francophone and global contexts; (b) generate and analyze ground-breaking research at the intersection of such disciplines as cultural anthropology, philosophy, socio-cultural and literary history, stylistics, urbanism, visual studies, and women’s and gender studies; and (c) guide students in using their specialized knowledge and skills to produce research of publishable quality on varied sites of analysis (city, library, archive, classroom, stage, environment, among others). The program prepares graduates for college and university teaching, and careers in other related fields.

The dual-title Ph.D. in Visual Studies comprises two core components: 1) historical and theoretical analysis of various forms of visual culture, their diverse sources, and their current manifestations; 2) historical and theoretical analysis of visual media in the information age, including the visual aspects of the digital humanities and the presentation of scholarship and teaching in visual media. A program-specific required course in each of these areas will ensure breadth of training for participating students. Together these components will offer students a
sophisticated understanding of and ability to intervene in debates about visual culture and visuality in the world today.

**Admission Requirements**

Students must apply and be admitted to the doctoral program in French and Francophone Studies and The Graduate School before they can apply for admission to the dual-title degree program. Applicants interested in the dual-title degree program may make their interest in the program known clearly in their applications to French and Francophone Studies and include remarks in their statement of purpose that address the ways in which their research and professional goals in the primary department reflect an interest in Visual Studies-related research. After admission to the doctoral program, students must apply for admission to and meet the admissions requirements of the Visual Studies dual-title program, as described in the Admission Requirements section of the Visual Studies Bulletin (http://bulletins.psu.edu/graduate/programs/majors/visual-studies). Doctoral students must be admitted into the dual-title degree program in Visual Studies prior to taking the qualifying examination in the French and Francophone Studies program.

**Degree Requirements**

To qualify for the dual-title degree, students must satisfy the degree requirements for the Ph.D. in French and Francophone Studies, listed on the Degree Requirements tab. In addition, students must complete the degree requirements for the dual-title in Visual Studies, listed on the Visual Studies Bulletin (http://bulletins.psu.edu/graduate/programs/majors/visual-studies) page.

The Visual Studies segment of the program will consist of a total of fifteen credits, including two required courses — VSTUD 501 Visual Culture Theory and History and VSTUD 502 Visual Studies in Digitality — and three elective courses dealing with questions of visuality, chosen in consultation with the Director of Graduate Studies for French and Francophone Studies. Up to six credits may be double-counted by both the primary graduate program (FFS) and the dual-title. All in all, students must complete a minimum of 66 post-baccalaureate credits for the Ph.D. in French and Francophone Studies and Visual Studies. Course work accepted for the M.A. in French and Francophone Studies will count towards the credit requirement.

The choice of courses in Visual Studies is to be proposed by the student, subject to approval in advance by the French and Francophone Studies and Visual Studies academic advisers. The suite of selected courses should have an integrated, intellectual thrust that probes thematic, national, or regional issues and be complementary to the student’s specialty in French and Francophone Studies.

**Language Requirements**

Fulfillment of the foreign language requirement will meet the existing French and Francophone Studies requirements.

The foreign language requirement at the doctoral level is designed to provide students with a skill that will aid them in research and in securing employment. The French and Francophone Studies department feels that the majority of students would profit most from four-skill proficiency in another language. However, some students would benefit most from a reading knowledge of two languages.

**Qualifying Examination**

The dual-title degree will be guided by the qualifying examination procedure of the French and Francophone Studies graduate program. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable. There will be a single qualifying examination, containing elements of both French and Francophone Studies and African Studies.

The qualifying examination committee for the dual-title degree will be composed of Graduate Faculty from French and Francophone Studies and must include at least one Graduate Faculty member from the Visual Studies Program. The designated dual-title faculty member may be appointed from French and Francophone Studies if that person holds a formal affiliation with the Visual Studies program.

**Doctoral Committee Composition**

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of a French and Francophone Studies and a Visual Studies dual-title Ph.D. student must include at least one member of the Visual Studies Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role.

If the chair of the committee representing French and Francophone Studies is not also a member of the Graduate Faculty in Visual Studies, the member of the committee representing Visual Studies must be appointed as co-chair.

**Comprehensive Examination**

The Comprehensive Examination consists of a series of content-intensive examinations and the doctoral dissertation proposal. The Visual Studies representative on the student’s dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.

**Dissertation and Final Oral Examination**

Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. Students enrolled in the dual-title program are required to write and orally defend a dissertation on a topic that reflects their original research and expertise in French and Francophone Studies and Visual Studies. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

**Dual-title M.A. and Ph.D. in French and Francophone Studies and Women’s Studies**

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

**Admission Requirements**

Students must apply and be admitted to the graduate program in French and Francophone Studies and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admission requirements of the Women’s Studies dual-title program. Refer to the Admission Requirements section of the Women’s Studies Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/womens-studies). Applicants interested in the dual-title degree program may make their interest in the program known clearly on their applications to French and Francophone Studies and include remarks in their statement of purpose that address the ways in which their research and professional goals in the primary department reflect an interest in Women’s Studies-related research.
To be enrolled in the dual-title M.A. or Ph.D. program in Women's Studies, a student must have the approval of the French and Francophone Studies Department and then submit a letter of application and transcript, which will be reviewed by the Women's Studies Admissions committee. An applicant must have a minimum grade-point average of 3.2 (on a 4.0 scale) to be considered for enrollment in the dual-title degree program. Students must be admitted into the dual-title degree program in Women's Studies prior to taking the qualifying examination in French and Francophone Studies.

**Degree Requirements for the M.A.**

To qualify for this dual-title degree, students must satisfy the requirements of the French and Francophone Studies Master of Arts degree program, listed on the Degree Requirements tab. In addition, they must satisfy the Women's Studies program requirements for the dual-title master's degree. Refer to the Degree Requirements section of the Women's Studies Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/womens-studies). Some courses may satisfy both the graduate program requirements and those of the Women's Studies program. Final course selection is determined by the student after consulting, in advance, with their French and Francophone Studies and Women's Studies advisers.

For students who elect to write the thesis for the dual-title M.A. degree in French and Francophone Studies and Women's Studies, the thesis must reflect the student’s education and interest in both French and Francophone Studies and Women's Studies. All members of the student’s thesis committee must be members of the Graduate Faculty. The master’s thesis committee must include at least one Graduate Faculty member from Women's Studies. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role.

**Degree Requirements for the Ph.D.**

The dual-title Ph.D. in French and Francophone Studies and Women’s Studies requires between 30 and 42 credits beyond the master's degree, including:

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<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>FR 571</td>
<td>French Literary Theory and Criticism</td>
<td>3</td>
</tr>
<tr>
<td>FR 580</td>
<td>Approaches to French Civilization</td>
<td>3</td>
</tr>
<tr>
<td>WMNST 501</td>
<td>Feminist Perspectives on Research and Teaching Across the Disciplines</td>
<td>3</td>
</tr>
<tr>
<td>WMNST 502</td>
<td>Global Perspectives on Feminism</td>
<td>3</td>
</tr>
<tr>
<td>WMNST 507</td>
<td>Feminist Theory</td>
<td>3</td>
</tr>
</tbody>
</table>

A further twenty-one credits selected in consultation with the adviser, of which nine credits must be Women's Studies approved.

The dual-title degree will be guided by the qualifying examination procedure of the French and Francophone Studies graduate program. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable. There will be a single qualifying examination, containing elements of both French and Francophone Studies and Women's Studies.

The qualifying examination committee for the dual-title degree will be composed of graduate Faculty from French and Francophone Studies and must include at least one Graduate Faculty member from the Women's Studies Program. The designated dual-title faculty member may be appointed from French and Francophone Studies if that person holds a formal affiliation with the Women's Studies program.

**Doctoral Committee Composition**

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of a French and Francophone Studies and Women's Studies dual-title Ph.D. student must include at least two members of the Women’s Studies Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role.

If the chair of the committee representing French and Francophone Studies is not also a member of the Graduate Faculty in Women's Studies, the member of the committee representing Women's Studies must be appointed as co-chair.

**Comprehensive Examination**

The Comprehensive Examination consists of a series of content-intensive examinations and the doctoral dissertation proposal. The Women's Studies representative on the student’s dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.

**Dissertation and Final Oral Examination**

Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. Students enrolled in the dual-title program are required to write and orally defend a dissertation on a topic that reflects their original research and expertise in French and Francophone Studies and Women’s Studies. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

**Student Aid**

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/courses) set by The Graduate School.

**Courses**

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**Learning Outcomes**

1. Graduates will be able to conduct research that significantly furthers knowledge and theory in the study of either French and Francophone literature or French and Francophone culture and society, and
will develop the skills needed to communicate the results of their research within the profession as future scholars and teachers.

2. Graduates will master a variety of theoretical approaches to literature and culture, including semiotics; reader-response criticism; “French Theory” feminist, queer and postcolonial theories; and narratological and sociological approaches.

3. Graduates will articulate arguments and ideas with rigor and clarity in oral presentations and written formats, according to the conventions of the discipline.

4. Graduates will demonstrate knowledge of scholarly and professional standards in the field through written work and oral presentations, and through interactions with faculty and graduate students both within and outside the Department.

5. Graduates will demonstrate the ability to design course activities and assessments appropriate to courses at various levels.

6. Graduates will master oral and written communication skills in the French language.

Contact
Graduate Program Head: Benedicte Monicat
Director of Graduate Studies/Professor-in-Charge: Jean-Claude Vuillemin
Primary Program Contact: Carolyn Fry
Email: ckf5024@psu.edu
Mailing Address: 442 Burrowes Building, University Park, PA 16802
Telephone: (814) 865-1016
Program Website: French (http://www.french.psu.edu)

Geodesign

Graduate Program Head: Eliza Pennypacker
Program Code: GEOZD
Campus(es): World Campus (M.P.S.)
Degrees Conferred: Master of Professional Studies (M.P.S.)
The Graduate Faculty: View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=face&prog=GEOZD)

Geodesign is a rapidly emerging and powerful approach to spatial problem-solving that requires the synthesis of geographic knowledge and scientific data with the best practices of environmental design. Graduates from the Master in Professional Studies (M.P.S.) in Geodesign program will be prepared to take leadership roles in addressing complex environmental design problems in settings ranging from urban design to conservation planning.

The M.P.S. in Geodesign program’s goal is to provide practicing professionals with an advanced skill set in geodesign. They will learn to capitalize on the power of spatial knowledge and evolving technologies, identify opportunities that emerge to better inform the design, understand their relevance to particular situations, and assist communities in designing alternative futures based on a unique process that brings all this information into focus.

The M.P.S in Geodesign program is intended specifically for professionals who are able to participate principally on a part-time basis and at a distance. It is offered exclusively through the World Campus.

Admission Requirements
Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

To be admitted to the program, applicants must be able to meet the following requirements:

1. A completed online Graduate School application (http://gradschool.psu.edu/prospective-students/how-to-apply) and payment of the application fee.
2. Personal statement of background and interest in the program, including an outline of possible topic for the individual capstone project (maximum 3-pages).
3. Official transcripts from all post-secondary institutions attended (http://www.gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission)
4. TOEFL scores (see below)
5. Three (3) letters of recommendation

Scores from the Graduate Record Examinations (GRE), or from a comparable substitute examination, will be considered, but are not required for admission.

Students with a 3.00 junior/senior average (on a 4.00 scale) will be considered for admission. The best-qualified applicants will be accepted up to the number of spaces available for new students. Exceptions to the minimum 3.00 grade-point average may be made for students with special backgrounds, abilities, and interests.

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. See GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

Degree Requirements

Master of Professional Studies (M.P.S.)
Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

Students earn the M.P.S. in Geodesign degree by successfully completing a minimum 35 credits of course work, including a supervised individual study project. Course requirements include a minimum of 18 credits at the 500 level or above, with a minimum of 6 credits at the 500 level. Note that because most of the available elective courses are worth 3 credits, many students are likely to take at least 36 credits (9 elective credits) to complete their degree program.

The individual study capstone project is the culminating experience for the graduate degree and requires the student to apply the geodesign framework to a real-world challenge, of his/ her choosing, in order to...
demonstrate aptitude in analytic, design, and collaborative skills. For most students the project will culminate in a formal public presentation, attended by the student’s adviser, who is member of the Graduate Faculty at Penn State. If the adviser is unable to attend, the department will send a representative from the Graduate Faculty. The presentation will take place at an appropriate professional conference, approved in consultation with the project adviser. Typically the presentation will be at an annual conference (at the national, regional or state level) of professional organizations, such as the American Planning Association, American Society of Landscape Architects, the Urban and Regional Information Systems Association, ESRI User Conferences, or other suitable professional organization-affiliated venues. The final venue selection will be one that is mutually agreeable between the student and adviser as to location and appropriate level of professional rigor. Alternatively, students who will be unable to attend a conference, or have other professional objectives, may work with their adviser to get approval to write and submit a project report as an article for an appropriate peer-reviewed journal. The student will provide the adviser with the article, who will in turn recommend final submission to the journal. This will provide an alternative path to successfully complete the culminating experience. Presentations and papers are preceded by dress rehearsals that are open to all students in the program through Web and audio conferencing. As part of his or her individual studies, every student is expected to contribute a formal peer review of one other student’s rehearsal.

An Advisory Board consisting of accomplished design, geography and planning professionals in government and industry, as well as Penn State faculty members in a variety of disciplines, guides the ongoing development of the curriculum. Based on taking courses on a part-time basis and at a distance, the curriculum will take at a minimum two-and-a-half years to complete.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>GEODZ 511</td>
<td>Geodesign History, Theory, Principles</td>
<td>3</td>
</tr>
<tr>
<td>GEODZ 822</td>
<td>GeoDesign Models I: Evaluation and Decision</td>
<td>3</td>
</tr>
<tr>
<td>GEODZ 824</td>
<td>GeoDesign Models II: Process and Impact</td>
<td>3</td>
</tr>
<tr>
<td>or GEODZ 826</td>
<td>GeoDesign Models III: Representation and Change</td>
<td></td>
</tr>
<tr>
<td>GEODZ 842</td>
<td>Geodesign Studio I: Rural/Regional Challenges</td>
<td>6</td>
</tr>
<tr>
<td>GEODZ 852</td>
<td>Geodesign Studio II: Urban/District-scale Challenges</td>
<td>6</td>
</tr>
</tbody>
</table>

Electives

Select three courses (at least 8 credits) of GEOG courses at the 400 level or higher; courses must be approved in advance by the student’s adviser. A list of acceptable electives is maintained by the program office.

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<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>GEODZ 596A</td>
<td>Individual Studies–Geodesign Capstone Project Proposal and Peer Review</td>
<td>3</td>
</tr>
<tr>
<td>GEODZ 596B</td>
<td>Individual Studies–Geodesign Capstone Project Dissemination</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits 35

Student Aid

World Campus students in graduate degree programs may be eligible for financial aid. Refer to the Tuition and Financial Aid section (http://www.worldcampus.psu.edu/tuition-and-financial-aid) of the World Campus website for more information.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact

Graduate Program Head: Eliza Pennypacker

Director of Graduate Studies/Professor-in-Charge: Stuart Echols

Primary Program Contact: Kelleann Foster

Email: kxf15@psu.edu

Mailing Address: 121 Stuckeman Family Bldg, University Park, PA 16802

Telephone: (814) 863-8133

Program Website: Geodesign (http://www.worldcampus.psu.edu/degrees-and-certificates/geodesign-masters/overview)

Geographic Information Systems

Graduate Program Head: Anthony C. Robinson

Program Code: GIS

Campus(es): World Campus (M.G.I.S.)

Degrees Conferred:

Master of Geographic Information Systems (M.G.I.S.)

The Graduate Faculty

View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=GIS)

The Master of Geographic Information Systems (M.G.I.S.) degree is awarded to students who demonstrate mastery of the technical competencies and leadership skills required to design, manage, and use geographic information technologies successfully in a wide range of professional fields. The M.G.I.S. program is intended specifically for working professionals who are able to participate only on a part-time basis and at a distance. It is offered exclusively through World Campus. The M.G.I.S. complements, but does not replace, the Department of Geography’s research-focused Master of Science (M.S.) program, which is offered at the University Park campus. Students who expect to pursue the Ph.D. in Geography should apply for admission to the residential M.S. program.

Admission Requirements

Applicants apply for admission to the program via the Graduate School (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. See GCAC-305 Admission Requirements for International Students
Degree Requirements

Master of Geographic Information Systems (M.G.I.S.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-700/transfer-credit).

Students earn the M.G.I.S. degree by successfully completing 36 credits of course work, including a supervised independent project. Course requirements include a minimum of 18 credits at the 500 or 800 level, with at least 6 credits at the 500 level.

The culminating experience for the degree is an independent project completed while enrolled in GEOG 596. A minimum of 6 credits and a maximum of 9 credits of GEOG 596 will count towards the degree. The independent project demonstrates the student's ability to apply advanced knowledge and skills related to geographic information systems in a way that makes a substantial contribution to his or her professional work. For most students, the project culminates in a formal public presentation, attended by a member of the Graduate Faculty associated with the M.G.I.S. program, which takes place at an appropriate professional conference. Alternative arrangements are made for students with special needs or constraints. For example, students who submit written reports of project aims and outcomes for publication in adviser-approved peer-reviewed journals are exempt from the public presentation requirement. Presentations and papers are preceded by dress rehearsals that are open to all students in the program through Web and audio conferencing. As part of his or her individual studies, every student is expected to contribute a formal peer review of one other student's rehearsal.

In lieu of specified prescribed and elective courses, MGIS students may elect to substitute those for courses that comprise an option. There are two option choices: Geospatial Intelligence Option (15 credits) and Geodesign Option (12 credits).

Geospatial Intelligence Option

M.G.I.S. students who choose to complete the Geospatial Intelligence Option may substitute the 15 credits that comprise the option for 15 credits of prescribed and elective courses (including GEOG 482 or GEOG 864, GEOG 483, and GEOG 484). This option is designed for current or aspiring practitioners in government agencies, businesses, and non-governmental organizations that rely on insights produced through skillful, knowledgeable, and conscientious analysis of diverse georeferenced data to plan for emergencies, to coordinate responses to natural and human induced disasters, to enforce the law, and to plan and conduct military operations.

Geodesign Option

In lieu of 3 credits of a prescribed introductory course (GEOG 484) plus 9 additional elective credits, M.G.I.S. students may substitute 12 credits associated with courses that comprise the Geodesign Option. This option is designed for current or aspiring professionals in government agencies, businesses, and non-profit organizations who see limitations
in current regional and urban planning and design approaches, and who seek a foundation in geospatially-based design through investigating the methods and collaborative nature of the Geodesign process.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOG 482</td>
<td>Making Maps That Matter With GIS</td>
<td>3</td>
</tr>
<tr>
<td>or GEOG 864</td>
<td>Professionalism and Ethics in Geographic Information Science and Technology</td>
<td></td>
</tr>
<tr>
<td>GEOG 483</td>
<td>Problem-Solving with GIS</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 583</td>
<td>Geospatial System Analysis and Design</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 586</td>
<td>Geographical Information Analysis</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 871</td>
<td>Geospatial Technology Project Management</td>
<td>3</td>
</tr>
</tbody>
</table>

**Geodesign Option Courses**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>GEODZ 511</td>
<td>Geodesign History, Theory, Principles</td>
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</tr>
<tr>
<td>GEODZ 822</td>
<td>GeoDesign Models I: Evaluation and Decision</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 487</td>
<td>Environmental Applications of GIS</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 865</td>
<td>Cloud and Server GIS</td>
<td>3</td>
</tr>
</tbody>
</table>

**Electives**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOG 596</td>
<td>Individual Studies</td>
<td>6-9</td>
</tr>
</tbody>
</table>

**Total Credits**: 36

**Student Aid**

World Campus students in graduate degree programs may be eligible for financial aid. Refer to the Tuition and Financial Aid section (http://www.worldcampus.psu.edu/tuition-and-financial-aid) of the World Campus website for more information.

**Courses**

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**Learning Outcomes**

1. Develop the technical and analytical competencies required to serve as leaders within private and public geospatial technology enterprises.
2. Demonstrate effective design, management, and application of geographic information technologies to support complex problems solving.
3. Combine prior knowledge and career experiences with technical competencies to become broadly-equipped geospatial technology practitioners.

**Contact**

**Graduate Program Head**: Anthony Robinson

**Director of Graduate Studies/Professor-in-Charge**: Justine Blanford

**Primary Program Contact**: Kary Blaschak-Isett

**Email**: kdb6@psu.edu

**Mailing Address**: John A. Dutton e-Education Institute, 2217 EES, University Park, PA 16802

**Telephone**: (814) 865-2557

**Program Website**: Geographic Information Systems (https://gis.e-education.psu.edu/mgis)

**Geography**

**Graduate Program Head**: Cynthia A. Brewer

**Program Code**: GEOG

**Campus(es)**

University Park (Ph.D., M.S.)

**Degrees Conferred**

- Doctor of Philosophy (Ph.D.)
- Master of Science (M.S.)
- Dual-Title Ph.D. in Geography and African Studies
- Dual-Title Ph.D. and M.S. in Geography and Demography
- Dual-Title Ph.D. and M.S. in Geography and Human Dimensions of Natural Resources and the Environment
- Dual-Title Ph.D. and M.S. in Geography and Operations Research
- Dual-Title Ph.D. and M.S. in Geography and Women's Studies

**The Graduate Faculty**

View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=GEOG)

The faculty encourages graduate students to arrange courses of study appropriate to their individual needs and aspirations. Programs in Geography may be directed toward a career in public service, teaching and research, private industry, or one of the many other vocational opportunities open to geographers.

Students typically concentrate their study on topics that fall within the special skills and interests of the faculty. Current specialties include behavioral geography; biogeography; cartography; climatology; cultural geography; feminist geography; geo-computation; geographic education; geographic information science; geography of the developing world; geographic theory; geographic visualization; historical geography; human dimensions of global change; nature and society; political geography; population geography; regional economic development and industrial location; remote sensing; and urban geography.

**Admission Requirements**

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Scores from the Graduate Record Examinations (GRE) are required for admission, as well as a personal statement.

Students with a 3.00 junior/senior grade-point average (on a 4.00 scale) and with appropriate course work in geography or a related discipline will be considered for admission to the M.S. program or to the five-year Ph.D.
program. Applicants with master's degrees from high-quality graduate programs in geography will be considered for admission to the four-year doctoral program. The best-qualified applicants will be admitted up to the number of places that are available for new students. All students must have or must acquire a broad competence in physical geography, human geography, environment and society, GISScience, and analysis methods (qualitative or quantitative).

Baccalaureate students must earn a master's degree before they will be considered for admission to the doctoral program.

**Degree Requirements**

**Master of Science (M.S.)**

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

Penn State's graduate program in Geography works with incoming students to design programs tailored to their specific interests and needs. Thus there are few formal requirements and a maximum of opportunities for students to pursue their own interests under the guidance of the faculty. Each student's work is supervised by his or her academic adviser and by a committee consisting of two additional members of the Graduate Faculty for M.S. students. The M.S. program is broadly based. It is designed to provide beginning graduate students with basic training in systematic fields, geographical theory, and research techniques.

The M.S. degree may be earned by completing a thesis or two papers. The thesis option requires completion of at least 30 credits at the 400, 500, 600, and 800 level. If the two-paper option is elected, the student must earn 35 credits at the 400, 500, or 800 level. In both cases, at least 18 credits in the 500 and 600 series, combined, must be included in the program. The master's papers are usually expanded versions of course or seminar papers that are of sufficiently high quality that they can be submitted to scholarly journals. At least one of the papers offered to fulfill the M.S. papers requirement must have been written in connection with a departmental course or seminar.

All M.S. students are required to enroll in the following courses during their first year of residence:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOG 500</td>
<td>Introduction to Geographic Research</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 502</td>
<td>Research Scholarship in Geography</td>
<td>3</td>
</tr>
</tbody>
</table>

Select at least three of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOG 501A</td>
<td>Research Perspectives in Physical Geography</td>
<td></td>
</tr>
<tr>
<td>GEOG 501B</td>
<td>Research Perspectives in Human Geography</td>
<td></td>
</tr>
<tr>
<td>GEOG 501C</td>
<td>Research Perspectives in Human-Environment Geography</td>
<td></td>
</tr>
<tr>
<td>GEOG 501D</td>
<td>Research Perspectives in GISScience</td>
<td></td>
</tr>
</tbody>
</table>

All M.S. students are required to complete at least one seminar at the 500 level. Supporting courses are chosen in consultation with an entrance committee (in year one) or the adviser (in subsequent years).

**Doctor of Philosophy (Ph.D.)**

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

There are three paths to a Ph.D. One is a five-year Ph.D. with M.S. degree, which is available to students who enter Penn State Geography's graduate program without a master's degree. These students are on an accelerated schedule and earn an M.S. along the way to the Ph.D. The second is a four-year Ph.D., which is available to those students who have already received a master's degree in another program either at Penn State or at another university. The third is an M.S.-to-Ph.D. path, which is available to Penn State Geography M.S. students who decide either to continue into the Ph.D. program after they have started their master's program, or to return for the Ph.D. after having graduated with the M.S. Students on this path are not accelerated and therefore will usually require two years to earn the master's and four years to earn the doctorate.

There is no fixed number of credits; courses are prescribed according to the student's prior experience and academic goals. Graduate Council's communication and foreign language requirement for the Ph.D. degree shall be satisfied in a manner approved by the candidate's doctoral committee.

All doctoral students are required to enroll in GEOG 500 and GEOG 502 during their first year of residence.

**Dual-Titles**

**Dual-Title Ph.D. in Geography and African Studies**

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

Geography doctoral students — who are already in the program and who have research and scholarly interests in comparative, sub-regional, national and thematic analyses, environmental change, livelihood systems, socio-economic and political change, and other aspects of African development — may apply to the dual-title doctoral degree program in African Studies. The goal of the dual-title program is to enable graduate students from Geography to complement their knowledge and skills in a major area of geographic specialization with in-depth knowledge of prevailing theories and problem-solving approaches to thematic, regional, or national issues pertaining to African Studies.

The dual-title degree program will provide interested Geography doctoral students with a multidisciplinary approach that will enhance their analytical capabilities for addressing key issues in African development and broad aspects of livelihood change. It thereby will add value to their Geography degree and increase their competitiveness in the job market. The well-rounded, regional specialist who graduates from the program is likely to be employed in an international setting. The program has the potential, therefore, to enhance the reputation of the Geography Department, the College of Earth and Mineral Sciences, the College of the Liberal Arts, and Penn State.

**Admission Requirements**

Students must apply and be admitted to the graduate program in Geography and The Graduate School before they can apply for admission to the dual-title degree program. Applicants interested in the dual-title degree program may make their interest in the program known clearly on
their applications to Geography and include remarks in their statement of purpose that address the ways in which their research and professional goals in Geography reflect an interest in African Studies-related research.

To be enrolled in the dual-title doctoral degree program in African Studies, a student must submit a letter of application and transcript, which will be reviewed by the African Studies Admissions Committee. Refer to the Admission Requirements section of the African Studies (http://bulletins.psu.edu/graduate/programs/majors/african-studies) Bulletin page. Students must apply for enrollment into the dual-title degree program in African Studies prior to taking their qualifying examination.

**Academic Advisers and Course Selection**

To qualify for the dual-title degree, students must satisfy the requirements of the Geography graduate program. In addition, students must complete the degree requirements for the dual-title in African Studies, listed on the African Studies Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/african-studies). Within this framework, final course selection is determined by the student in consultation with the Geography and African Studies academic advisers.

Upon acceptance into the dual-title degree program by the African Studies admissions committee, the student will be assigned an African Studies academic adviser in consultation with the African Studies director and the African Studies admissions committee. As a student develops specific scholarly interests, s/he may request a different African Studies adviser from the one assigned by the African Studies admissions committee. The student and the Geography and African Studies academic advisers will establish a program of study that is appropriate for the student's professional objectives and that is in accordance with the policies of the Graduate Council, the Geography graduate program, and the African Studies dual-title graduate degree program.

**Requirements for the Geography-African Studies Ph.D.**

The Dual-Title Doctoral Degree in Geography and African Studies is awarded only to students who are admitted to the Geography doctoral program and admitted to the dual-title degree program in African Studies. To qualify for the dual-title degree, students must satisfy the degree requirements for the degree they are enrolled in Geography, listed in the Degree Requirements section. In addition, students must complete the degree requirements for the dual-title in African Studies, listed on the African Studies Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/african-studies). The minimum course requirements for the Dual-Title Ph.D. degree in Geography and African Studies are as follows:

- Completion of all course work and other requirements for the Geography Ph.D.
- 18 credits of Africa-related coursework at the 400-, 500-, or 800-level, of which the following are required:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AFR 501</td>
<td>Key Issues in African Studies</td>
<td>3</td>
</tr>
<tr>
<td>Select at least two of the following:</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>AFR 532</td>
<td>Environment and Livelihoods in Africa</td>
<td></td>
</tr>
<tr>
<td>AFR 534</td>
<td>Political Economy of Energy and Extractive Industries in Africa (Oil and Mining)</td>
<td></td>
</tr>
<tr>
<td>AFR 537</td>
<td>Gender, Sexuality and Islam in Africa: Exploring Contemporary Feminist Scholarship</td>
<td></td>
</tr>
</tbody>
</table>

- As many as 6 of the 18 credits may come from 400-, 500-, or 800-level Geography courses, as approved by the student's Geography and African Studies Program advisers.
- The remaining credits can be taken in AFR or in any department other than Geography; of these, no more than 6 credits may be taken at the 400-level and no more than 3 combined credits may come from AFR 596 and GEOG 596.
- Communication and foreign language requirements will be determined by the student and the Geography and African Studies advisers in accordance with the existing Geography language requirements.

The choice of electives in African Studies is to be proposed by the student and is subject to approval by the Geography and African Studies academic advisers. The suite of selected courses should have an integrated, intellectual thrust that probes a thematic, national, or regional issue and that complements the student's specialty in Geography.

**Language Requirement**

The language requirement for a student in the dual-title doctoral degree program will be determined by the student and the Geography and African Studies Program advisers in accordance with the existing Geography language requirements.

**Qualifying Exam**

The qualifying exam in Geography is an oral exam designed to help students to "...think analytically and critically in their field of expertise and to understand and apply ideas from other fields of geography to their research domain" (Geography Graduate Student Handbook 2011-2012, p. 30). The format of the qualifying exam for the dual-title degree student will be unchanged from the existing Geography qualifying exam and will be guided directly by the requirements outlined in the Geography Graduate Student Handbook. The only difference from the Geography qualifying exam will be an explicit African Studies component. The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Geography and must include at least one Graduate Faculty member from the African Studies program. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. There will be a single qualifying examination, containing elements of both Geography and African Studies. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

**Dissertation Committee Composition**

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of a Geography and African Studies dual-title Ph.D. student must include at least one member of the African Studies Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in African Studies, the member of the committee representing African Studies must be appointed as co-chair. The African Studies representative on the student’s dissertation committee will develop
To qualify for the dual-title degree, students must satisfy the degree requirements for the degree they are enrolled in Geography, listed in the Degree Requirements section. In addition, students must complete the degree requirements for the dual-title in HDNRE, listed on the HDNRE Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/human-dimensions-natural-resources-environment). Doctoral students must be admitted into the dual-title degree program in HDNRE prior to taking the qualifying examination in their primary graduate program.

Degree Requirements
To qualify for the dual-title degree, students must satisfy the degree requirements for the degree they are enrolled in Geography, listed in the Degree Requirements section. In addition, students must complete the degree requirements for the dual-title in Demography, listed on the Demography Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/demography).

The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Geography and must include at least one Graduate Faculty member from the Demography program. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. There will be a single qualifying examination, containing elements of both Geography and Demography. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee for a Geography and Demography dual-title Ph.D. student must include at least one member of the Demography Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in Demography, the member of the committee representing Demography must be appointed as co-chair. The Demography representative on the student’s dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their dissertation committee and reflects their original research and education in Geography and Demography. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

Dual-Title M.S. and Ph.D. in Geography and Human Dimensions of Natural Resources and the Environment
Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

Admission Requirements
Students must apply and be admitted to the graduate program in Geography and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Demography dual-title program. Refer to the Admission Requirements section of the Demography Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/demography). Doctoral students must be admitted into the dual-title degree program in Demography prior to taking the qualifying examination in their primary graduate program.

Degree Requirements
To qualify for the dual-title degree, students must satisfy the degree requirements for the degree they are enrolled in Geography, listed in the Degree Requirements section. In addition, students must complete the degree requirements for the dual-title in Demography, listed on the Demography Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/demography).

The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Geography and must include at least one Graduate Faculty member from the Demography program. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. There will be a single qualifying examination, containing elements of both Geography and Demography. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee for a Geography and Demography dual-title Ph.D. student must include at least one member of the Demography Graduate Faculty. Faculty
members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in HDNRE, the member of the committee representing HDNRE must be appointed as co-chair. The HDNRE representative on the student’s dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their dissertation committee and reflects their original research and education in Geography and HDNRE. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

**Dual-Title M.S. and Ph.D. in Geography and Operations Research**

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-208/dual-title-graduate-degree-programs).

**Admission Requirements**

Students must apply and be admitted to the graduate program in Geography and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Operations Research dual-title program. Refer to the Admission Requirements section of the Operations Research Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/operations-research). Doctoral students must be admitted into the dual-title degree program in Operations Research prior to taking the qualifying examination in their primary graduate program.

**Degree Requirements**

To qualify for the dual-title degree, students must satisfy the degree requirements for the degree they are enrolled in Geography, listed in the Degree Requirements section. In addition, students must complete the degree requirements for the dual-title in Operations Research, listed on the Operations Research Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/operations-research).

The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Geography and must include at least one Graduate Faculty member from the Operations Research program. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. There will be a single qualifying examination, containing elements of both Geography and Operations Research. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of a Geography and Operations Research dual-title Ph.D. student must include at least one member of the Operations Research Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in Operations Research, the member of the committee representing Operations Research must be appointed as co-chair. The Operations Research representative on the student’s dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their dissertation committee and reflects their original research and education in Geography and Operations Research. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

**Dual-Title M.S. and Ph.D. in Geography and Women’s Studies**

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-208/dual-title-graduate-degree-programs).

**Admission Requirements**

Students must apply and be admitted to the graduate program in Geography and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Women’s Studies dual-title program. Refer to the Admission Requirements section of the Women’s Studies Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/womens-studies). Doctoral students must be admitted into the dual-title degree program in Women’s Studies prior to taking the qualifying examination in their primary graduate program.

**Degree Requirements**

To qualify for the dual-title degree, students must satisfy the degree requirements for the degree they are enrolled in Geography, listed in the Degree Requirements section. In addition, students must complete the degree requirements for the dual-title in Women’s Studies, listed on the Women’s Studies Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/womens-studies).

The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Geography and must include at least one Graduate Faculty member from the Women’s Studies program. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. There will be a single qualifying examination, containing elements of both Geography and Women’s Studies. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of a Geography and Women’s Studies dual-title Ph.D. student must include at least two members of the Women’s Studies Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in Women’s Studies, the member of the committee representing Women’s Studies must be appointed as co-chair. The Women’s Studies
forms of student aid are described in the Tuition & Funding Graduate assistantships available to students in this program and other Student Aid program, and the Graduate School. Primary Program Contact:

Director of Graduate Studies/Professor-in-Charge:

Brian King

Email: jd213@psu.edu

Forms of student aid are described in the Tuition & Funding Graduate assistantships available to students in this program and other Student Aid program, and the Graduate School. Primary Program Contact:

Director of Graduate Studies/Professor-in-Charge:

Brian King

Email: jd213@psu.edu

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Learning Outcomes

1. Know: Graduates will demonstrate knowledge of the core theories and methods in geography as well as deeper knowledge of three out of four subfields. Graduates will demonstrate specialized knowledge within their chosen sub-field: Human Geography, Environment-Society, Physical Geography, or Geographic Information Science.

2. Create: Graduates will be able to creatively synthesize theory and literature within their field of specialization. They will be able to generate new ideas and if appropriate formulate hypotheses in geographic knowledge. Graduates will be able to select from a range of methodological options and create a research framework to provide solutions to geographical problems.

3. Apply: Graduates will be able to carry out independent, original, and ethical research that addresses problems in the subfields of geography.

4. Critical thinking: Graduates will be able to critically analyze work in their field of specialization.

5. Communicate: Graduates will be able to convey ideas or arguments in a professional manner with clear, concise, well-organized papers, proposals, and oral presentations.

Contact

Graduate Program Head: Cynthia Brewer

Director of Graduate Studies/Professor-in-Charge: Brian King

Primary Program Contact: Jessica Perks

Email: jd213@psu.edu

Mailing Address: 302 Walker Building, University Park, PA 16802

Telephone: (814) 865-3434

Program Website: Geography (http://www.geog.psu.edu)

Geosciences

Graduate Program Head: Mark Patzkowsky

Program Code: GEOSC

Campus(es): University Park (Ph.D., M.S.)

Degrees Conferred: Doctor of Philosophy (Ph.D.)

Master of Science (M.S.)

Dual-Title Ph.D. in Geosciences and Astrobiology

Dual-Title Ph.D. in Geosciences and Biogeochemistry

Dual-Title Ph.D. and M.S. in Geosciences and Operations Research

Integrated B.S in Geosciences and M.S. in Geosciences

The Graduate Faculty

View (https://secure.gradsch.psu.edu/gpms/index.cfm?

searchType=fac&prog=GEOSC)

The Department of Geosciences offers M.S. and Ph.D. degree programs that provide students with a broad background in any of the major areas of geological sciences and intensive research experiences culminating in the preparation of a formal thesis. The goal of the programs is to prepare students for scientific careers in academia, government, or industry. A wide range of faculty interests and exceptional laboratory and other support facilities provide an extensive variety of areas of specialization in which students may choose their course work and research topics, which include:

- aqueous geochemistry
- chemistry and physics of rocks and mineral
- geodynamics
- global change and earth history
- sedimentary geology and paleobiology
- solid earth and applied geophysics
- surficial processes

The research of faculty and students is facilitated through the Biogeochemical Research Initiative for Education (BRIE, an NSF-sponsored graduate program in microbial biogeochemistry), the Petroleum Geosystems Initiative (an industry-sponsored, team-based M.S. program) linking the Department of Geosciences and the Department of Energy and Geo-Environmental Engineering and the Penn State Astrobiology Research Center (PSARC, an NSF-sponsored interdisciplinary program in the origin and evolution of life in the universe, aimed at understanding the connections between the environment and the biota on Earth, especially during the stages of its evolution) as well as the Environment Institute of the College of Earth and Mineral Sciences, including the Earth System Science Center, and the Center for Environmental Chemistry and Geochemistry.

In addition to extensive computing and supercomputing facilities developed in association with the Earth System Science Center, students
have access to a wealth of analytical, experimental, and field equipment. State-of-the-art analytical equipment is maintained by the department and the Material Characterization Laboratory. The Department of Geography and the Office for Remote Sensing of Environmental Resources have remote sensing facilities.

**Admission Requirements**

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Scores from the Graduate Record Examinations (GRE) are normally required for admission. Exceptions must be approved by the department.

For admission, applicants generally are expected to have a bachelor’s degree in some branch of the natural or physical sciences, engineering, or mathematics. An applicant also is expected to have completed standard introductory courses in geosciences, chemistry, physics, and mathematics through integral calculus, plus 15 credits of intermediate-level work in one or a combination of these subjects. Greater than minimal preparation in chemistry, geology, biology, mathematics, or physics may be required for particular subdisciplines. Applicants who have taken somewhat less than the indicated minimum in these subjects may be admitted but must make up their deficiencies concurrently with their graduate studies.

Students with special backgrounds, abilities, and interests whose undergraduate grade-point average in courses pertinent to geosciences is below a 3.00 (on a 4.00 scale) will be considered for admission only when there are strong indications that a 3.00 average can be maintained at the graduate level.

Students are admitted both to the M.S. and Ph.D. degree programs. A student may work toward a Ph.D. degree without first earning a master’s degree. If this option is desired, the student must arrange the scheduling of a qualifying evaluation no later than the end of the third semester of residence at Penn State.

**Degree Requirements**

**Master of Science (M.S.)**

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

Upon arrival, students will be advised initially by a committee appointed by the associate head for graduate program and research. The committee in turn will designate an interim adviser. Before the end of the first academic year of residence, the student is expected to develop specific academic and research interests so that an appropriate permanent academic adviser and research supervisor may be chosen. The academic adviser and research supervisor are usually the same person, except when the research supervisor is not a member of the geosciences Graduate Faculty. In such a case, a geosciences program family member serves as the academic adviser.

Master’s degree students are required to take 30 credits at the 400, 500, 600, and 800 level, including at least 18 credits at the 500 to 600 level, combined. The 12 to 16 common degree credits described below satisfy the Graduate School minimum of at least 12 credits in course work in the major program.

As part of the M.S. program, each student is required to complete a thesis. The thesis must be defended in an oral examination administered by an M.S. committee. The thesis must be accepted by the advisers and/or committee members, the head of the graduate program, and the Graduate School.

All graduate students in geosciences are expected to acquire breadth of knowledge in the geosciences, a fundamental and advanced knowledge of their subdiscipline, and skills in the areas of data collection and quantitative analysis. Toward that end, all graduate students must select one of the approved courses in each of the following areas:

1. Geosciences Breadth – 3-4 credits
2. Disciplinary Fundamentals – 3-4 credits
3. Data Gathering – 3-4 credits
4. Quantitative Analysis – 3-4 credits

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOSC 500</td>
<td>Issues in Geosciences</td>
<td>3</td>
</tr>
</tbody>
</table>

**Disciplinary Fundamentals**

Select 3-4 credits from the following:

- GEOSC 488 An Introduction to Seismology
- GEOSC 489 Dynamics of the Earth
- GEOSC 502 Evolution of the Biosphere
- GEOSC 518 Stable Isotope Geochemistry
- GEOSC 519 Mineral Equilibria
- GEOSC 533 Principles of Geochemistry
- GEOSC 542 Quantitative Methods in Hydrogeology
- GEOSC 548 Surface Processes
- GEOSC 585 Sedimentary Geology

**Data Gathering and Interpretation**

Select 3-4 credits from the following:

- GEOSC 410 Marine Biogeochemistry
- GEOSC 413 Techniques in Environmental Geochemistry
- GEOSC 483 Environmental Geophysics
- GEOSC 508 Mechanics of Earthquakes and Faulting
- GEOSC 558 Multi-channel Seismic Processing and Interpretation
- GEOSC 565 Tectonic Geomorphology
- GEOSC 572 Field Stratigraphy

**Quantitative Analysis**

Select 3-4 credits from the following:

- EMCH 524A Mathematical Methods in Engineering
- GEOSC 514 Data Inversion in the Earth Sciences
- GEOSC 560 Kinetics of Geological Processes
- GEOSC 561 Mathematical Modeling in the Geosciences
- PNG 425 Principles of Well Testing and Evaluation
- GEOSC 597 Special Topics (either Multivariate Analyses in Geosciences OR Data Analysis in the Earth Sciences)

**Electives**

12 credits
A current list of approved courses is maintained by the program office.

Doctor of Philosophy (Ph.D.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

Upon arrival, students will be advised initially by a committee appointed by the associate head for graduate program and research. The committee in turn will designate an interim adviser. Before the end of the first academic year of residence, the student is expected to develop specific academic and research interests so that an adviser and research supervisor may be chosen. The academic adviser and research supervisor are usually the same person, except when the research supervisor is not a member of the geosciences Graduate Faculty. In such a case, a geosciences program family member serves as the academic adviser.

Continuation in the Ph.D. program is determined by an oral qualifying examination before a qualifying examination committee. Preparation and defense of two research proposals will serve as one means of assessing the student’s ability. At least one of these proposals should represent original work by the student, but the other may be an actual dissertation proposal and involve limited initial input from the adviser or others.

Course work in addition to the degree requirements described below will be selected by the student in consultation with his/her committee.

The comprehensive examination is both oral and written. It is administered by the dissertation committee after the student has essentially completed course work and after a foreign language requirement (if required by the committee) is fulfilled. A final oral defense of the dissertation is required.

All graduate students in geosciences are expected to acquire breadth of knowledge in the geosciences, a fundamental and advanced knowledge of their subdiscipline, and skills in the areas of data collection and quantitative analysis. Toward that end, all graduate students must select one of the approved courses in each of the following areas:

1. Geosciences Breadth — 3-4 credits
2. Disciplinary Fundamentals — 3-4 credits
3. Data Gathering — 3-4 credits
4. Quantitative Analysis — 3-4 credits

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOSC 500</td>
<td>Issues in Geosciences</td>
<td>3</td>
</tr>
</tbody>
</table>

Disciplinary Fundamentals

Select 3-4 credits from the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOSC 488</td>
<td>An Introduction to Seismology</td>
</tr>
<tr>
<td>GEOSC 489</td>
<td>Dynamics of the Earth</td>
</tr>
<tr>
<td>GEOSC 502</td>
<td>Evolution of the Biosphere</td>
</tr>
<tr>
<td>GEOSC 518</td>
<td>Stable Isotope Geochemistry</td>
</tr>
<tr>
<td>GEOSC 519</td>
<td>Mineral Equilibria</td>
</tr>
<tr>
<td>GEOSC 533</td>
<td>Principles of Geochemistry</td>
</tr>
</tbody>
</table>

Data Gathering and Interpretation

Select 3-4 credits from the following:

<table>
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</tr>
</thead>
<tbody>
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<td>GEOSC 502</td>
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</tr>
<tr>
<td>GEOSC 518</td>
<td>Stable Isotope Geochemistry</td>
</tr>
<tr>
<td>GEOSC 519</td>
<td>Mineral Equilibria</td>
</tr>
<tr>
<td>GEOSC 533</td>
<td>Principles of Geochemistry</td>
</tr>
</tbody>
</table>

Quantitative Analysis

Select 3-4 credits from the following:

<table>
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<tr>
<th>Code</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMCH 524A</td>
<td>Mathematical Methods in Engineering</td>
</tr>
<tr>
<td>GEOSC 514</td>
<td>Data Inversion in the Earth Sciences</td>
</tr>
<tr>
<td>GEOSC 560</td>
<td>Kinetics of Geological Processes</td>
</tr>
<tr>
<td>GEOSC 561</td>
<td>Mathematical Modeling in the Geosciences</td>
</tr>
<tr>
<td>PNG 425</td>
<td>Principles of Well Testing and Evaluation (either Multivariate Analyses in Geosciences OR Data Analysis in the Earth Sciences)</td>
</tr>
<tr>
<td>GEOG 597</td>
<td>Special Topics (either Multivariate Analyses in Geosciences OR Data Analysis in the Earth Sciences)</td>
</tr>
</tbody>
</table>

A current list of approved courses is maintained by the program office.

Dual-Titles

Dual-title Ph.D. in Geosciences and Astrobiology

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

Admission Requirements

Students must apply and be admitted to the graduate program in Geosciences and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Astrobiology dual-title program. Refer to the Admission Requirements section of the Astrobiology Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/astrobiology).

Doctoral students must be admitted into the dual-title degree program in Astrobiology prior to taking the qualifying examination in their primary graduate program.

Degree Requirements

To qualify for the dual-title degree, students must satisfy the degree requirements for the degree they are enrolled in Geosciences, listed in the Degree Requirements section. In addition, students must complete the degree requirements for the dual-title in Astrobiology, listed on the Astrobiology Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/astrobiology).

The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Geosciences and must include at least one Graduate Faculty member from the Astrobiology program.
Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. There will be a single qualifying examination, containing elements of both Geosciences and Astrobiology. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of a Geosciences and Astrobiology dual-title Ph.D. student must include at least one member of the Astrobiology Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in Astrobiology, the member of the committee representing Astrobiology must be appointed as co-chair. The Astrobiology representative on the student's dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their dissertation committee and reflects their original research and education in Geosciences and Astrobiology. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

**Dual-title Ph.D. in Geosciences and Biogeochemistry**

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

**Admission Requirements**

Graduate students with research and educational interests in biogeochemistry may apply to the Biogeochemistry Dual-Title Degree Program. Students must apply and be admitted to the graduate program in Geosciences and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Biogeochemistry dual-title program. Refer to the Admission Requirements section of the Biogeochemistry Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/biogeochemistry). Doctoral students must be admitted into the dual-title degree program in Biogeochemistry prior to taking the qualifying examination in their primary graduate program. Students in the Biogeochemistry Dual Title program are required to have two advisers from separate disciplines: one individual serving as a primary adviser in their major degree program and a secondary adviser in an area within a field covered by the dual-title program and a member of the Biogeochemistry faculty.

**Degree Requirements**

To qualify for the dual-title degree, students must satisfy the degree requirements for the degree they are enrolled in Geosciences, listed in the Degree Requirements section. In addition, students must complete the degree requirements for the dual-title in Biogeochemistry, listed on the Biogeochemistry Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/biogeochemistry). Additional course work from an approved list of courses is required.

All students must pass a qualifying examination that includes an assessment of their potential in the field of biogeochemistry. A single qualifying examination that includes biogeochemistry will be administered for admission into the student's Ph.D. program, as well as the Biogeochemistry dual-title. The structure and timing of this exam will be determined jointly by the dual-title and major program. The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Geosciences and must include at least one Graduate Faculty member from the Biogeochemistry program. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of a Geosciences and Biogeochemistry dual-title Ph.D. student must include at least one member of the Biogeochemistry Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in Biogeochemistry, the member of the committee representing Biogeochemistry must be appointed as co-chair. The Biogeochemistry representative on the student's dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their dissertation committee and reflects their original research and education in Geosciences and Biogeochemistry. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

**Dual-title Ph.D. and M.S. in Geosciences and Operations Research**

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

**Admission Requirements**

Students must apply and be admitted to the graduate program in Geosciences and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Operations Research dual-title program. Refer to the Admission Requirements section of the Operations Research Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/operations-research). Doctoral students must be admitted into the dual-title degree program in Operations Research prior to taking the qualifying examination in their primary graduate program.

**Degree Requirements**

To qualify for the dual-title degree, students must satisfy the degree requirements for the degree they are enrolled in Geosciences, listed in
the Degree Requirements section. In addition, students must complete the degree requirements for the dual-title in Operations Research, listed on the Operations Research Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/operations-research).

The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Geosciences and must include at least one Graduate Faculty member from the Operations Research program. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. There will be a single qualifying examination, containing elements of both Geosciences and Operations Research. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of a Geosciences and Operations Research dual-title Ph.D. student must include at least one member of the Operations Research Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in Operations Research, the member of the committee representing Operations Research must be appointed as co-chair. The Operations Research representative on the student’s dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their dissertation committee and reflects their original research and education in Geosciences and Operations Research. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

**Integrated Undergrad-Grad Programs**

**Integrated B.S in Geosciences and M.S. in Geosciences**

Requirements listed here are in addition to requirements listed in GCAC-210 Integrated Undergraduate-Graduate (IUG) Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/integrated-undergraduate-graduate-degree-programs).

The Department of Geosciences offers an integrated B.S./MS. Program that is designed to allow academically superior students to obtain both the B.S. and the M.S. degree in Geosciences within 5 years of study. Students who wish to complete the Integrated B.S./M.S. Program in Geosciences must apply for admission to the Graduate School and the Integrated B.S./M.S. program by the end of their junior year.

During the first three years, the student follows the course scheduling of one of the options in Geosciences (see the Undergraduate Bulletin (http://bulletins.psu.edu/undergraduate)); however, if a student intends to enter the Integrated B.S./M.S. program, he/she would be encouraged to take, wherever appropriate, upper level classes. By the end of the junior year, the student normally would apply for admission to the program. A decision of acceptance would be made prior to the beginning of the senior year and a M.S. Advising Committee would be appointed. During the senior year, the student would follow the scheduling of the B.S. Geosciences option he/she has selected, with an emphasis on completing 500-level course work wherever appropriate. During the senior year, the student will start work on a thesis designed to meet the departmental requirements of a M.S. thesis. During the fifth year, the student will take courses fulfilling the departmental M.S. degree requirements and complete the M.S. thesis.

**Admission Requirements**

Students who wish to complete the Integrated B.S/M.S. Program in Geosciences must apply for admission via the Graduate School application for admission (http://www.gradschool.psu.edu/prospective-students/how-to-apply), and must meet all the admission requirements of the Graduate School and the Geosciences graduate program for the Master of Science degree, listed in the Admission Requirements section, by the end of their junior year. Typical test scores of students admitted to the Geosciences Graduate Program are: GPA 3.5, and GRE’s Verbal 570, and Quantitative 700. Three letters of recommendation by faculty members for admission to graduate studies are required. The applications are reviewed by the Admissions Committee of the Geosciences Graduate Program and acted upon by the Associate Head for Graduate Programs.

In consultation with an adviser, students must prepare a plan of study appropriate to this integrated program, and must present their plan of study in person to the head of the graduate program or the appropriate committee overseeing the integrated program prior to being admitted to the program. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser as the student advances through the program.

**Degree Requirements**

Students must fulfill all degree requirements for each degree in order to be awarded that degree, subject to the double-counting of credits as outlined below. Degree requirements for the Bachelor of Science in Geosciences are listed in the Undergraduate Bulletin (http://bulletins.psu.edu/undergraduate). Degree requirements for the Master of Science in Geosciences degree are listed on the Degree Requirements tab. Students must sequence their courses so all undergraduate degree requirements are fulfilled before taking courses to count solely towards the graduate degree. If students accepted into the IUG program are unable to complete the M.S. degree, they are still eligible to receive their undergraduate degree if all the undergraduate degree requirements have been satisfied.

Up to 12 credits may be double-counted towards the degree requirements for both the graduate and undergraduate degrees; a minimum of 50% of the double-counted courses must be at the 500 or 800 level. Credits associated with the culminating experience for the graduate degree cannot be double-counted.

**Student Aid**

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

In addition, several graduate fellowships are available for students within the Department of Geosciences.

Programs of study are planned to require no more than two years for the M.S. degree and three additional years, or five years total, for the Ph.D.
degree. A student transferring to the department with the M.S. degree should plan on four additional years. Financial support from teaching or research assistantships or from fellowships is available to students in good standing, but not awarded beyond these limits except in unusual cases.

**Courses**

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**Learning Outcomes**

**Master of Science (M.S.)**

1. KNOW: Students will develop and demonstrate advanced knowledge of a sub-specialty of geosciences, including understanding of, for example, historical and cutting-edge concepts, approaches, and techniques used in the field.

2. ANALYZE & CREATE: Students will demonstrate the ability to contextualize the results of data collection and analysis.

3. RESEARCH IMPLEMENTATION: Students will demonstrate the ability to develop and implement scientific approaches, utilizing data collection, analysis, or numerical models, to address a question or hypothesis.

4. COMMUNICATE: Students will develop the ability to communicate their research findings to an audience of their peers in both written and oral form.

5. QUANTIFY: Students will develop the ability to incorporate quantitative analysis of data to support interpretations.

6. CRITICAL THINKING: Graduates will be able to critically analyze and assess work by others in their field of specialty.

7. PROFESSIONAL PRACTICE: Students will demonstrate knowledge of ethical standards in research and scholarship, and the ability to collaborate in a collegial and ethical manner with other professionals within their field or with diverse scientific backgrounds.

**Doctor of Philosophy (Ph.D.)**

1. KNOW: Students will develop and demonstrate advanced knowledge of a sub-speciality of geosciences, including understanding of, for example, historical and cutting-edge concepts, approaches, and techniques used in the field.

2. ANALYZE & CREATE: Students will demonstrate the ability to independently conceive a research hypothesis or question, and to contextualize the results of data collection and analysis.

3. RESEARCH IMPLEMENTATION: Students will demonstrate the ability to develop and implement scientific approaches, utilizing data collection, analysis, or numerical models, to address a question or hypothesis.

4. COMMUNICATE: Students will develop the ability to communicate their research findings to an audience of their peers in both written and oral form.

5. QUANTIFY: Students will develop the ability to incorporate quantitative analysis of data to support interpretations.

6. CRITICAL THINKING: Graduates will be able to critically analyze and assess work by others in their field of specialty.

7. PROFESSIONAL PRACTICE: Students will demonstrate knowledge of ethical standards in research and scholarship, and the ability to collaborate in a collegial and ethical manner with other professionals within their field or with diverse scientific backgrounds.

**Contact**

**Graduate Program Head:** Mark Patzkowsky

**Primary Program Contact:** Angela Packer

**Email:** amp13@psu.edu

**Mailing Address:** 507 Deike Building, University Park, PA 16802

**Telephone:** (814) 865-7394

**Program Website:** Geosciences (http://www.geosc.psu.edu)
Degree Requirements

Master of ARTs (M.A.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

The M.A. in German is designed to offer students a general foundation in German culture, language, linguistics, and literature. After completing a small set of core requirements, students may pursue their individual interests from among the courses offered by faculty who specialize in German Applied Linguistics, Culture, Linguistics, and Literature. The M.A. degree requires a minimum of 36 credits, with at least 18 at the 500 level, and is designed as a terminal degree.

The following courses are required for the M.A. degree:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GER 510</td>
<td>Literary Theory. An Introduction</td>
<td>3</td>
</tr>
<tr>
<td>GER 511</td>
<td>The Teaching of College German</td>
<td>3</td>
</tr>
<tr>
<td>Select one of the following:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GER 513</td>
<td>German Phonetics and Phonology</td>
<td>3</td>
</tr>
<tr>
<td>GER 514</td>
<td>German Syntax</td>
<td></td>
</tr>
<tr>
<td>GER 515</td>
<td>Introduction to German Applied Linguistics</td>
<td></td>
</tr>
</tbody>
</table>

Total Credits: 9

Practical experience in supervised teaching is required for all graduate degrees. Students who wish to earn a master’s degree must enroll in GER 596 and write a scholarly research paper of between thirty and fifty pages on a topic defined in conjunction with a faculty adviser. The research paper should demonstrate mastery of primary and secondary literature, interpretative skills, and academic prose in both German and English. A one-hour oral defense of the paper shall be scheduled two weeks after its formal submission to the adviser. A committee consisting of faculty adviser and two other members of the German program selected by the M.A. candidate shall evaluate the student’s knowledge of the subject matter.

Doctor of Philosophy (Ph.D.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

For the Ph.D., a student must complete at least 54 credits (these can include M.A. credits) of graduate-level work. The following courses are required of all students:

<table>
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</tr>
<tr>
<td>GER 515</td>
<td>Introduction to German Applied Linguistics</td>
<td></td>
</tr>
</tbody>
</table>

Total Credits: 9

Other requirements include:

1. demonstrated reading knowledge of one foreign language in addition to German and English,
2. successful passing of the comprehensive examination with written and oral components, and
3. completed doctoral dissertation and passing a final oral examination (the dissertation defense). The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

Dual-Titles

Dual-Title Ph.D. in German and Language Science

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

Graduate students with research and educational interests in German and Language Science may apply to the dual-title Ph.D. in German and Language Science. The goal of the dual-title degree in German and Language Science is to enable graduate students from German to acquire the knowledge and skills of their major area of specialization in German, while at the same time gaining the perspective and methods of the Language Science.

Admission Requirements

Students must apply and be admitted to the graduate program in German and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission and meet the admissions requirements of the Language Science dual-title program. Refer to the Admission Requirements of the Language Science Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/language-science). Doctoral Students must be admitted into the dual-title degree program in Language Science prior to taking the qualifying examination in their primary graduate program.

Degree Requirements

To qualify for the dual-title degree, students must satisfy the Ph.D. degree requirements in German. In addition, students must complete the degree requirements for the dual-title in Language Science, listed on the Language Science Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/language-science).

Some courses may satisfy both German and Language Science degree requirements. Final course selection must be approved by the student’s dissertation committee. Students who hold a master's degree from another institution may petition to have equivalent course credits accepted.

The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from German and must include at least one Graduate Faculty member from the Language Science program. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. There will be a single qualifying examination, containing elements of both German and Language Science. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/
Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their dissertation committee and reflects their original research and education in German and Language Science. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

**Dual-Title Ph.D. in German and Visual Studies**

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

Graduate students with interests in German culture and the history of visual media may apply to the dual-title Ph. D. in German and Visual Studies. The goal of the dual-title Ph.D. in German and Visual Studies is to enable graduate students from German to acquire the knowledge and skills of their major area of specialization in German, while at the same time gaining the theories and methods of Visual Studies.

**Admission Requirements**

Students must apply and be admitted to the graduate program in German and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Visual Studies Dual-title program. Refer to the Admission Requirements section of the Visual Studies Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/visual-studies).

Students must receive approval from the Director of Graduate Studies in German, and must submit a recommendation from a member of the German Graduate Faculty who is also a member of the Visual Studies Graduate Faculty. Doctoral students must be admitted into the dual-title degree program in Visual Studies prior to taking the qualifying examination in German.

**Degree Requirements**

To qualify for the dual-title degree, students must satisfy the degree requirements for the Ph.D. degree in German. In addition, students must complete the degree requirements for the dual-title in Visual Studies, listed on the Visual Studies Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/visual-studies).

The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from German and must include at least one Graduate Faculty member from the Visual Studies program. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. There will be a single qualifying examination, containing elements of both German and Visual Studies. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of a German and Visual Studies dual-title Ph.D. student must include at least one member of the Visual Studies Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in Visual Studies, the member of the committee representing Visual Studies must be appointed as co-chair. The Visual Studies representative on the student’s dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their dissertation committee and reflects their original research and education in German and Visual Studies. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

**Student Aid**

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

In addition, the following awards typically have been available to graduate students in this program.

**Exchange Fellowships at Christian Albrechts Universität, Kiel, and the Phillips Universität, Marburg**

Available to graduate students in German and other fields for a full academic year. Students must have a good command of German.

**Walter Edwin Thompson and Dr. Regina Block Thompson Scholarship Fund**

Thompson Fellowships are available each year for graduate students in the Department of Germanic and Slavic Literatures and Languages. These fellowships can be awarded in addition to other grants or stipends.

**Courses**

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**Learning Outcomes**

Ph.D. graduates in German literature and culture or in German linguistics and applied linguistics will be able to:
1. KNOWLEDGE: Demonstrate knowledge of appropriate critical and theoretical vocabularies and perspectives about reading and writing so that they can become part of the ongoing national and international discussion central to German literature and culture or to German linguistics and applied linguistics.

2. CRITICAL THINKING: Demonstrate the ability to critique, edit, and revise written texts, whether their own or their students’.

3. COMMUNICATION: Demonstrate mastery of the conventions of writing a paper suitable for presentation at a professional conference.

4. RESEARCH/CREATE: Design a dissertation on a topic that reflects their original research and education in German literature and culture or in German linguistics and applied linguistics.

5. TEACH: Refine a variety of strategies and methodologies to help improve the reading and writing of students and to teach College German.

**Contact**

Graduate Program Head: Thomas Beebee

Director of Graduate Studies/Professor-in-Charge: Sabine Doranx

Primary Program Contact: Laura Shaffer

Email: lab5@psu.edu

Mailing Address: 442 Burrowes Bldg, University Park, PA 16802

Telephone: (814) 865-1352

Program Website: German (http://german.la.psu.edu/german/graduate)

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**Admission Requirements**

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Undergraduate degrees in any major are acceptable for admission. Applicants who are still completing their baccalaureate requirements at the time of the application may be provisionally admitted (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/provisional-admission) to the Graduate School conditional on the awarding of the baccalaureate degree.

Admission to the M.H.A program is based on clear suitability for the M.H.A. program as demonstrated by the application as a whole, to include:

- a completed online Graduate School application (http://gradschool.psu.edu/prospective-students/how-to-apply) and payment of the nonrefundable application fee,
- evidence of a bachelor’s degree from a regionally accredited college as outlined in the link above;
- a statement of career and educational goals;
- a successful undergraduate record with a minimum grade-point average of 3.00 (with particular attention given to the last two years of undergraduate work);
- satisfactory scores on the Graduate Record Examination (GRE) or Graduate Management Admission Test (GMAT) are required if the GPA is less than 3.00 (typically, applicants who have scores of 1,000 or higher on the GRE and are admitted to the program tend to be successful in the program);
- three years of work experience; and
- names of three references willing to provide recommendations.

The GPA requirement may be relaxed if the student has professional experience or other strong evidence suggesting likely success in the M.H.A. program. Some applicants may be admitted on a provisional basis (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/provisional-admission); the condition for removal of provisional status is obtaining a grade-point average of 3.00 in 15 credits of approved courses within two semesters.

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. See GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

**Degree Requirements**

**Master of Health Administration (M.H.A.)**

Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

The degree requires a total of 36 credits, with a minimum of 33 credits at the 500-level, including a 3-credit culminating experience (faculty-supervised paper); up to 3 credits of 400-level work may be included in the electives. An overall 3.00 (B) grade-point average must be earned in all course work.
Health Education

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HADM 539</td>
<td>Health Systems Organization</td>
<td>3</td>
</tr>
<tr>
<td>HADM 540</td>
<td>Health Administrative Policy Formulation</td>
<td>3</td>
</tr>
<tr>
<td>HADM 541</td>
<td>Health Economics and Policy</td>
<td>3</td>
</tr>
<tr>
<td>HADM 542</td>
<td>Health Care Politics and Policy</td>
<td>3</td>
</tr>
<tr>
<td>HADM 545</td>
<td>Health Financial Management</td>
<td>3</td>
</tr>
<tr>
<td>PADM 503</td>
<td>Research Methods</td>
<td>3</td>
</tr>
<tr>
<td>PADM 506</td>
<td>Management Information Systems for Public and Health Administration</td>
<td>3</td>
</tr>
<tr>
<td>PADM 510</td>
<td>Organization Behavior</td>
<td>3</td>
</tr>
</tbody>
</table>

**Electives**

Select 9 credits of the following: 9

- HADM 543 Long-Term Care Administration and Policy
- HADM 546 Health Planning for Public Administration
- HADM 548 Health Care Quality Assurance
- HADM 551 Health Care Law
- HADM 552 Health Delivery Systems
- HADM 597 Special Topics
- PADM 505 Human Resources in the Public and Nonprofit Sectors
- PADM 511 Organizational Change and Development
- PADM 512 Issues in Human Resources
- PADM 514 Public Organization and Managerial Consultation
- PADM 515 Labor Management Relations
- PADM 516 Strategic Planning

**Culminating Experience**

- HADM 594 Research Topics (Faculty-supervised paper) 3

**Total Credits**: 36

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**Contact**

**Graduate Program Head**: Alexander Siedschlag

**Director of Graduate Studies/Professor-in-Charge**: Glenn Silverstein

**Email**: pmp19@psu.edu

**Mailing Address**: School of Public Affairs, 777 West Harrisburg Pike, 159W Olmsted Bldg., Middletown, PA 17057

**Telephone**: (717) 749-6051

**Program Website**: Health Administration (https://harrisburg.psu.edu/public-affairs/health-administration/master-health-administration)

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**Health Education**

<table>
<thead>
<tr>
<th>Graduate Program Head</th>
<th>Holly Angelique</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Program Code</strong></td>
<td>HLHED</td>
</tr>
<tr>
<td><strong>Campus(es)</strong></td>
<td>Harrisburg (M.Ed.)</td>
</tr>
<tr>
<td><strong>Degrees Conferred</strong></td>
<td>Master of Education (M.Ed.)</td>
</tr>
<tr>
<td><strong>The Graduate Faculty</strong></td>
<td>View (<a href="https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=Fac&amp;prog=HLHED">https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=Fac&amp;prog=HLHED</a>)</td>
</tr>
</tbody>
</table>

The Penn State Harrisburg Master of Education in Health Education applies education, public health, and behavioral theories to prepare health education specialists to work in any setting in which the aim is to promote health and wellness. The goal of the master’s degree in health education is to educate professionals who help individuals, families, and their communities maximize and maintain healthy lifestyles. Health education specialists teach people about behaviors that promote health and wellness and are trained to collect and analyze data to identify community needs prior to planning, implementing, monitoring, and evaluating programs designed to encourage healthy lifestyles, policies, and environments. Health educators may serve as resource to assist individuals, other health professionals, or the community, and may administer fiscal resources for health education programs.

The health education program is designed for working professionals and recent bachelor’s degree graduates to pursue the master’s program in health education part-time or full-time. The program is customizable, allowing students the flexibility to choose from a wide range electives within and outside the program to meet their career and professional goals.

The master’s program in health education is aligned with the Responsibilities and Competencies for Health Education Specialists as stated by the National Commission for Health Education Credentialing, Inc. (NCHEC). After completion of the program, students are eligible to sit for the Certified Health Education Specialist (CHES) exam.

**Admission Requirements**

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Students must have a baccalaureate degree from an accredited college or university, an overall minimum undergraduate grade-point average of...
2.50 and a junior/senior GPA of 3.00 (on a 4.00 scale) for admission into the program. Students are also required to submit:

- A completed Graduate School application form (http://gradschool.psu.edu/prospective-students/how-to-apply) with nonrefundable application fee;
- Official transcripts from all post-secondary institutions attended (http://www.gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission).

Degree Requirements
Master of Education (M.Ed.)
Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

A minimum of 30 credits at the 400, 500, or 800 level is required for the completion of the degree. A 3-credit research-based culminating experience is required. The program requires students to complete 21 credits in prescribed core courses and 9 credits in elective courses.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>HLHED 415</td>
<td>Planning and Developing Health Education Programs</td>
<td>3</td>
</tr>
<tr>
<td>HLHED 456</td>
<td>Advanced Techniques in School and Community Health Education</td>
<td>3</td>
</tr>
<tr>
<td>EDUC 440</td>
<td>Educational Statistics and Measurements</td>
<td>3</td>
</tr>
<tr>
<td>or EDPSY 400</td>
<td>Introduction to Statistics in Educational Research</td>
<td></td>
</tr>
<tr>
<td>HLHED 552</td>
<td>Current Health Education Issues</td>
<td>3</td>
</tr>
<tr>
<td>HLHED 553</td>
<td>Multicultural Health Issues</td>
<td>3</td>
</tr>
<tr>
<td>EDUC 586</td>
<td>Educational Research Designs</td>
<td>3</td>
</tr>
<tr>
<td>or HLHED 530</td>
<td>Research Techniques in Health Education</td>
<td></td>
</tr>
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</table>

Electives
Select a minimum 9 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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</tr>
</thead>
<tbody>
<tr>
<td>HLHED 420</td>
<td>Development of Stress Management Programs for Health Education</td>
<td></td>
</tr>
<tr>
<td>HLHED 443</td>
<td>Alcohol and Drug Education</td>
<td></td>
</tr>
<tr>
<td>HLHED 497</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HLHED 501</td>
<td>World Health Promotion</td>
<td></td>
</tr>
<tr>
<td>HLHED 516</td>
<td>Evaluation of Health Education and Promotion Programs</td>
<td></td>
</tr>
<tr>
<td>HLHED 590</td>
<td>Colloquium</td>
<td></td>
</tr>
<tr>
<td>HLHED 596</td>
<td>Individual Studies</td>
<td></td>
</tr>
<tr>
<td>HLHED 597</td>
<td>Special Topics</td>
<td></td>
</tr>
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</table>

Culminating Experience

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HLHED 591</td>
<td>Capstone Seminar in Health Education</td>
<td>3</td>
</tr>
<tr>
<td>or HLHED 587</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total Credits: 30

1 Students also may select electives from suitable courses in Psychology, Community Psychology and Social Change, Education, Training and Development, or Health Administration programs. Note that 6 credits must be at the 500 level. Please contact the program office for further information about electives.

Student Aid
Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Learning Outcomes
1. KNOW. Graduates will be able to assess the needs for, develop and implement health education and promotion programs for diverse target populations.
2. APPLY. Graduates will be able to apply theories and models of health education in the planning and implementation of health education programs.
3. CREATE. Graduates will be able to conduct evaluation and research related to health education.
4. COMMUNICATE. Graduates will be able communicate and advocate for health and health education.
5. CRITICAL THINKING. Graduates will be able to critically conceptualize strategies, health education and evaluation programs for ethnically, racially, and cultural diverse population.
6. ETHICS. Graduates will be able to apply ethical standards when disseminating health education to the public.
7. PROFESSIONAL PRACTICE. Graduates will demonstrate knowledge of and ability to practice professional standards of health education and professional behaviors.

Contact
Graduate Program Head: Holly Angelique

Director of Graduate Studies/Professor-in-Charge: Weston Kensinger

Primary Program Contact: Deborah Klugh

Email: dlk33@psu.edu

Mailing Address: Olmsted W314 Penn State Harrisburg, 777 W. Harrisburg Pike, Middletown, PA 17047

Telephone: (717) 948-6059

Program Website: Health Education (https://harrisburg.psu.edu/behavioral-sciences-and-education/health-education/master-education-health-education)
Health Policy and Administration

Graduate Program Head
Christopher Hollenbeak

Program Code
HPA

Campus(es)
University Park (Ph.D., M.S., M.H.A.)
World Campus (M.H.A.)

Degrees Conferred
Doctor of Philosophy (Ph.D.)
Master of Science (M.S.)
Master of Health Administration (M.H.A.)
Dual-Title Ph.D. and M.S. in Health Policy and Administration and Demography
Integrated B.S. in Health Policy and Administration and M.H.A. in Health Policy and Administration
Joint J.D./M.H.A. with Penn State Law

The Graduate Faculty

The Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

M.H.A.
Satisfactory scores from either the Graduate Management Admission Test (GMAT) or the Graduate Record Examination (GRE) are required for admission; the GRE is preferred. This requirement will be waived for applicants with five or more years of relevant work experience. A junior/senior grade-point average of 3.00 or better (on a 4.00 scale), a relevant personal statement and three letters of recommendation are necessary. Some work experience in health care is preferred, but not required.

M.S. and Ph.D.
Satisfactory scores from either the Graduate Management Admission Test (GMAT) or the Graduate Record Examination (GRE) are required for admission; the GRE is preferred. A junior/senior grade-point average of 3.00 or better (on a 4.00 scale) and a well-considered statement of experience and career goals are major criteria for admission. Some work experience in health services is preferred, but not required.

Degree Requirements

Master of Health Administration (M.H.A.)
Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

The program can be completed on a full-time basis in 21 months or on a part-time basis with the aid of technology through the World Campus in 28 months. Requirements for the completion of the M.H.A. include 49 credits with at least 39 credits at the 500- or 800-level. Included in the 49 credits is a residency in a health care setting and a capstone course to demonstrate evidence of analytical ability and synthesis of material.

Master of Science (M.S.)
Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

The M.S. curriculum in HPA includes study in three substantive areas:
1. a core set of courses in health services organization, delivery, finance, and policy;
2. courses in health services research methods and statistics, and
3. courses and a master's thesis approved by the thesis advisor.

At least 15 credits of the program must be completed in HPA departmental course offerings at the 400- and 500-level. At least 18 credits of the degree must be in 500-and 600-level courses. A 6-credits master's thesis must be completed as part of the degree requirement.

Doctor of Philosophy (Ph.D.)
Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

The HPA doctoral curriculum includes study in three substantive areas:
1. core courses in health services organization, delivery, finance and policy;
2. core courses in health services research methods and statistics, and
3. courses and a doctoral dissertation in an emphasis track approved by the dissertation committee.

**Dual-Titles**

**Dual-Title M.S. and Ph.D. in Health Policy and Administration and Demography**

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

**Admission Requirements**

Students must apply and be admitted to the graduate program in Health Policy and Administration and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Demography dual-title program. Refer to the Admission Requirements section of the Demography Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/demography). Doctoral students must be admitted into the dual-title degree program in Demography prior to taking the qualifying examination in their primary graduate program.

**Degree Requirements**

To qualify for the dual-title degree, students must satisfy the degree requirements for the degree they are enrolled in Health Policy and Administration, listed in the Degree Requirements section. In addition, students must complete the degree requirements for the dual-title in Demography, listed on the Demography Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/demography).

The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Health Policy and Administration and must include at least one Graduate Faculty member from the Demography program. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. There will be a single qualifying examination, containing elements of both Health Policy and Administration and Demography. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of a Health Policy and Administration and Demography dual-title Ph.D. student must include at least one member of the Demography Graduate Faculty. Graduate Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in Demography, the member of the committee representing Demography must be appointed as co-chair. The Demography representative on the student’s dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their dissertation committee and reflects their original research and education in Health Policy and Administration and Demography. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

**Integrated Undergrad-Grad Programs**

**Integrated B.S. in Health Policy and Administration and M.H.A. in Health Policy and Administration**

Requirements listed here are in addition to requirements listed in GCAC-210 Integrated Undergraduate-Graduate (IUG) Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/integrated-undergraduate-graduate-degree-programs).

**Admission Requirements**

The following credentials will be considered for admission:

- A demonstrated ability to communicate effectively, an advanced level of maturity, and high motivation to pursue a career in the health care field
- Academic references
- Successful completion of 60 undergraduate credits having maintained a cumulative GPA of 3.4 or better

Students must apply to the program via the Graduate School application for admission (http://www.gradschool.psu.edu/prospective-students/how-to-apply), and must meet all the admission requirements of the Graduate School and the Health Policy and Administration graduate program for the Master of Health Administration degree, listed in the Admission Requirements section. Students shall be admitted to an IUG program no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree, as specified in the proposed IUG plan of study.

In consultation with an adviser, students must prepare a plan of study appropriate to this integrated program, and must present their plan of study in person to the head of the graduate program or the appropriate committee overseeing the integrated program prior to being admitted to the program. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser as the student advances through the program.

**Degree Requirements**

Students admitted to the B.S. in Health Policy and Administration/M.H.A. are able to earn both the B.S. and M.H.A. in five calendar years of full-time academic study.

Students must fulfill all degree requirements for each degree in order to be awarded that degree, subject to the double-counting of credits as outlined below. Degree requirements for the Bachelor of Science in Health Policy and Administration are listed in the Undergraduate Bulletin (http://bulletins.psu.edu/undergraduate). Degree requirements for the Master of Health Administration in Health Policy and Administration degree are listed on the Degree Requirements tab. Students must sequence their courses so all undergraduate degree requirements are fulfilled before taking courses to count solely towards the graduate degree. If students accepted into the IUG program are unable to complete the M.S. degree, they are still eligible to receive their undergraduate degree if all the undergraduate degree requirements have been satisfied.

Up to 12 credits may be double-counted towards the degree requirements for both the graduate and undergraduate degrees; a minimum of 50% of the double-counted courses must be at the 500 or 800 level. Credits
associated with the culminating experience for the graduate degree cannot be double-counted.

**Joint Degrees**

**Joint J.D./M.H.A. with Penn State Law**

Requirements listed here are in addition to requirements listed in GCAC-211 Joint Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/joint-degree-programs).

Penn State Law (University Park) and Health Policy and Administration (HPA) offer coordinated programs of studies leading to the degrees of Juris Doctor (J.D.) and Master of Health Administration (M.H.A).

**Admission Requirements**

Students applying to the joint degree program must be admitted separately into both Penn State Law and HPA. Students must first be admitted to the law school and must complete the required first-year curriculum in the J.D. program before commencing the M.H.A. component. Admissions requirements and applications for admission for Penn State Law are listed in the J.D. Admissions Requirements tab. Application to the M.H.A. program must take place through the Graduate School Application. Formal admission to the M.H.A. program would normally take place during the student’s first year of law, but HHD may extend provisional admission to the M.H.A. program at the time an applicant applies to Penn State Law particularly where an applicant’s law school choice depends upon admission to the J.D./M.H.A. joint degree program. At the student’s request, the LSAT may replace the GRE for joint degree admissions purposes. International applicants to the joint degree program who do not qualify for the TOEFL exemption must have a minimum TOEFL score of 88 on the internet-based test (with a minimum speaking score of 20), or a minimum of 575 on the paper test; a minimum of 6.5 on the IELTS will also be acceptable.

**Residency**

Students in the program will spend six semesters in Penn State Law and two to three semesters in HPA.

**Liaisons**

The director of the HPA M.H.A. program and the Penn State Law Associate Dean for Academic Affairs are designated program advisors and liaisons between the programs. Students will need to work with these designated program advisors and their individual faculty advisors from both programs to build an individual program.

**Inter Program Transfer of Credits**

Courses cannot be transferred or shared until the applicant is officially admitted to the joint program. Retroactive transfers of courses taken prior to admission to the joint program are not permitted.

**Penn State Law**

Penn State Law will accept the transfer of twelve (12) credits from the M.H.A. program's required core curriculum as elective credit towards the J.D. Students must obtain a grade satisfactory to the program in order for the credits to be transferable.

**Health Policy and Administration**

HPA will accept the transfer of twelve (12) credits from the Penn State Law curriculum towards the M.H.A. in lieu of:

1. two M.H.A. electives,
2. a required M.H.A. course in health law, and
3. one other required M.H.A. course as determined by the student and their advisors.

Specific law course selection for transfer to the M.H.A. will be dependent on course offerings available at Penn State Law. Students must obtain a grade satisfactory to the program in order for the credits to be transferable.

**Course Sequencing**

Students enrolling in the joint degree may choose to conduct their study in either of two sequence options below. Each “Year” refers to the traditional academic year beginning in late August and concluding in May. In compliance with ABA Standards and Rules law students may not enroll for more than 17 credits per semester at Penn State.

**Joint J.D./ M.H.A. Degree Program Option 1**

**Year 1**

- J.D. Required First-Year Curriculum (32 crs)
- Summer Semester: HPA 595 - M.H.A. Residency Requirement. This requirement may be satisfied with a J.D. externship, as coordinated between Penn State Law and the M.H.A. program. (1-3 crs)*

Year 1 total credits is 32-35*

**Year 2**

- Fall Semester: HPA 503, HPA 447, HPA 520, HPA 523 (12 crs)
- Spring Semester: HPA 524, HPA 835, HPA 551, HPA 855 (12 crs)
- Summer Semester: HPA 595 - M.H.A. Residency Requirement, if not fulfilled between year one and two of program. This requirement may be satisfied with a J.D. externship, as coordinated between Penn State Law and the M.H.A. program. (1-3 crs)*

Year 2 total credits is 24-27*

Penn State Law does not have a required number of credits for the second and third year of the J.D. degree program. Students are required to complete 88 credits to earn the J.D. Twelve (12) credits is full-time. J.D. students may enroll in a maximum of 17 credits per semester. J.D. students will complete a minimum of 56 credits their second and third year.

**Year 3**

- Fall Semester: HPA 850, HPA 805, HPA 556, elective credits from J.D. Program (minimum 3), substitution credits for HPA 836 or HPA 556 (12 crs)
- Spring Semester: Capstone (3), HPA 545, elective credits from J.D. Program (minimum 3), substitution credits for HPA 836 or HPA 556 (12 crs)

Year 3 total credits is 24.

Penn State Law does not have a required number of credits for the second and third year of the J.D. degree program. Students are required to complete 88 credits to earn the J.D. Twelve (12) credits is full-time. J.D. students may enroll in a maximum of 17 credits per semester. J.D. students will complete a minimum of 56 credits their second and third year.

**Year 4**
• J.D. Upper Level Coursework: If not already satisfied, student must successfully complete Professional Responsibility (CORE 934) and the seminar requirement, both J.D. degree requirements at Penn State Law.

Penn State Law does not have a required number of credits for the second and third year of the J.D. degree program. Students are required to complete 88 credits to earn the J.D. Twelve (12) credits is full-time. J.D. students may enroll in a maximum of 17 credits per semester. J.D. students will complete a minimum of 56 credits their second and third year.

Total credits required for the J.D. degree is 88.
Total credits required for the M.H.A. degree is 49-51.*

*Variable credit totals depend on which year M.H.A. Summer Residency requirement is met and whether it is met with HPA 595 (1 cr) or J.D. externship (3crs).

Joint J.D./ M.H.A. Degree Program Option 2

Year 1
• J.D. Required First-Year Curriculum (32 crs)

Year 2
• J.D. Upper Level Coursework: Student should consider taking Professional Responsibility (CORE 934) and a seminar course, both J.D. degree requirements at Penn State Law.

Penn State Law does not have a required number of credits for the second and third year of the J.D. degree program. Students are required to complete 88 credits to earn the J.D. Twelve (12) credits is full-time. J.D. students may enroll in a maximum of 17 credits per semester. J.D. students will complete a minimum of 56 credits their second and third year.

Year 3 total credits is 25-27*

Penn State Law does not have a required number of credits for the second and third year of the J.D. degree program. Students are required to complete 88 credits to earn the J.D. Twelve (12) credits is full-time. J.D. students may enroll in a maximum of 17 credits per semester. J.D. students will complete a minimum of 56 credits their second and third year.

Year 4
• Fall Semester: HPA 503, HPA 447, HPA 520, HPA 523 (12 crs)
• Spring Semester: HPA 524, HPA 835, HPA 551, HPA 885 (12 crs)
• Summer Semester: HPA 595 - M.H.A. Residency Requirement. This requirement may be satisfied with a J.D. externship, as coordinated between Penn State Law and the M.H.A. program. (1-3 crs)

Total credits required for the J.D. degree is 88.
Total credits required for the M.H.A. degree is 49-51.*

*Variable credit totals depend on which year M.H.A. Summer Residency requirement is met and whether it is met with HPA 595 (1 cr) or J.D. externship (3crs)

Recommended Program of Study and Advising
The director of the HPA M.H.A. program and the Penn State Law Associate Dean for Academic Affairs are designated program advisors. In addition, students will have individual faculty advisors in both programs. Periodic interaction between the two advisors will be encouraged. A program of study will be developed for each student.

Tuition
Students will be charged the applicable Penn State Law tuition to cover the J.D. program and the applicable graduate tuition to cover the M.H.A. degree program. Penn State Law tuition will be paid for the semesters in which the student is registered for Penn State Law courses, and graduate tuition will be paid for the semesters in which the student is registered for graduate courses in the M.H.A. program. A student may take up to one course (3 credit hours) per semester in the program where the student is not primarily registered without any change in tuition, but must pay additional tuition to the program that the student is not primarily registered if he or she wishes to take additional course work pursuant to that program during the semester.

Financial Aid and Assistantships
Decisions on financial aid and assistantships will be made by each school according to that school’s procedures. Students on graduate assistantships must adhere to the course load limits (http://bulletins.psu.edu/graduate/academicprocedures/procedures5) set by The Graduate School.

Fulfillment of Degree Requirements and Graduation
A student in the program may complete the requirements for one of the degrees and be awarded that degree prior to completing all the requirements for the other degree; provided, however, that the student shall have successfully completed at least two semesters of work towards the other degree. All courses in one program that will count towards meeting the requirements of the other must be completed before the awarding of either degree. Students will be required to fulfill all requirements for each degree in order to be awarded that degree, subject to the inter-program transfer of credits.

Student Aid
Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up
deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**Learning Outcomes**

**Master's Degrees**

1. Graduates will demonstrate a thorough understanding of the financing, organization, and delivery of health services, along with appropriate research methods.
2. Graduates will master the current literature on health policy, health administration, and related topics.
3. Graduates will complete an independent research project that significantly furthers knowledge in the field.
4. Graduates will be able to effectively communicate arguments and ideas in oral presentations and written works.
5. Graduates will demonstrate knowledge of professional standards in health policy and administration.

**Doctor of Philosophy (Ph.D.)**

1. Graduates will demonstrate a thorough understanding of the financing, organization, and delivery of health services, along with appropriate research methods.
2. Graduates will master the current literature on health policy, health administration, and related topics.
3. Graduates will complete an independent research project that significantly furthers knowledge in the field.
4. Graduates will be able to effectively communicate arguments and ideas in oral presentations and written works.
5. Graduates will demonstrate knowledge of professional standards in health policy and administration.

**Contact**

**Graduate Program Head:** Christopher Hollenbeak

**Ph.D. and M.S. Program Contacts**

**Director of Graduate Studies/Professor-in-Charge:** John Moran

**Primary Program Contact:** Sarah Woodward

**Email:** smr38@psu.edu

**Mailing Address:** 118 Keller Building, University Park, PA 16802-1300

**Telephone:** (814) 863-9971

**Program Website:** Ph.D. & M.S. at University Park (http://hhd.psu.edu/hpa/graduate/phd-health-policy)

**M.H.A. Program Contacts**

**Director of Graduate Studies/Professor-in-Charge:** Christopher Calkins

**Primary Program Contact:** Aileen Galley

**Email:** ahs13@psu.edu

**Mailing Address:** 604 Ford Building, University Park, PA 16802

**Telephone:** (814) 873-4810

**Program Website:** M.H.A. at University Park (http://www.hhdev.psu.edu/hpa/graduate)

**M.H.A. at World Campus** (http://www.worldcampus.psu.edu/degrees-and-certificates/health-policy-and-administration-masters/overview)

**Higher Education**

**Program Head:** Kevin Kinser

**Program Code:** HIED

**Campus(es):**

University Park (Ph.D., D.Ed., M.Ed.)

World Campus (M.Ed.)

**Degrees Conferred**

- Doctor of Philosophy (Ph.D.)
- Doctor of Education (D.Ed.)
- Master of Education (M.Ed.)
- Dual-Title Ph.D., D.Ed., and M.Ed. in Higher Education and Comparative and International Education
- Joint J.D./Ph.D., D.Ed., M.Ed. with Penn State Law

**The Graduate Faculty**

View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=HIED)

The graduate program in Higher Education has as its goal the preparation of individuals who will pursue careers and exert leadership in postsecondary education as administrators, faculty, or researchers in the nation’s colleges and universities and in a variety of public and private agencies and associations in the United States and other nations. With emphasis on the systematic study of higher education, the program builds on the scholarly and scientific disciplines offered throughout the University and applies these studies to the professional functions and responsibilities that its graduates will assume, and to the knowledge of the field of higher education.

**Admission Requirements**

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Doctoral applicants must submit test scores from either the GRE, GMAT, or LSAT, taken no more than 5 years prior to the application date. Master’s applicants must submit test scores from either the GRE, GMAT, MAT, or LSAT, taken no more than 5 years prior to the application date.

The requirement for test scores is waived for World Campus M.Ed. applicants who have either:

1. worked full-time for a minimum of three years in an administrative role in a college or university;
2. a master’s degree; or
3. completed the Institutional Research Certificate Program at Penn State.

All applicants must also submit a curriculum vitae (CV), a statement of purpose, and three letters of recommendation.

Students in the D.Ed. and Ph.D. programs at University Park may begin the program in the fall semester. Students in the M.Ed. program at University Park may begin the program in the fall or spring semesters.
Students in the M.Ed. program through World Campus may begin the program in the summer, fall, or spring semesters.

**Degree Requirements**

**Master of Education (M.Ed.)**

Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

A minimum of 30 credits is required, and must include:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>HIED 808</td>
<td>Pro-Seminar in U.S. Higher Education</td>
<td>3</td>
</tr>
<tr>
<td>HIED 545</td>
<td>Foundations in Higher Education and Student Affairs</td>
<td>3</td>
</tr>
<tr>
<td>HIED 842</td>
<td>Administrative Leadership in Higher Education</td>
<td>3</td>
</tr>
<tr>
<td>HIED 846</td>
<td>College Students and Their Success</td>
<td>3</td>
</tr>
<tr>
<td>HIED 841</td>
<td>Research and Assessment in Student Affairs</td>
<td>3</td>
</tr>
</tbody>
</table>

**Emphasis Area in Higher Education**

Students will choose an emphasis area to tailor a program of study to fit an intended career path, in consultation with their adviser.

A list of acceptable emphasis areas and their required courses is maintained by the program.

**Electives**

Students will choose from a list of approved electives maintained by the program office, in consultation with the student's adviser.

**Culminating Experience**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIED 596</td>
<td>Individual Studies</td>
<td>3</td>
</tr>
</tbody>
</table>

**Total Credits**

In addition, the program may require a 9-credit internship depending on students' previous professional experiences in higher education administration. D.Ed. students must pass a qualifying examination, a comprehensive written and oral examination, and a final oral examination (the dissertation defense). Their dissertation must also be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

**Doctor of Philosophy (Ph.D.)**

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

Ph.D. students must pass a qualifying examination, a comprehensive written and oral examination, and a final oral examination (the dissertation defense). Their dissertation also must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

A minimum of 51 credits is required:

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<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>HIED 501</td>
<td>Foundations of Higher Education</td>
<td>3</td>
</tr>
<tr>
<td>HIED 552</td>
<td>Administration and Organization in Higher Education</td>
<td>3</td>
</tr>
<tr>
<td>HIED 556</td>
<td>Higher Education Students and Clientele</td>
<td>3</td>
</tr>
<tr>
<td>HIED 502</td>
<td>Diversity &amp; Equity in Higher Education</td>
<td>3</td>
</tr>
</tbody>
</table>

**Specialization in Higher Education**

Select 9 credits in additional HIED course work.

**Theoretical/Conceptual**

Select 9 credits from list maintained by the program office.

**Methodological**

Select 12 credits, including at least (a) one quantitative course (e.g., STAT 500 or EDPSY 406) and (b) one qualitative course (e.g., HIED 586).

**Proposal**

HIED 594 | Research Topics (Research Proposal Topics) | 3       |

**Dissertation**

HIED 600 | Thesis Research | 15      |

or HIED 610 | Thesis Research Off Campus | 15      |

**Total Credits**

In addition, the program may require a 9-credit internship depending on students' previous professional experiences in higher education administration. D.Ed. students must pass a qualifying examination, a comprehensive written and oral examination, and a final oral examination (the dissertation defense). Their dissertation must also be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

**Doctor of Education (D.Ed.)**

Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

The D.Ed. requires a minimum of 90 credits, of which at least 30 credits must be earned in residence at the University Park campus. A maximum of 30 credits from a completed master's degree earned at an institution that does not grant a doctorate in Higher Education may be accepted towards this minimum, subject to restrictions outlined in GCAC-309 Transfer Credit (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/transfer-credit). A maximum of 60 credits beyond the baccalaureate may be accepted towards this minimum, subject to restrictions outlined in GCAC-309 Transfer Credit (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/transfer-credit).

<table>
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<tr>
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<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>HIED 501</td>
<td>Foundations of Higher Education</td>
<td>3</td>
</tr>
<tr>
<td>HIED 502</td>
<td>Diversity &amp; Equity in Higher Education</td>
<td>3</td>
</tr>
</tbody>
</table>

**Specialization in Higher Education**

Select 9 credits of additional HIED course work.

**Theoretical/Conceptual**

Select 9 credits from a list maintained by the program office.

**Methodological**

Select 18 credits, with at least (a) one quantitative course (e.g., STAT 500 or EDPSY 406) and (b) one qualitative course (e.g., HIED 586).

**Proposal**

HIED 594 | Research Topics (Research Proposal Topics) | 3       |
HIED 594  Research Topics (Research Proposal Topics)  3

Total Credits  51

Dual-Titles

Dual-Title M.Ed., D.Ed., and Ph.D. in Comparative and International Education

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

Admission Requirements

Students must apply and be admitted to the graduate program in Higher Education and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Comparative and International Education dual-title program. Refer to the Admission Requirements section of the Comparative and International Education Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/comparative-international-education). Doctoral students must be admitted into the dual-title degree program in Comparative and International Education prior to taking the qualifying examination in their primary graduate program.

Degree Requirements

To qualify for the dual-title degree, students must satisfy the degree requirements for the degree they are enrolled in Higher Education. In addition, students must complete the degree requirements for the dual-title in Comparative and International Education, listed on the Comparative and International Education Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/comparative-international-education). Some courses may satisfy both Higher Education and Comparative and International Education degree requirements. Final course selection must be approved by the student’s dissertation committee.

The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Higher Education and must include at least one Graduate Faculty member from the Comparative and International Education program. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. There will be a single qualifying examination, containing elements of both Higher Education and Comparative and International Education. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of a Higher Education and Comparative and International Education dual-title Ph.D. student must include at least one member of the Comparative and International Education Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in Comparative and International Education, the member of the committee representing Comparative and International Education must be appointed as co-chair. The Comparative and International Education representative on the student’s dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination. Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their dissertation committee and reflects their original research and education in Higher Education and Comparative and International Education. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

Joint Degrees

Joint J.D/M.Ed., D.Ed., and Ph.D. with Penn State Law

Requirements listed here are in addition to requirements listed in GCAC-211 Joint Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/joint-degree-programs).

Penn State Law (PSL) and the Higher Education (HIED) Program offer a joint degree program leading to a Juris Doctor (J.D.); and either a Master of Education (M.Ed.), a Doctor of Education (D.Ed.), or a Doctor of Philosophy (Ph.D.) in Higher Education.

Admission Requirements

Applicants to the joint degree program must apply and be admitted first to Penn State Law, and subsequently to the Higher Education graduate program. Admissions requirements and applications for admission to Penn State Law are listed in the J.D. Admissions (https://pennstatelaw.psu.edu/penn-state-law-jd-admissions) section of the Penn State Law website. The admission requirements for the Higher Education graduate program are listed on the Admission Requirements tab. When applying to the Higher Education graduate program, applicants must include two letters of recommendation from Penn State Law faculty members and a career statement. Applicants to the joint degree program may submit LSAT scores instead of GRE scores.

Residency

Students will normally spend four semesters in residence at PSL and as many additional semesters in residence as needed to complete the additional requirements for the pertinent HIED degree. Ph.D. candidates must arrange the sequence of semesters to ensure that they are in residence as full-time students in the HIED program for at least two consecutive semesters (Fall-Spring or Spring-Fall) excluding summer in a single twelve-month period.

Degree Requirements

Students must fulfill all requirements for each degree in order to be awarded that degree, subject to the double-counting of credits as outlined below. Degree requirements for the J.D. program are listed on the Penn State Law website (https://pennstatelaw.psu.edu/jd-degree-requirements). Degree requirements for the Ph.D., D.Ed., and M.Ed. degrees are listed on the Degree Requirements tab.

Penn State Law

A maximum of twelve credits for HIED course work may be double-counted for credit toward the J.D. degree at PSL. Students must obtain a grade satisfactory to PSL for the course work to be credited towards the J.D. degree. The following HIED courses may qualify for credit in PSL:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>HIED 545</td>
<td>Foundations in Higher Education and Student Affairs</td>
<td>3</td>
</tr>
</tbody>
</table>
Higher Education

The courses that may be double-counted will be determined by the student's degree program. Normally a maximum of twelve credits of PSL course work will be counted for credit for the minimum requirements for a master's degree, subject to approval by the student's advisory committee.

Sequence

The sequence of courses will be determined by the students and their advisors.

Recommended Program of Study and Advising

All students in the program will have two advisers, one from PSL and one from HIED. Periodic interaction between the two advisers is encouraged.

Tuition

Students will be charged the applicable PSL tuition to cover the J.D. program and the applicable graduate tuition to cover the HIED degree program. PSL tuition will be paid for the semesters in which the student is registered for PSL courses, and graduate tuition will be paid for the semesters in which the student is registered for graduate courses. A student may take up to one course (3 credit hours) per semester in the program where the student is not primarily registered without any change in tuition, but must pay additional tuition to the program that the student is not primarily registered if he or she wishes to take additional course work pursuant to that program during the semester.

Financial Aid and Assistantships

Decisions on financial aid and assistantships will be made by each school according to that school's procedures. Generally, assistantships and financial aid granted by HIED will not apply to time spent at PSL.

Fulfillment of Degree Requirements and Graduation

All courses in one program that will count toward meeting the requirements of the other program must be completed before the awarding of either degree. If students accepted into the joint degree program are unable to complete the J.D. degree, they are still eligible for the Higher Education degree if all Higher Education degree requirements have been satisfied.

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School's website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Learning Outcomes

Master of Education (M.Ed.)

1. Demonstrate reading proficiencies to deal effectively with theoretical, empirical, and policy material in higher education.
2. Demonstrate writing proficiencies to analyze problems of practice, draw upon and apply concepts studied, and synthesize ideas into relevant and useful conclusions.
3. Demonstrate critical thinking skills that require suspended judgment and the application of relevant theory to varied areas of practice.
4. Demonstrate responsibility toward the goal of becoming a proactive, reflective life-long learner.
5. Demonstrate the ability to collaborate with others to facilitate problem-solving and decision making through reflective practice.
6. Demonstrate an understanding of purpose, audience, and context in communication activities.
7. Demonstrate appropriate use of communication technologies.
8. Demonstrate an ability to draw upon key theories, concepts and research findings to assess current issues and challenges facing higher education institutions.
9. Demonstrate the ability to collect and analyze data to improve practice in particular administrative areas of higher education.
10. Demonstrate an understanding of professional and ethical practice.

Doctor of Education (D.Ed.)

1. Distinguish various aspects of higher education—including perspectives on its past, present, and future.
2. Interpret and communicate knowledge of higher education that informs research, policy, and professional practice.
3. Demonstrate competence in designing and conducting applied research that results in informs and improves professional practice.
4. Identify and address ways in which power operates in higher education, and has been differentially distributed by race and by other marginalized social identities.
5. Utilize concepts, theories, and frameworks from education and other fields of inquiry in exploring and critically analyzing programs and practices in higher education.
6. Evaluate required competencies, needed preparation, and potential rewards relative to a pursuing a range of career opportunities in all sectors of academia.

Doctor of Philosophy (Ph.D.)

1. Distinguish various aspects of higher education—including perspectives on its past, present, and future.
2. Interpret and communicate knowledge of higher education that informs research, policy, and professional practice.
3. Demonstrate competence in designing and conducting research that generates new knowledge.
4. Identify and address ways in which power operates in higher education, and has been differentially distributed by race and by other marginalized social identities.
5. Utilize concepts, theories, and frameworks from education and other fields of inquiry in exploring and critically analyzing topics in higher education.
6. Evaluate required competencies, needed preparation, and potential rewards relative to a pursuing a range of career opportunities in all sectors of academia.

**Contact**

**Graduate Program Head:** Kevin Kinser  
**Director of Graduate Studies/Professor-in-Charge:** Leticia Oseguera  
**Primary Program Contact:** Susan Bass  
**Email:** HIED@psu.edu  
**Mailing Address:** 400 Rackley Building, University Park, PA 16802  
**Telephone:** (814) 863-2690  
**Program Website:** Higher Education at University Park (http://www.ed.psu.edu/educ/eps/higher-education)  
Higher Education at World Campus (http://www.worldcampus.psu.edu/degrees-and-certificates/higher-education-masters/apply)

**History**

**Graduate Program Head**  
Michael Kulikowski

**Program Code**  
HIST

**Campus(es)**  
University Park (Ph.D., M.A.)  
Doctor of Philosophy (Ph.D.)  
Master of Arts (M.A.)  
Dual-Title Ph.D. in History and African American and Diaspora Studies  
Dual-Title Ph.D. in History and Asian Studies  
Dual-Title Ph.D. and M.A. in History and Women’s Studies  
Integrated B.A. in History and M.A. in History

**Degrees Conferred**

**The Graduate Faculty**  
View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=HIST)

Graduate instruction at the master's and doctoral degree level is offered in the following areas:

- United States (19th and 20th century)  
- Europe (Medieval, Early Modern, and Modern)  
- Asia (Late Imperial and 20th century)  
- Latin America (Colonial and Modern)

Only students focusing their course of study on the department's four primary areas of strength (Latin America, Early Modern Global, 19th-century United States, and Late Imperial and Republican China) are admitted into the graduate program. Courses in all other areas are offered on a regular basis and encouraged as secondary areas of focus.

**Admission Requirements**

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Applicants to the doctoral program must hold or be near completion of the master's degree (or its equivalent); all others will be considered for admission to the master's program, even if it is their ultimate intention to pursue a doctoral degree at Penn State.

To be considered for admission, applicants must submit a completed online Graduate School application (http://www.gradschool.psu.edu/prospective-students/how-to-apply) and payment of the nonrefundable application fee. In addition, applicants must submit official transcripts from all post-secondary institutions attended (http://www.gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission) that show:

1. substantial course work in history,  
2. a minimum GPA of 3.50 (on a 4.0 scale),  
3. at least three semesters of college-level work in a foreign language (additional language training appropriate to the fields in which the applicant proposes to work may also be required for admission) and  
4. where applicable, a minimum GPA of 3.50 for all graduate work previously undertaken.

Each applicant must submit the scores of the Graduate Record Examination (GRE) taken within five years previous to the date of application; the general examination scores are mandatory, the history examination is optional. Successful applicants typically have minimum scores of 160 (or 650 old scoring) on the verbal and quantitative sections, and 5.0 on the analytical writing section of the general examination.

The Department of History further requires all applicants to submit directly to the department a statement of intent outlining their proposed fields of study and career goals, as well as a sample of their written work (undergraduate history thesis, master’s thesis, seminar paper or equivalent research paper) as evidence of their historical research and writing skills. Three letters of recommendation are required; it is strongly preferred that at least two of them be from historians.

**Degree Requirements**

**Master of Arts (M.A.)**

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

The Director of Graduate Studies, who supervises the overall graduate program in history and maintains student records, will assign newly admitted graduate students to advisers on the basis of each student’s expressed area of interest. Advisers provide assistance in planning courses of study, guidance in choosing scholarly papers and dissertation topics, direction in conducting research, and career counseling.

Students who serve as graduate assistants will be given a variety of experiences as they assist different professors, ranging from paper-grading and administering exams, to preparing and delivering occasional lectures, to conducting review or discussion sections for large lecture courses.
Candidates for the M.A. degree must earn a minimum of 36 credits of course work that can be counted towards a graduate degree, of which 12 credits will be in the student’s primary area and 6 credits in one secondary area. At least 30 credits must be at the 500 level, with no more than 6 credits of HIST 596. The only required course is HIST 500. Course work offered by outside departments may be scheduled as part of the student’s program with approval of the student’s academic committee and the Director of Graduate Studies. In some cases, students may be required to take additional credits in order to make up deficiencies in foreign language skills and/or undergraduate coursework.

Reading proficiency in at least one foreign language must be demonstrated no later than the beginning of the second year of residence.

Students are required to convene two separate, formal meetings with their advisers and master’s committees: Committee Formation Meeting and the Master’s oral examination. The convening of the student’s master’s committee must take place no later than the end of the first year in the master’s program. Every student should, in consultation with the permanent adviser, select at least two other members of the Graduate Faculty to serve on their master’s committee (for a minimum total of three faculty members). There must be faculty representation of each of the students’ two fields (selected from the department’s list of officially recognized fields). At this first meeting there should be a discussion and approval of the general program plan (seminars, courses and other requirements).

Students must hold a Master’s oral examination. The examination consists of an oral defense of two research papers written while in the M.A. program in two department-defined fields of study (e.g., 19th century US and Modern Europe). The research papers must be of a length, substance, and quality that the committee deems to be of journal article-caliber. Students must submit the papers to the committee a minimum of two weeks prior to the oral examinations; the papers then must be orally presented and successfully defended before the committee in the M.A. examination. Submission and defense of these two research papers constitutes the culminating experience for the Master of Arts degree.

Doctor of Philosophy (Ph.D.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

The Director of Graduate Studies, who supervises the overall graduate program in history and maintains student records, will assign newly admitted graduate students to advisers on the basis of each student's expressed area of interest. Advisers provide assistance in planning courses of study, guidance in choosing scholarly papers and dissertation topics, direction in conducting research, and career counseling.

Students who serve as graduate assistants will be given a variety of experiences as they assist different professors, ranging from paper-grading and administering exams, to preparing and delivering occasional lectures, to conducting review or discussion sections for large lecture courses. Advanced doctoral students may hold lectureships while working on their dissertations; lecturers have complete instructional responsibility for one or two sections of an undergraduate course in their area of specialization.

Credits & Course Requirements

Candidates for the Ph.D. degree in History must complete at least 27 credits of graduate-level work at the 500-600 level (with no more than one HIST 596 per academic year), of which 12 credits will be in the student’s primary area and 6 credits each in two secondary areas. The only required course is HIST 500. The remainder of a student’s doctoral program, including foreign language requirements, should be determined in consultation with the dissertation committee. Course work offered by outside departments may be scheduled as part of the student’s program with approval of the student’s dissertation committee and the Director of Graduate Studies.

Foreign Language Requirements

Reading proficiency in at least one foreign language must be demonstrated no later than the third semester of residency (not including summer semester).

English Competence

A student in the Doctor of Philosophy in History degree program is required to demonstrate high-level competence in the use of the English language, including reading, writing, and speaking. At the end of the first year of enrollment all students who are non-native speakers of English must submit a portfolio which includes at least two pieces of written work from every seminar. In addition, the Director of Graduate Studies will solicit evaluations from their adviser(s) and seminar instructors in order to identify any deficiencies. Students with any identified deficiencies will be directed into appropriate remedial activities. The deficiencies must be met before the qualifying examination. Competence must be formally attested by the program before the doctoral comprehensive examination is scheduled. (International students should note that passage of the minimal TOEFL or IELTS requirement does not demonstrate the level of competence expected of a Ph.D. from Penn State.)

Dissertation Committee Composition

By the end of the first year in the doctoral program, every student should, in consultation with the permanent adviser, select at least two other members of the Graduate Faculty to serve on their dissertation committee. Dissertation committees for History Ph.D. candidates must meet all Graduate Council requirements (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation).

Only those faculty who have been approved and designated by the Graduate School as members of the Graduate Faculty in History can serve as representatives of the three primary and secondary fields on any dissertation committee. The list of History Graduate Faculty is available online (http://www.gradschool.psu.edu/gs/faculty/facultylist.cfm?program=90).

Qualifying Examination

The qualifying examination may be taken after the completion of at least 18 credits of acceptable graduate work at Penn State and must be taken within three semesters (excluding summer sessions) of entry into the doctoral program. Following successful passage of the qualifying exam, a program plan will be submitted to the Departments of History and the participating program after consultation with members of the student’s dissertation committee.

Formal Meetings

Students are required to convene two separate, formal meetings with their advisers and dissertation committees for:

1. a discussion and approval of the general program plan (seminars, courses and other requirements) and
2. their Ph.D. comprehensive examinations.
Doctoral Dissertation Defense
Upon the researching, writing, and completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense). The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

Dual-Titles
Dual-Title Ph.D. in History and African American and Diaspora Studies
Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

Admission Requirements
Students must apply and be admitted to the graduate program in History and The Graduate School before they can apply for admission to the dual-title degree program. After admission to History, students must apply for admission to and meet the admissions requirements of the African American and Diaspora Studies dual-title program. Refer to the Admission Requirements section of the African American and Diaspora Studies Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/african-american-diaspora-studies). Doctoral students must be admitted into the dual-title degree program in African American and Diaspora Studies prior to taking the qualifying examination in their home department.

Degree Requirements
To qualify for the dual-title degree, students must satisfy the degree requirements for the Ph.D. in History. In addition, students pursuing the dual-title Ph.D. in History and African American and Diaspora Studies must complete the degree requirements for the dual-title Ph.D. in African American and Diaspora Studies, listed on the African American and Diaspora Studies Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/african-american-diaspora-studies).

Qualifying Examination
The qualifying examination committee must include at least one member of the African American and Diaspora Studies Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

The dual-title field must be fully integrated into the qualifying exam for the doctoral program. In addition, student in the dual-title Ph.D. in African American and Diaspora Studies will be required to present to their committee a portfolio of work in African American and Diaspora Studies which includes a statement of the student’s interdisciplinary research interests, a program plan, and samples of writing that indicate the student’s interest in questions taken up by scholars of African American and Diaspora Studies.

Doctoral Committee Composition
In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of a History and African American and Diaspora Studies dual-title Ph.D. student must include at least one member of the African American and Diaspora Studies Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in African American and Diaspora Studies, the member of the committee representing African American and Diaspora Studies must be appointed as co-chair.

Comprehensive Exams
The African American and Diaspora Studies Graduate Faculty member on the student’s committee is responsible for developing and administering the African American and Diaspora Studies portion of the student’s comprehensive exams. The exam must incorporate written and oral components in African American and Diaspora Studies based on the student’s thematic or regional area of interest and specialization in African American and Diaspora Studies. The African American and Diaspora Studies portion of the exam will include the following components: broad history of the field, contemporary theory and debates, and either sexual and gender politics or a topic related to the student’s specific area of interest.

Dissertation
Ph.D. candidates must complete a dissertation on a topic that is approved in advance by their dissertation committee and reflects their original research and education in both History and African American and Diaspora Studies. In order to earn the dual-title Ph.D. degree, the dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School, and the student must pass a final oral examination (the dissertation defense).

Dual-Title Ph.D. in History and Asian Studies
Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

Graduate students with research and educational interests in Asian studies may apply to the dual-title Ph.D. in History and Asian Studies. The goal of the dual-title Ph.D. in History and Asian Studies is to enable graduate students from History to acquire the knowledge and skills of their major area of specialization in History while at the same time gaining the perspective of Asian Studies.

In order to prepare graduate students for the competitive job market, this program provides them with a solid disciplinary foundation that will allow them to compete for the best jobs in their field. For such students, the dual-title Ph.D. in History and Asian Studies will add value to their degree and their status as candidates. It will produce excellent historians who are experts in Asian Studies as well. The dual-title degree in History and Asian Studies will build curricular bridges beyond the student’s major field so as to provide a unique training regime for the global scholar.

Admission Requirements
Students must apply and be admitted to the graduate program in History and The Graduate School before they can apply for admission to the dual-title degree program. After admission to History, students must apply for admission to and meet the admissions requirements of the Asian Studies dual-title program. Refer to the Admission Requirements section of the Asian Studies Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/asian-studies). Doctoral students must be admitted into the dual-title degree program in Asian Studies prior to taking the qualifying examination in their home department.
Degree Requirements
The doctoral degree in History and Asian Studies is awarded only to students who are admitted to the History Ph.D. program and subsequently admitted to the dual-title in Asian Studies. To qualify for the dual-title degree, students must satisfy the degree requirements for the Ph.D. in History. In addition, students pursuing the dual-title Ph.D. in History and Asian Studies must complete the degree requirements for the dual-title Ph.D. in Asian Studies, listed on the Asian Studies Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/asian-studies). The minimum course requirements for the dual-title Ph.D. degree in History and Asian Studies are as follows:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIST 580</td>
<td>Pre-modern China</td>
<td>3</td>
</tr>
<tr>
<td>HIST 581</td>
<td>Late Imperial and Modern China</td>
<td>3</td>
</tr>
<tr>
<td>ASIA 501</td>
<td>Proseminar in Asian Studies I</td>
<td>3</td>
</tr>
<tr>
<td>&amp; ASIA 502</td>
<td>Proseminar in Asian Studies II (the required</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>prosemnarin sequence in Asian studies)</td>
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</tr>
<tr>
<td>Select an additional 3 credits in an Asia-related course (400-level and above) in Asian Studies or in any department other than History</td>
<td>3</td>
<td></td>
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</table>

Total Credits: 15

Foreign Language Requirements
All-skills proficiency in one Asian language and two years' college study (or equivalent knowledge) of another Asian language, or alternative proficiency appropriate to the student's field.

Qualifying Examination
There will be a single qualifying examination, containing elements of both History and Asian Studies. The qualifying examination committee must include at least one member of the Asian Studies Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

Students must meet the Ph.D. qualifying examination requirements specified by the History department. In addition, the student will be required to present a portfolio of work in Asian Studies to their committee. Such a portfolio would minimally include a statement of the student's interdisciplinary research interests and a program plan.

DisserTAtion Committee Composition
In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of a History and Asian Studies dual-title Ph.D. student must include at least one member of the Asian Studies Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in Asian Studies, the member of the committee representing Asian Studies must be appointed as co-chair.

Comprehensive Exams
The Asian Studies-affiliated faculty member on the student's committee is responsible for ensuring that Asian Studies content constitutes a portion of the student's comprehensive exams. The Asian Studies' content will focus on the following areas: theory, methodology, transnationalism, and interdisciplinary material related to the student's discipline.

Dissertation
Ph.D. candidates must complete a dissertation on a topic that is approved in advance by their dissertation committee and reflects their original research and education in both History and Asian Studies. In order to earn the dual-title Ph.D. degree, the dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School, and the student must pass a final oral examination (the dissertation defense).

Dual-Title M.A. and Ph.D. in History and Women's Studies
Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

Dual-title degrees in History and Women's Studies foster interdisciplinary scholarly work that is grounded in historical study, research, and teaching. A dual-title program will enhance the intellectual rigor and breadth of graduate work through core courses in feminist theory and methodologies; by exposure to a range of interdisciplinary approaches to scholarship that focuses on the intersections of gender, sexuality, race, ethnicity, nation, and citizenship; and by offering students a pedagogical framework that encourages an interdisciplinary approach to teaching.

Admission Requirements
Students must apply and be admitted to the graduate program in History and The Graduate School before they can apply for admission to the dual-title degree program. After admission to History, students must apply for admission to and meet the admissions requirements of the Women's Studies dual-title program. Refer to the Admission Requirements section of the Women's Studies Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/womens-studies). Doctoral students must be admitted into the dual-title degree program in Women's Studies prior to taking the qualifying examination in their home department.

Degree Requirements for the Dual-Title M.A.
To qualify for the dual-title degree, students must satisfy the degree requirements for the M.A. in History. In addition, students pursuing the dual-title M.A. in History and Women's Studies must complete the degree requirements for the dual-title M.A. in Women's Studies, listed on the Women's Studies Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/womens-studies).

For the dual-title M.A., a minimum of one member of the master's committee will be a member of the Graduate Faculty in Women's Studies.

Degree Requirements for the Dual-title Ph.D.
To qualify for the dual-title degree, students must satisfy the degree requirements for the Ph.D. in History. In addition, students pursuing the dual-title Ph.D. in History and Women's Studies must complete the degree requirements for the dual-title Ph.D. in Women's Studies, listed on the Women's Studies Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/womens-studies).

Qualifying Examination
There will be a single qualifying examination, containing elements of both History and Women's Studies. The qualifying examination committee must include at least one member of the Women's Studies Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. Dual-title
graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

Students must meet the Ph.D. qualifying examination requirements specified by the History department. In addition, the student will be required to present a portfolio of work in Women's Studies to their committee. Such a portfolio would include:

- a statement of the student's interdisciplinary research interests,
- a program plan, and
- samples of writing that indicate the student's work in Women's Studies.

Dissertation Committee Composition
In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of a History and Women's Studies dual-title Ph.D. student must include at least two members of the Women's Studies Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. If the chair of the dissertation committee representing History is not also a member of the Graduate Faculty in Women's Studies, one of the members of the dissertation committee representing Women's Studies must be appointed as co-chair.

Comprehensive Exams
The Women's Studies affiliated faculty members on the student's dissertation committee are responsible for ensuring that Women's Studies content constitutes a portion of the student's comprehensive exams. The Women Studies' content will focus on the following areas: feminist theory, feminist methodology, global feminism, and feminist studies

Dissertation
Ph.D. candidates must complete a dissertation on a topic that is approved in advance by their dissertation committee and reflects their original research and education in both History and Women's Studies. In order to earn the dual-title Ph.D. degree, the dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School, and the student must pass a final oral examination (the dissertation defense).

Integrated Undergrad-Grad Programs
Integrated B.A. in History and M.A. in History
Requirements listed here are in addition to requirements listed in GCAC-210 Integrated Undergraduate-Graduate (IUG) Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/integrated-undergraduate-graduate-degree-programs).

Admission Requirements
In addition to the admission requirements noted on the Degree Requirements tab, admission to the History IUG will be based upon students' having:

1. completed at least one 400-level history course in a primary area of interest (with a B grade or higher) and attained a minimum GPA of 3.5 in all courses.
2. completed at least 60 credits (but no more than 100 credits).
3. submitted a proposed program plan directly to the Department of History's Director of Graduate Studies prior to the fall application deadline. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser as the student advances through the program.

Students must apply to the program via the Graduate School application for admission (http://www.gradschool.psu.edu/prospective-students/how-to-apply), and must meet all the admission requirements of the Graduate School and the History graduate program for the Master of Arts degree. Students shall be admitted to an IUG program no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree, as specified in the proposed IUG plan of study. Students must be admitted to the program prior to taking the first course they intend to count towards the graduate degree.

Degree Requirements
Students must fulfill all requirements for each degree in order to be awarded that degree, subject to the double-counting of credits as outlined below. Degree requirements for the B.A. in History are listed in the Undergraduate Bulletin (http://bulletins.psu.edu/undergraduate). Degree requirements for the M.A. degree are listed on the Degree Requirements tab. Up to 12 credits may be double-counted towards the degree requirements for both the graduate and undergraduate degrees; a minimum of 50% of the double-counted courses must be at the 500 or 800 level. Credits associated with the culminating experience for the graduate degree cannot be double-counted.

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<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>HIST 453</td>
<td>American Environmental History</td>
<td>3</td>
</tr>
<tr>
<td>HIST 454</td>
<td>American Military History</td>
<td>3</td>
</tr>
<tr>
<td>HIST 514</td>
<td>The Early Modern World: Empires, Trade, and Religion</td>
<td>3</td>
</tr>
<tr>
<td>HIST 515</td>
<td>Early Modern Europe</td>
<td>3-6</td>
</tr>
<tr>
<td>HIST 516</td>
<td>US Women's and Gender History</td>
<td>3</td>
</tr>
<tr>
<td>HIST 544</td>
<td>Topics in the Civil War and Reconstruction</td>
<td>3</td>
</tr>
<tr>
<td>HIST 545</td>
<td>United States History, 1877 to Present</td>
<td>Present</td>
</tr>
<tr>
<td>HIST 546</td>
<td>The Rise and Fall of Modern America, 1919 to the present</td>
<td>3</td>
</tr>
<tr>
<td>HIST 580</td>
<td>Pre-modern China</td>
<td>3</td>
</tr>
</tbody>
</table>

History IUG students should compose their master's committee and convene a committee meeting with all members present in the semester immediately following admission to the IUG (typically the sixth semester). At this first meeting there should be a discussion and approval of the general program plan (seminars, courses, and other requirements).

If students accepted into the IUG program are unable to complete the M.A. degree, they are still eligible to receive their undergraduate degree if all the undergraduate degree requirements have been satisfied.

Student Aid
Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding section of The Graduate School's website. Students on graduate assistantships must adhere to the course
load limits set by The Graduate School.

In addition, the following awards typically have been available to graduate students in this program:

**James Hamilton Hartzell and Lucretia Irvine Boyd Hartzell History Award**
A $200 to $300 award made annually to a graduate student in the Department of History whose field of interest is Pennsylvania history.

**James Landing Fellowship and the Warren Hassler Fellowship for Study in the Civil War**
Each fellowship is available each year to doctoral candidates who are working on their dissertations. The award consists of a stipend that earns the successful candidate one semester of release time for research and writing. No tuition waiver is offered.

**Hill Fellowships for Study in History**
Awarded annually by the Department of History to doctoral candidates who are working on their dissertations. The amount of the award varies, but it generally supports one semester free of duties.

**Edwin Erle Sparks Fellowship in the Humanities**
One fellowship is available each year to doctoral candidates in the Department of History who are working on their dissertations.

**Mark and Lucy Macmillan Stitzer Award**
Awarded by the Department of History each year to support graduate student travel for the purpose of research. The number and value of these awards depends on the quality of proposals received, the level of funding required by each meritorious project, and the funds available in the endowment. Preference is given to request for doctoral dissertation research.

**The E-Tu Zen Sun Award for Outstanding Teaching by a Graduate Assistant**
One award is made each year to recognize excellence in teaching by a History graduate assistant in the conduct of discussion sections, review sessions, or lecture presentations. The value of the award varies depending on funds available, but it is normally about $500.

**Courses**
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**Learning Outcomes**
1. Demonstrate command of current and past historiographical theory and methods.
2. Evaluate and master primary and secondary source material relevant to a particular historical period and theoretical topic consistent with highest ethical standards and practices of the discipline.
3. Formulate and execute independent research around historical argument on the basis of evidence that further knowledge and theory in the field of historical studies.
4. Articulate arguments and ideas with clarity in oral presentations and written formats in accordance with the conventions of the discipline.
5. Create historical arguments that demonstrate knowledge of professional standards of scholarly and professional work through their written and oral works and interaction with colleagues.

**Contact**
**Graduate Program Head:** Michael Kulikowski  
**Director of Graduate Studies/Professor-in-Charge:** Gregory Smits  
**Primary Program Contact:** Alesha Drapcho-Gavlock  
**Email:** amd353@psu.edu  
**Mailing Address:** 108 Weaver Building, University Park, PA 16802  
**Telephone:** (814) 865-6224  
**Program Website:** History (http://history.psu.edu)

**Homeland Security**
**Graduate Program Head:** Alexander Siedschlag  
**Program Code:** HLS  
**Campus(es):** World Campus (M.P.S.)  
**Degrees Conferred:** Master of Professional Studies (M.P.S.)

The intercollege Master of Professional Studies in Homeland Security (MPS-HLS) degree program is designed to prepare professionals and develop leaders for the field of homeland security by providing exceptional graduate education that includes an integrated curriculum, expert faculty, and student interaction. The program is comprised of courses from several Penn State colleges and delivered via distance education through the Penn State World Campus to accommodate the needs and careers of professionals who are already active in homeland security and related fields of civil security, or those interested in transitioning into the field. The program provides select graduate students with an integrated, cross-disciplinary curriculum that is focused on a set of unified educational goals to help them understand and manage the complexities of homeland security in a global environment. Within the degree program and in addition to its common core curriculum, students choose the base program or one of six options that represent main elements, capabilities, and risk-informed priorities of the homeland security mission space:

1. agricultural biosecurity and food defense;  
2. counterterrorism;  
3. cyber threat analytics and prevention;  
4. geospatial intelligence;  
5. public health preparedness; and  
6. information security and forensics.
The participating academic units for this collaborative program are: Penn State Harrisburg, the College of Medicine (in collaboration with the Milton S. Hershey Medical Center), the College of the Liberal Arts, the College of Earth and Mineral Sciences, the College of Agricultural Sciences, and Penn State Great Valley.

**Admission Requirements**

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

**Core Application Packet**

- Completed online Graduate School application (http://www.gradschool.psu.edu/prospective-students/how-to-apply) and payment of nonrefundable application fee
- Statement of purpose
- Vita or résumé
- Three letters of recommendation
- Official transcripts from all post-secondary institutions attended (http://www.gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission)

**Statement of Purpose and Curriculum Vitae**

A statement of professional experience and goals (up to 500 words) and the applicant’s vita or résumé must accompany the application.

**Letters of Recommendation**

- The individuals writing letters should be familiar with you and comfortable discussing your professional and/or academic strengths and accomplishments.
- The Admissions Committee prefers that all letters be written within the last six months and reference the applicant’s current career goals and/or ability to perform graduate level study.
- A person choosing to submit a letter of reference will do this through the online application process and either select our pre-formatted template or upload his/her own letter.

**GPA Requirements**

The applicant’s grade-point average is interpreted by the Admissions Committee in the context of a completed application.

**GRE Requirements**

The Graduate Record Examination may be required by some options.

**Other Considerations**

Special backgrounds, abilities, and interests related to homeland security are desirable.

**Degree Requirements**

**Master of Professional Studies (M.P.S)**

Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

The Master of Professional Studies in Homeland Security program requires a minimum of 33 credits, 24 of which must be earned at Penn State. Up to 10 graduate credits may be transferred in from a regionally accredited institution (subject to restrictions outlined in GCAC-309 Transfer Credit (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/transfer-credit)); if the full 10 credits are transferred, the minimum total number of credits in the degree program will be 34. At least 18 credits must be courses at the 500 or 800 level, of which 6 credits must be in 500-level courses.

Students are expected to maintain a B (3.0) or better average in academic courses to be retained in the program. Graduate Council policy requires that students must have a GPA of 3.0 or above in order to graduate from the program.

Each student will take a 9 credit core curriculum consisting of HLS 801/PADM 801, HLS 803/PHIL 803, and HLS 805/PLSC 805, as well as a non-credit Orientation Course. Students will also take 12 credits of prescribed courses for the specialized option. There are 9 elective credits that are chosen from an approved list in consultation with the student’s academic adviser. The list of electives is maintained by the Option Director and is provided to the students in the option. Finally, each degree candidate must complete a capstone project on a topic related to homeland security and defense, in association with HLS 594/AGBIO 594/GEOG 594/INSC 594/IST 594/PHP 594/PLSC 594.

**Time Limitation**

All degree requirements for the Master of Professional Studies in Homeland Security must be met within five years of admission to degree status.

**Prescribed Courses**

Homeland security refers to the unifying core for the vast global network of organizations and institutions that are involved in the efforts to secure society. Regardless of field of specialization, or chosen discipline for graduate study, all professionals in the program will participate in a Unifying Core Curriculum with the following educational goals and objectives:

- Understand major policies and legislation that shapes homeland security in a globalized society.
- Become familiar with organizations that play a key role in the implementation of homeland security policies and administration, and recognize the interactions among them.
- Understand the way in which a person or group responds to a set of conditions so as to prevent and respond to incidents and catastrophic events when needed.
- Recognize the impact that catastrophic events, both natural and man-made, have on society and the domestic and global economy.
- Identify and assess potential threats, vulnerabilities, and consequences.
- Apply leadership skills and principles that are necessary for producing and acting on information of value within a collaborative setting.
- Communicate effectively in the context of particular institutional cultures.
- Use, conduct, and interpret research and data effectively in decision-making.
- Practice ethics and integrity as a foundation for analytical debate and conclusion.
- Develop an appreciation of the cultural, social, psychological, political, and legal aspects of terrorism and counterterrorism.

The Core Curriculum consists of the following four courses:
Listed below are the courses required/suggested for the Base Program and for the Options:

### Homeland Security (Base Program)

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<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tr>
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<td><strong>Required Courses</strong></td>
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<tr>
<td>HLS Orientation</td>
<td>Homeland Security Administration: Policies and Programs</td>
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<tr>
<td>HLS/PADM 801</td>
<td>Homeland Security: Social and Ethical Issues</td>
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<td>HLS/PLSC 805</td>
<td>Violence, Threats, Terror, and Insurgency</td>
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<td><strong>Base Program Prescribed Courses</strong></td>
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<tr>
<td>HLS 811</td>
<td>Fundamentals of Homeland Security</td>
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<tr>
<td>HLS/PADM 404</td>
<td>Homeland Security and Defense in Practice</td>
<td>3</td>
</tr>
<tr>
<td>HLS/PADM 802</td>
<td>Multifaceted Approaches to Homeland Security</td>
<td>3</td>
</tr>
<tr>
<td>HLS 804</td>
<td>Strategic Planning and Organizational Imperatives in Homeland Defense and Security</td>
<td>3</td>
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### Agricultural Biosecurity and Food Defense Option

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<td>HLS/PADM 801</td>
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<td>HLS/PLSC 805</td>
<td>Violence, Threats, Terror, and Insurgency</td>
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<td></td>
<td><strong>Agricultural Biosecurity and Food Defense Option Prescribed Courses</strong></td>
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<tr>
<td>AGBIO 520</td>
<td>Agricultural Biosecurity: Protecting a Key Infrastructure</td>
<td>3</td>
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<tr>
<td>AGBIO 521</td>
<td>Food Defense: Prevention Planning for Food Processors</td>
<td>3</td>
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<tr>
<td>AGBIO 801</td>
<td>Veterinary Infectious Disease Diagnostic and Surveillance Systems</td>
<td>3</td>
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<td>AGBIO 802</td>
<td>Plant Protection: Responding to Introductions of Threatening Pests and Pathogens</td>
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<td>AGBIO 594</td>
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### Counterterrorism Option

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<td>HLS/PADM 801</td>
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<td>Violence, Threats, Terror, and Insurgency</td>
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<tr>
<td>PLSC 836</td>
<td>Root Causes of Terrorism</td>
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<td>PLSC 569</td>
<td>Counterterrorism</td>
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<td>PLSC 838</td>
<td>Tools and Analysis of Counterterrorism</td>
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<td>PLSC 837</td>
<td>Radicalization, Counter-Radicalization, and De-Radicalization</td>
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### Cyber Threat Analytics and Prevention Option

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<td><strong>Cyber Threat Analytics and Prevention Option Prescribed Courses</strong></td>
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<td>SWENG 545</td>
<td>Data Mining</td>
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<td>INSC 561</td>
<td>Web Security and Privacy</td>
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<td>INSC 846</td>
<td>Network and Predictive Analytics for Socio-Technical Systems</td>
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<td>IST 564</td>
<td>Crisis, Disaster and Risk Management</td>
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### Geospatial Intelligence Option

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<td>HLS/PADM 801 Homeland Security Administration: Policies and Programs</td>
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<td>HLS/PHIL 803 Homeland Security: Social and Ethical Issues</td>
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<td>GEOG 882 Geographic Foundations of Geospatial Intelligence</td>
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<tr>
<td>GEOG 483 Problem-Solving with GIS</td>
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<tr>
<td>GEOG 480 Exploring Imagery and Elevation Data in GIS Applications</td>
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<tr>
<td>GEOG 885 Advanced Analytic Methods in Geospatial Intelligence</td>
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<td>GEOG 594A Culminating Experiences in Geospatial Intelligence</td>
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<td>GEOG 594B Geospatial Intelligence Capstone Experience</td>
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### Information Security and Forensics Option

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<tr>
<td>IST 454 Computer and Cyber Forensics</td>
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<td>IST 456 Information Security Management</td>
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<td>IST 815 Foundations of Information Security and Assurance</td>
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<td>IST 554 Network Management and Security</td>
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### Public Health Preparedness Option

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<tr>
<td>PHP 410 Public Health Preparedness for Disaster and Terrorist Emergencies I</td>
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<td>PHP 510 Public Health Preparedness for Disaster and Terrorist Emergencies II</td>
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<td>PHP 527 Public Health Evaluation of Disasters and Bioterrorism</td>
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<td>PHP 530 Critical Infrastructure Protection of Health Care Delivery Systems</td>
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### Student Aid

World Campus students in graduate degree programs may be eligible for financial aid. Refer to the Tuition and Financial Aid section (http://www.worldcampus.psu.edu/tuition-and-financial-aid) of the World Campus website for more information.

### Learning Outcomes

Graduates from the IMPS-HLS program will be able to...

1. **SEARCH AND SYNTHESIZE** literature to integrate homeland security principles into disciplines and professional fields.
2. **INTEGRATE** the use of disciplinary methods, techniques, and knowledge to solve practical problems.
3. **IDENTIFY AND ASSESS** potential threats, vulnerabilities, and consequences in a context from local to global environments.
4. **EVALUATE** scientific evidence and best practice to inform and improve real-world decisions.
5. **APPLY** leadership skills and principles to produce and act on information in a collaborative setting.
6. **COMMUNICATE** the major issues of their discipline effectively to a diverse community of the Homeland Security Enterprise.

### Contact

Graduate Program Head: Alexander Siedschlag

Option Directors

- Base Program: Alexander Siedschlag
- Agricultural Biosecurity and Food Defense Option: Gretchen Kulda
- Counterterrorism Option: James Piazza
- Cyber Threat Analytics and Prevention Option: Robin Qiu
- Geospatial Intelligence Option: Gregory Thomas
• Information Security and Forensics Option: Peter Forester
• Public Health Preparedness Option: Eugene J. Lengerich

Primary Program Contact: Lesa Stanford

Email: lis12@psu.edu

Mailing Address: 777 West Harrisburg Pike, 131W Olmsted Bldg., Middletown, PA 17057

Telephone: (717) 948-6050

Program Website: Homeland Security (http://www.worldcampus.psu.edu/homeland-security-ccn)

Horticulture

Graduate Program Head
Erin Connolly

Program Code
HORT

Campus(es)
University Park (Ph.D., M.S.)

Degrees Conferred
Doctor of Philosophy (Ph.D.)
Master of Science (M.S.)
Dual-Title Ph.D. and M.S. in Horticulture and International Agriculture and Development

The Graduate Faculty

View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=HORT)

The Horticulture program is administered in the Department of Plant Science, College of Agricultural Sciences. Each student will be associated with an adviser who may provide financial support, research facilities, and/or office space. Applicants are encouraged to explore, study, and research opportunities by contacting faculty who may be prospective advisers.

This program provides opportunities for students interested in Horticulture to become a professional leader and an independent scholar. Faculty in this program are competent to prepare candidates in the subfields of Horticulture including:

• crop production and marketing
• integrated crop management
• plant genetics and breeding
• horticultural plant physiology
• postharvest physiology
• plant molecular biology and biotechnology, and
• horticultural ecology.

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Scores from the Graduate Record Examinations (GRE), or from a comparable substitute examination accepted by the Horticulture graduate program, are required for admission. At the discretion of the graduate program officer, a student may be admitted for graduate study in a program without these scores.

Prerequisites for admission vary according to the area of specialization, but basic courses in physical sciences, mathematics, biological sciences, communication skills, and social sciences and humanities are required. Students who lack prerequisite courses may be provisionally admitted (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/provisional-admission) but are required to make up deficiencies without degree credit.

Students with a 3.00 junior/senior average (on a 4.00 scale) and with appropriate course backgrounds will be considered for admission. The best qualified applicants will be accepted up to the number of spaces that are available for new students.

Degree Requirements

Master of Science (M.S.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

A minimum of 30 credits at the 400, 500, 600, or 800 level is required, with at least 18 credits at the 500 and 600 level, combined, including:

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<tr>
<td>AGRO 501</td>
<td>Graduate Student Dialogue</td>
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<td>HORT 590</td>
<td>Colloquium</td>
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<tr>
<td>AGRO 555</td>
<td>Effective Scientific Communications</td>
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</tr>
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<td>HORT 600</td>
<td>Thesis Research</td>
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</tr>
<tr>
<td>or HORT 610</td>
<td>Thesis Research Off Campus</td>
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</table>

Total Credits 32

All M.S. degree candidates must complete at least 2 credits of HORT 602; however, these 2 credits cannot be counted towards the minimum credits required for the degree. A thesis is required for the M.S. degree. The thesis must be accepted by the advisers and/or committee members, the head of the graduate program, and the Graduate School, and the student must pass a thesis defense.

Doctor Of Philosophy (Ph.D.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

The communication requirement for the Ph.D. degree may be satisfied by completing at least 6 graduate credits in an area of communications skills approved by the student’s advisory committee.

Students must complete 55-60 credits of formal course work beyond the baccalaureate, plus additional seminar, teaching, and research credits. A minimum of 12 credits of 500 level formal courses beyond the bachelor’s degree is required. Courses will be chosen by the student and dissertation adviser in consultation with the doctoral committee. Ph.D. students must complete:
Degree Requirements

To qualify for the dual-title degree, students must satisfy the degree requirements for the degree they are enrolled in Horticulture. In addition, students must complete the degree requirements for the dual-title in INTAD, listed on the INTAD Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/international-agriculture-development).

The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Horticulture and must include at least one Graduate Faculty member from the INTAD program. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. There will be a single qualifying examination, containing elements of both Horticulture and INTAD. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of a Horticulture and INTAD dual-title Ph.D. student must include at least one member of the INTAD Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in INTAD, the member of the committee representing INTAD must be appointed as co-chair. The INTAD representative on the student’s dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their dissertation committee and reflects their original research and education in Horticulture and INTAD. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

Students who wish to compete for fellowships should be sure that their application materials are complete by January 15 for entry the following fall semester.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up development. Doctoral students must be admitted into the dual-title degree program in INTAD prior to taking the qualifying examination in their primary graduate program.

### Degree Requirements

To qualify for the dual-title degree, students must satisfy the degree requirements for the degree they are enrolled in Horticulture. In addition, students must complete the degree requirements for the dual-title in INTAD, listed on the INTAD Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/international-agriculture-development).

The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Horticulture and must include at least one Graduate Faculty member from the INTAD program. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. There will be a single qualifying examination, containing elements of both Horticulture and INTAD. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of a Horticulture and INTAD dual-title Ph.D. student must include at least one member of the INTAD Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in INTAD, the member of the committee representing INTAD must be appointed as co-chair. The INTAD representative on the student’s dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their dissertation committee and reflects their original research and education in Horticulture and INTAD. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

### Dual-Titles

**Dual-Title M.S. and Ph.D. in International Agriculture and Development**

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

**Admission Requirements**

Students must apply and be admitted to the graduate program in Horticulture and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the INTAD dual-title program. Refer to the Admission Requirements section of the INTAD Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/international-agriculture-development).

### Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up...
Learning Outcomes

Master of Science (M.S.)

Know: Graduates of the Agronomy or Horticulture M.S. degree programs will demonstrate mastery of the principles and common research methods within the field of agronomy or horticulture. The demonstration will cover mastery of biotechnology, sustainability, profitability, weed mgt. and herbicide resistance, nutrient mgt., food safety, and/or turfgrass science.

Create/Apply: Graduates of the Agronomy or Horticulture M.S. degree programs will be able to assimilate essential concepts and literature in agronomy and horticulture, create hypotheses, develop tests of hypotheses, and develop solutions to agronomic and horticultural problems. M.S. graduates will also be able to carry out applied research projects that address problems in the field of agronomy or horticulture.

Communicate: Graduates of the Agronomy or Horticulture M.S. degree programs will be able to effectively communicate technical knowledge, research findings, and current topics in agronomy or horticulture verbally and in writing to scientists and lay people.

Critical thinking: Graduates of the Agronomy or Horticulture M.S. degree programs will be able to critically analyze research performed by others and evaluate agronomic or horticultural problems and formulate solutions to problems.

Professional practice: M.S. graduates of the Agronomy or Horticulture Graduate Programs will demonstrate ability to collaborate in a collegial manner and demonstrate high ethical standards, values, and best practices.

Doctor of Philosophy (Ph.D.)

Know: Graduates of the Agronomy/Horticulture Ph.D. Programs will demonstrate in-depth knowledge of essential theories and research methods within the fields of agronomy or horticulture. The demonstration areas will cover the application of biotechnology, sustainability, profitability, weed mgt. and herbicide resistance, nutrient mgt., food safety, and/or turfgrass science.

Create/Apply: Graduates of the Agronomy/Horticulture Ph.D. Programs will be able to assimilate essential theory and literature in agronomy to generate new ideas and develop creative solutions to agronomic and horticultural problems. Graduates of the program will also be able to conduct original research in an independent manner that addresses problems in the fields of agronomy or horticulture.

Communicate: Graduates of the Agronomy/Horticulture Ph.D. Programs will be able to convey ideas, arguments, and current topics in agronomy or horticulture verbally and in writing to scientists and lay people.

Critical thinking: Graduates of the Agronomy/Horticulture Ph.D. Programs will be able to critically analyze research performed by others in the fields of agronomy or horticulture.

Professional practice: Graduates of the Agronomy/Horticulture Ph.D. Programs will demonstrate the ability to work with others in a collegial manner and demonstrate the highest ethical standards, values, and best practices in their field.

Contact

Graduate Program Head: Erin Connolly

Director of Graduate Studies/Professor-in-Charge: Jonathan Lynch

Primary Program Contact: Stacy Smith

Email: sls60@psu.edu

Mailing Address: Dept. Plant Science, 101 Tyson Building, University Park, PA 16802

Telephone: (814) 863-7724

Program Website: Horticulture (https://plantscience.psu.edu/graduateprograms/hort)

Hospitality Management

Graduate Program Head: Donna Quadri-Felitti

Program Code: HM

Campus(es): University Park (Ph.D., M.S.)

Degrees Conferred

Doctor of Philosophy (Ph.D.)

Master of Science (M.S.)

Dual-Title Ph.D. and M.S. in Hospitality Management and Operations Research

The Graduate Faculty:

View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=HM)

The graduate programs offered in Hospitality Management (HM) are widely considered to be among the most competitive in the world. Both programs are research-focused, with an M.S. degree program intended to prepare students for continued academic study at the doctoral level, and a Ph.D. degree program primarily designed for students pursuing careers in advanced research and academia. Students in these programs are expected to work closely together with faculty members who are leading researchers in their respective fields. These mentorships provide first-hand training on how to successfully conceive, design, conduct, and report forward-looking research, while simultaneously providing a comprehensive understanding of the classroom environment through a structured teaching development program.

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Entry into the program requires a baccalaureate degree from a regionally accredited institution as well as a minimum of one year of work experience in the hospitality industry.
Scores for the Graduate Record Examinations (GRE), Graduate Management Aptitude Test (GMAT), or from a comparable substitute examination accepted by the Hospitality Management graduate program are required for admission.

Students with a 3.00 junior/senior grade-point average (on a 4.00 scale) will be considered for admission. Exceptions to this minimum average are sometimes made for students with special backgrounds, abilities, interests, and circumstances. Students are expected to have managerial competency in accounting, marketing, economics, human resource management, management information systems, and computer technology prior to entry into the program. Deficiencies in any of these areas must be made up in the first year that the student is enrolled (and will not be counted toward the program's degree requirement).

**Degree Requirements**

**Master of Science (M.S.)**

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

The master's degree program is designed to help students develop solid graduate-level research skills within a focused hospitality research area. Each student must complete a core of 12 credits of Methods Courses to include HM 503, STAT 500, and 6 credits of Methods Courses. In addition, students must take a minimum of 4 credits of HM 590 Colloquium. Students also complete a minimum of 15 credits of concentration area course work that is custom tailored to the student's hospitality research interests and academic and professional background.

A master's thesis is required of all students. Students must register for at least 6 credits in thesis research (HM 600 or HM 610), and a total of 37 credits is required for the degree, with at least 18 in the 500 and 600 series, combined. The thesis is based on original empirical research. A master's committee of three persons who oversee the master's thesis is appointed for each student. This committee gives the final master's exam, which is an oral defense of the master's thesis.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HM 503</td>
<td>Research Methods in Hospitality Management</td>
<td></td>
</tr>
<tr>
<td>STAT 500</td>
<td>Applied Statistics</td>
<td></td>
</tr>
<tr>
<td>HM 590</td>
<td>Colloquium (4 credits total)</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>A minimum of 15 credits of concentration area course work that is custom tailored to the student's hospitality research interests and academic and professional background</td>
<td>15</td>
</tr>
</tbody>
</table>

**Culminating Experience**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HM 600</td>
<td>Thesis Research</td>
<td>6</td>
</tr>
<tr>
<td>or HM 610</td>
<td>Thesis Research Off Campus</td>
<td></td>
</tr>
</tbody>
</table>

**Total Credits**

37

**Doctor of Philosophy (Ph.D.)**

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

The doctoral program is an advanced graduate research program designed for students who want to become educators, researchers, and knowledge-based professionals in the hospitality field. Students' programs are individualized to ensure in addition to a mastery of the scope of knowledge in hospitality management they will also have the ability to complete significant research in a focused hospitality management area. A student must complete the following courses prior to scheduling the Ph.D. comprehensive examination:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HM 585</td>
<td>Seminar in Hospitality Management</td>
<td>3</td>
</tr>
<tr>
<td>HM 586</td>
<td>Data Analysis in Hospitality Management</td>
<td>3</td>
</tr>
<tr>
<td>HM 590</td>
<td>Colloquium (total of 4 credits)</td>
<td>4</td>
</tr>
<tr>
<td>12 credits of quantitative and statistical analysis</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>18 credits in an HM concentration area</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>12 credits from an outside supporting area</td>
<td>12</td>
<td></td>
</tr>
</tbody>
</table>

**Total Credits**

52

The language or communication requirement for the Ph.D. can be fulfilled by:

1. demonstrating proficiency in an approved foreign language, or
2. demonstrating proficiency in computer programming, or
3. completing a minor.

The demonstration of proficiency is determined by an HM faculty committee.

**Dual-Titles**

**Dual-Title M.S. and Ph.D. in Hospitality Management and Operations Research**

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

**Admission Requirements**

Students must apply and be admitted to the graduate program in Hospitality Management and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Operations Research dual-title program. Refer to the Admission Requirements section of the Operations Research Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/operations-research). Doctoral students must be admitted into the dual-title degree program in Operations Research prior to taking the qualifying examination in their primary graduate program.

**Degree Requirements**

To qualify for the dual-title degree, students must satisfy the degree requirements for the degree they are enrolled in Hospitality Management. In addition, students must complete the degree requirements for the dual-title in Operations Research, listed on the Operations Research Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/operations-research).

The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Hospitality Management and must include at least one Graduate Faculty member from the Operations Research program. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. There will be
a single qualifying examination, containing elements of both Hospitality Management and Operations Research. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of a Hospitality Management and Operations Research dual-title Ph.D. student must include at least one member of the Operations Research Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in Operations Research, the member of the committee representing Operations Research must be appointed as co-chair. The Operations Research representative on the student's dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their dissertation committee and reflects their original research and education in Hospitality Management and Operations Research. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School's website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

The School of Hospitality Management provides competitive funding for admitted Ph.D. students. Funding is typically guaranteed for the first three (3) years of a student's full-time participation in the program, and paid teaching opportunities generally offered in the fourth (4th) year, upon completion of structured teaching development program and approval of the faculty. In addition, other funding through the School partially supports graduate student travel and registration to leading conferences, as well as financial support with University-wide research competitions. Other funding opportunities also frequently exist for additional summer research, for varying lengths of time.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Learning outcomes

1. KNOW: Students will be able to demonstrate mastery of their specific research area. Students will demonstrate in-depth knowledge of the primary literature in their specialty area including comprehension of research designs, methods, results and significance to the specialty area.

2. APPLY/CREATE: Students will be able to design and carry out a major research project in their field. Students will be able to read the research literature in their area of specialization and generate ideas for an original research project. Students will be able to design a research plan and implement it to completion successfully.

3. THINK: Students will be able to think critically about research in hospitality management and their areas of specialization. Students are able to identify the research question, understand the research method and conclusions in a scientific article. Students will be able to use knowledge of statistics to explain and critique conclusions in a scientific paper.

4. COMMUNICATE: Students will be able to use standards of field in written and oral communication. Students will be able to present results of their dissertation research in clear, concise oral presentations.

5. PROFESSIONAL PRACTICE: Students will be able to identify ethical issues in research and teaching. Students will demonstrate knowledge and comprehension of research ethics issues including knowledge of ethical principles related to authorship, research reporting, data fabrication, plagiarism, conflicts of interest, peer review, data sharing and other areas of misconduct.

Contact

Graduate Program Head: Donna Quadri-Felitti

Director of Graduate Studies/Professor-in-Charge: Anna Mattila

Primary Program Contact: Ashley Medina

Email: alm626@psu.edu

Mailing Address: 201 Mateer Building, University Park, PA 16802

Telephone: (814) 863-1448

Program Website: Hospitality Management (http://www.hhdev.psu.edu/shm/graduate)
**Human Development and Family Studies**

**Graduate Program Head**
Douglas M. Teti

**Program Code**
HDFS

**Campus(es)**
University Park (Ph.D., M.S.)

**Degrees Conferred**
Doctor of Philosophy (Ph.D.)
Master of Science (M.S.)
Dual-Title Ph.D. and M.S. in Human Development and Family Studies
and Demography
Dual-Title Ph.D. in Human Development and Family Studies
and Social Data Analytics

**The Graduate Faculty**

This interdisciplinary program is one of the graduate programs of the College of Health and Human Development. It is administered through the Department of Human Development and Family Studies. The Human Development and Family Studies graduate program is designed to educate students about research, theory, and methodology related to the study of individuals and families across diverse populations and diverse settings. There is a strong interest in the ways in which social institutions and settings such as day care facilities, schools, neighborhoods, and social policy institutions facilitate (or inhibit) opportunities for development and change for individuals and families. Understanding the characteristics and conditions that place individuals or families at risk for developing problems, designing effective prevention programs to address those risks, and mounting rigorous evaluations of such programs is a growing emphasis in the program. All students, regardless of substantive area, are encouraged to develop strong skills in research methods, a hallmark of our graduate training. Through course work and apprenticeship experiences, students develop an understanding of the program's multidisciplinary life span/life course, and applied orientation. As students progress through the program, they are expected to develop specialized expertise in two or more of the department's areas of concentration: individual development, family studies, intervention research, and research methods.

**Admission Requirements**

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Scores from the Graduate Record Examinations (GRE) are required for admission. Entering students should have some course work in social sciences, such as developmental and family science courses from psychology or sociology programs; and foundational courses in research methods and statistics. At the discretion of the program, students not meeting these requirements may be provisionally admitted (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/provisional-admission) with limited deficiencies to be made up concurrently with their graduate work.

Students with appropriate backgrounds will be considered for admission for fall semester only. The best-qualified applicants will be accepted up to the number of spaces that are available for new students. The program does not admit applicants for the terminal master's degree.

**Degree Requirements**

**Master of Science (M.S.)**

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

Students who enter the graduate program without a master's degree must complete a master's degree en route to the Ph.D. For the Master of Science degree, a minimum of 30 credits at the 400, 500, or 800 level is required, with at least 18 credits in the 500 and 600 series combined. Students are required to complete the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Required Courses</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HDFS 501</td>
<td>Human Development Across the Lifespan</td>
<td>3</td>
</tr>
<tr>
<td>HDFS 503</td>
<td>Human Development Intervention: Analysis of Theories and Approaches</td>
<td>3</td>
</tr>
<tr>
<td>HDFS 525</td>
<td>Introduction to Family Studies</td>
<td>3</td>
</tr>
</tbody>
</table>

**Research Methods**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HDFS 516</td>
<td>Methods of Research in Human Development</td>
<td>3</td>
</tr>
<tr>
<td>HDFS 519</td>
<td>Methods of Statistical Analysis in Human Development</td>
<td>3</td>
</tr>
</tbody>
</table>

**Substantive Field**

A minimum of 9 credits of course work (400 and 500 level) in their substantive field, 6 of which must be in HD FS (excluding HDFS 596 independent study)

**Culminating Experience**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HDFS 600</td>
<td>Thesis Research</td>
<td>6</td>
</tr>
<tr>
<td>or HDFS 610</td>
<td>Thesis Research Off Campus</td>
<td></td>
</tr>
</tbody>
</table>

Total Credits 30

The thesis must be accepted by the advisers and/or committee members, the head of the graduate program, and the Graduate School, and the student must pass a thesis defense. Course work completed for the HD FS master's degree at Penn State can be applied to satisfy the degree requirements for the HD FS Ph.D.

**Doctor of Philosophy (Ph.D.)**

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

For the Ph.D., a minimum of 40.5 credits at the 400, 500, or 800 level is required. Students are required to complete the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HDFS 501</td>
<td>Human Development Across the Lifespan</td>
<td>3</td>
</tr>
<tr>
<td>HDFS 503</td>
<td>Human Development Intervention: Analysis of Theories and Approaches</td>
<td>3</td>
</tr>
<tr>
<td>HDFS 525</td>
<td>Introduction to Family Studies</td>
<td>3</td>
</tr>
<tr>
<td>HDFS 596</td>
<td>Individual Studies (Professional Development Orientation)</td>
<td>1</td>
</tr>
</tbody>
</table>
**Research Methods**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HDFS 516</td>
<td>Methods of Research in Human Development</td>
<td>3</td>
</tr>
<tr>
<td>HDFS 519</td>
<td>Methods of Statistical Analysis in Human Development</td>
<td>3</td>
</tr>
<tr>
<td>HDFS 523</td>
<td>Strategies for Data Analysis in Developmental Research</td>
<td>3</td>
</tr>
<tr>
<td>HDFS 526</td>
<td>Measurement in Human Development</td>
<td>3</td>
</tr>
</tbody>
</table>

**Electives**

A minimum of 6 additional credits in methodology

A minimum of 12 credits of elective course work (400 and 500 level) in their substantive field, 9 of which must be in HD FS seminars.

1. Must be taken in the first year.
2. Must be taken by the end of the second year in the program.
3. These 12 credits must be in addition to the 6 additional credits in methodology and cannot be double-counted towards that requirement.

All doctoral students must pass a qualifying examination, a comprehensive written and oral examination, and a final oral examination (the dissertation defense). To earn the Ph.D. degree, doctoral students must also write a dissertation that is accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

**Dual-Titles**

**Dual-Title M.S. and Ph.D. in Human Development and Family Studies and Demography**

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

This program is designed for students who want to integrate Population Studies (including such foci as fertility, marriage, cohabitation, labor force participation, mortality) with the study of human development and family studies.

**Admission Requirements**

Students must apply and be admitted to the graduate program in HDFS and the Graduate School before they can be admitted to a dual-title degree program. Applicants interested in the dual-title degree program may note their interest in their applications to HDFS. Students admitted to the HDFS program will be admitted to the dual-title program in Demography upon the recommendation of a Demography Program faculty member in HDFS. Ph.D. students must apply and be admitted to the dual-title degree program in Demography prior to taking the qualifying exam.

Additional admissions requirements are listed in the Admissions Requirements section of the Demography Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/demography).

**Degree Requirements**

To qualify for the dual-title degree, students must satisfy the requirements of the Ph.D. in HDFS. In addition, students pursuing the dual-title Ph.D. in HDFS and Demography must complete the degree requirements for the dual-title Demography Ph.D., listed on the Demography Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/demography).

The qualifying examination committee for the dual-title degree will be composed of Graduate Faculty from HDFS and must include at least one Graduate Faculty member from Demography. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. There will be a single qualifying examination, containing elements of both HDFS and Demography. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the chair and at least one additional member of the student’s dissertation committee must be members of the Graduate Faculty in Demography. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. The Demography faculty members on the student’s committee are responsible for administering an examination in demography that constitutes a portion of the comprehensive examination of the doctoral student in the dual-title.

Ph.D. candidates must complete a dissertation on a topic that reflects their original research and education in both HDFS and Demography. In order to earn the dual-title Ph.D. degree, the dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School, and the student must pass a final oral examination (the dissertation defense).

**Dual-Title Ph.D. in Human Development and Family Studies and Social Data Analytics**

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

HDFS doctoral students interested in having a degree that reflects interdisciplinary training in an array of tools, techniques, and methodologies for social data analytics, while maintaining a close association with HDFS, may apply to pursue a dual-title Ph.D. in HD FS and Social Data Analytics.

Social data analytics is the integration of social scientific, computational, informational, statistical, and visual analytic approaches to the analysis of large or complex data that arise from human interaction. The dual-title Ph.D. program provides additional training with the aim of providing scientists with the skills required to expand the field of social data analytics, creatively answer important social scientific questions, and communicate effectively with both academic and nonacademic audiences.

**Admission Requirements**

Students must apply and be admitted to the graduate program in HDFS and the Graduate School before they can be admitted to a dual-title degree program. Applicants interested in the dual-title degree program may note their interest in their applications to HDFS. Students admitted to the HDFS program will be admitted to the dual-title program in Social Data Analytics upon the recommendation of a Social Data Analytics Program faculty member in HDFS. Students must apply and be admitted
to the dual-title degree program in Social Data Analytics prior to taking the qualifying exam.

Additional admissions requirements are listed in the Admission Requirements section of the Social Data Analytics Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/social-data-analytics).

Degree Requirements
To qualify for the dual-title degree, students must satisfy the requirements of the Ph.D. in HDFS. In addition, students pursuing the dual-title Ph.D. in HDFS and Social Data Analytics must complete the degree requirements for the dual-title Social Data Analytics Ph.D., listed on the Social Data Analytics Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/social-data-analytics).

The qualifying examination committee for the dual-title degree will be composed of Graduate Faculty from HDFS and must include at least one Graduate Faculty member from Social Data Analytics. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. There will be a single qualifying examination, containing elements of both HDFS and Social Data Analytics. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of a dual-title doctoral degree student must include at least one member of the Social Data Analytics Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. If the chair of the committee representing HDFS is not also a member of the Graduate Faculty in Social Data Analytics, the member of the committee representing Social Data Analytics must be appointed as co-chair. The Social Data Analytics representative on the student’s dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.

Ph.D. candidates must complete a dissertation on a topic that reflects their original research and education in both HDFS and Social Data Analytics. In order to earn the dual-title Ph.D. degree, the dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School, and the student must pass a final oral examination (the dissertation defense).

Student Aid
Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Learning Outcomes
1. Know. Graduates will demonstrate an understanding of core theories and methods related to lifespan development, family process, and prevention science.
2. Know, Apply/Create. Graduates will demonstrate skills in statistics and research methods with an emphasis on selecting and applying methods in conjunction with theory specific to their area of study.
3. Know, Think, Communicate. Graduates will demonstrate a mastery of the literature in their research area and an ability to integrate and communicate knowledge across at least 2 core department areas.
4. Communicate. Graduates will communicate, in both written and oral formats, the importance and relevance of a research topic as well as the implications research results have for the field.
5. Apply/Create, Think, Communicate. Graduates will demonstrate the ability to develop independent research questions to be addressed empirically, conduct the empirical analyses, and convey findings in a manner suitable for dissemination to the field.
6. Professional Practice, Think. Graduates will comply with standard ethical regulations regarding the conduct of research, knowledge of ethical guidelines regarding the analysis and publication of scientific research.

Contact
Graduate Program Head: Douglas Teti
Director of Graduate Studies/Professor-in-Charge: Lisa Kopp
Primary Program Contact: Christa Kreps
Email: csh5007@psu.edu
Mailing Address: 115 HHD Bldg, University Park, PA 16802
Telephone: (814) 863-8001
Program Website: Human Development and Family Studies (http://www.hhdev.psu.edu/hdfs)

Human Dimensions of Natural Resources and the Environment

Graduate Program Head: Alan Graefe
Program Code: HDNRE
Campus(es): University Park
Degrees Conferred: Dual-Title
The Graduate Faculty

Students electing the dual-title intercollege program in HDNRE through participating majors may earn a degree with the dual-title at both the Ph.D. and M.S./M.A. levels, i.e., Ph.D. in (graduate program name) and Human Dimensions of Natural Resources and the Environment, or M.S./M.A. in (graduate program name) and Human Dimensions of Natural Resources and the Environment.
The following graduate programs offer dual-title degrees in HDNRE:

- Anthropology
- Architecture
- Energy and Mineral Engineering
- Forest Resources
- Geography
- Landscape Architecture
- Recreation, Park and Tourism Management
- Rural Sociology

The HDNRE dual-title intercollege degree program is administered by the HDNRE Program Committee. The committee maintains program definition, identifies appropriate faculty and courses, and recommends policies and procedures for its operation. This dual-title intercollege degree program is offered through graduate major programs in four colleges: Agricultural Sciences, Earth and Mineral Sciences, Health and Human Development, and the Liberal Arts. HDNRE enables students to attain and be identified with the content, techniques, applications, methods, and policy implications of an interdisciplinary focus on Human Dimensions of Natural Resources and the Environment, while maintaining a close association with areas of application.

Through participation in HDNRE, student's programs of study will emphasize integrated, multidisciplinary approaches designed for improving their understanding about and management of natural resources. Areas of study will reflect the faculty adviser's home department and disciplinary thrust.

### Admission Requirements

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

To pursue a dual-title intercollege degree under this program, the student must first apply and be admitted through one of the existing graduate programs that offers the dual-title degree in HDNRE:

- Anthropology
- Architecture
- Energy and Mineral Engineering
- Forest Resources
- Geography
- Landscape Architecture
- Recreation, Park and Tourism Management
- Rural Sociology

Once accepted into their home degree program, the student can apply to the Admissions Committee of Human Dimensions of Natural Resources and the Environment. The Human Dimensions of Natural Resources and the Environment admissions committee reviews applications and recommends students for admission to the dual-title degree program to The Graduate School. HDNRE admission requirements include:

1. a minimum baccalaureate Jr/Sr grade point average of 3.0 out of a 4.0 scale;
2. a statement of professional goals, natural resource management philosophy, and reasons for applying to the program; and
3. three letters of reference from individuals capable of evaluating the applicant's potential for graduate work in interdisciplinary natural resource management.

Doctoral students must apply and be admitted to the HDNRE dual-title program prior to taking the qualifying examination.

### Degree Requirements

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

To qualify for the HDNRE dual-title intercollege degree, students must satisfy the requirements of the major degree program in which they are enrolled, including the communication/foreign language requirements, if any. In addition, they must satisfy the minimum requirements in the HDNRE dual-title intercollege program described here. Final course selection is determined by the student and her/his advisers and/or doctoral committee. All dual-title intercollege degree candidates must enroll in HDNRE 590 in each of their first two semesters.

### Master's Degrees

A student in the dual-title intercollege M.S./M.A. in HDNRE must complete 17 credits of HDNRE course work beyond the bachelor's degree in addition to curricular requirements for the master's degree in the student's primary program.

#### Required Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HDNRE 590</td>
<td>Human Dimensions in Natural Resources and the Environment Colloquium</td>
<td>2</td>
</tr>
<tr>
<td>HDNRE 574</td>
<td>Integrated Perspectives in Human Dimensions of Natural Resources and the Environment</td>
<td>3</td>
</tr>
<tr>
<td>HDNRE 575</td>
<td>Ethical Issues in Human Dimensions of Natural Resources and the Environment</td>
<td>3</td>
</tr>
<tr>
<td>RSOC 555</td>
<td>Human Dimensions of Natural Resources</td>
<td>3</td>
</tr>
<tr>
<td>ANTH 599</td>
<td>Human Ecology</td>
<td>3</td>
</tr>
<tr>
<td>or FOR 565</td>
<td>GIS Based Socio-Ecological Landscape Analysis</td>
<td>3</td>
</tr>
</tbody>
</table>

An additional 3 credit course in consultation with student's advisers and/or committee

Total Credits 17

1 HDNRE 590 must be taken in each of the first two semesters of enrollment in the dual-title intercollege degree program.

In addition, 6 credits of Thesis Research (600 or 610 in the student's home graduate degree program) are required if the candidate is writing a thesis. Particular courses may satisfy both the graduate major program requirements and those of the HDNRE dual-title intercollege program. All courses must be approved by the student's M.S./M.A. advisers and/or committee.

The thesis supervisor and chair of the student's committee shall be a member of the student's major program, and a member of the dual-title program. All members of the committee must hold Graduate Faculty status or secure the same before serving on the committee.

The culminating experience (e.g., thesis or scholarly paper) must incorporate an HDNRE interest together with the primary field of study. All students are also required to successfully complete an oral defense of
the M.S./M.A. thesis as part of the master's requirements if required by the participating program.

**Doctoral Degrees**

A candidate for the dual-title intercollege HDNRE Ph.D. must complete, in addition to curricular requirements for the doctoral degree in the student's primary program, a minimum of 18 credits of HDNRE coursework.

<table>
<thead>
<tr>
<th>Code</th>
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</tr>
</thead>
<tbody>
<tr>
<td>HDNRE 590</td>
<td>Human Dimensions in Natural Resources and the Environment Colloquium</td>
<td>3</td>
</tr>
<tr>
<td>HDNRE 574</td>
<td>Integrated Perspectives in Human Dimensions of Natural Resources and the Environment</td>
<td>3</td>
</tr>
<tr>
<td>HDNRE 575</td>
<td>Ethical Issues in Human Dimensions of Natural Resources and the Environment</td>
<td>3</td>
</tr>
<tr>
<td>RSOC 555</td>
<td>Human Dimensions of Natural Resources</td>
<td>3</td>
</tr>
<tr>
<td>ANTH 559</td>
<td>Human Ecology</td>
<td>3</td>
</tr>
<tr>
<td>or FOR 565</td>
<td>GIS Based Socio-Ecological Landscape Analysis</td>
<td></td>
</tr>
<tr>
<td>An additional 3 credit course in consultation with student's dissertation committee</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

Total Credits: 18

1 HDNRE 590 must be taken in each of the first two semesters of enrollment in the dual-title intercollege degree program, and once more prior to graduation, for a total of 3 credits.

Particular courses may satisfy both the graduate major program requirements and those of the HDNRE program. If an HDNRE M.S./M.A. student continues into the HDNRE Ph.D. program, 15 credits of interdisciplinary course work must be selected, with the approval of the student's dissertation committee. As well, a continuing doctoral student must take 3 additional credits of HDNRE 590 (each student must enroll the first two semesters of the doctoral program and then once more prior to graduation).

There will be a single qualifying examination, containing elements of both the student's graduate major program and HDNRE. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

The qualifying examination committee and the dissertation committee must include at least one Graduate Faculty member from HDNRE. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. The HDNRE representative on the qualifying examination committee will participate in constructing and evaluating the qualifying examination, and the HDNRE representative on the dissertation committee will participate in constructing and evaluating the comprehensive examination. If the chair of the dissertation committee is not also a member of the Graduate Faculty in HDNRE, the member of the committee representing HDNRE must be appointed as co-chair.

All Ph.D. students will be required to complete, present, and defend a dissertation that incorporates a topic related to both their graduate major program and HDNRE. Candidates for the dual-title Ph.D. degree in HDNRE will be required to pass a final oral examination (the dissertation defense) covering their graduate major program field and HDNRE, with emphasis on the student's area of specialization. To earn the Ph.D. degree, doctoral students must also write a dissertation that is accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

**Student Aid**

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School's website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

**Courses**

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**Graduate Program Head:** Alan Graefe

**Email:** gyu@psu.edu

**Mailing Address:** 801F Ford Building, University Park, PA 16802

**Telephone:** (814) 863-8986

**Program Website:** Human Dimensions of Natural Resources and the Environment (https://agsci.psu.edu/hdnre)
Human Resources and Employment Relations

Graduate Program Head
Paul F. Clark

Program Code
HRER

Campus(es)
University Park (M.S.)
World Campus (M.P.S.)

Degrees Conferred
Master of Science (M.S.)
Master of Professional Studies (M.P.S.)
Integrated B.S. in Labor and Employment Relations and M.S. in Human Resources and Employment Relations
Integrated B.S. in Labor and Employment Relations and M.P.S in Human Resources and Employment Relations
Integrated B.S. in Psychology and M.S. in Human Resources and Employment Relations
Integrated B.S. in Spanish and M.S. in Human Resources and Employment Relations
Joint J.D./M.S. with Penn State Law

The Graduate Faculty

Master of Science in Human Resources and Employment Relations

The Master of Science (M.S.) degree in Human Resources and Employment Relations (HRER) is a two-year program designed for students anticipating careers in some aspect of labor and human resources or labor-management relations. The program has the following objectives:

- provide students with an understanding of the roles employers, employees, employee organizations, and public policy makers play in the employment relationship;
- familiarize students with the complex personal and organizational issues inherent in the employment relationship;
- prepare students to systematically analyze complex issues and evaluate research results in the process of administering labor and human resource systems;
- prepare students for advanced graduate or professional training beyond the master’s degree; and
- prepare students for employment as practitioners in the field.

Master of Professional Studies in Human Resources and Employment Relations

The M.P.S. in Human Resources and Employment Relations (HRER) is a 33 credit program of study for professionals working in human resources/employment relations or considering a career in some aspect of human resources and employment relations. The program will prepare students to:

- understand the roles that employers, employees, employee organizations and unions, and public policy makers play in the employment relationship;
- analyze the complex personal, legal, and organizational issues inherent in the employment relationship;
- understand the ethical dimensions of human resource and employment relations; and
- analyze complex issues and evaluate research results in the process of administering labor and human resource systems;

Courses include the study of employment law, labor and employment relations, human resources, workplace organization, labor markets, ethics, the employment relationship, recruiting/selection, compensation and benefits, workforce development, and diversity in the workplace.

The program highlights the changing nature of the HRER field, including the impact of the globalization of private and public organizations and the growing importance of diversity in the workforce. It culminates in a capstone class in which students will demonstrate their understanding of the curriculum and apply it to their professional areas of interest. Upon completion of the M.P.S. HRER, students will be equipped to work as professionals in human resource management, employment relations, and general management with private employers, unions, government agencies, and non-profit organizations.

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Master of Professional Studies (M.P.S.)

Students who do not have a GPA of at least 3.0 will be considered on a case-by-case basis depending on the quality of their overall application. Applicants who are still completing their baccalaureate requirements at the time of application may be provisionally admitted (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/provisional-admission) to the Graduate School. Completion of admission in such cases is dependent upon receipt of the missing credentials. Students are also expected to have a minimum of two years of full-time work experience prior to admission.

Admissions decisions for the program are based on the quality of the applicant’s credentials. The decisions are based on a review of the complete application portfolio. During the admission process, students who are better suited for another graduate level program will be encouraged to apply to the appropriate program. Applicants to the M.P.S. HRER must submit the following materials:

- A 2-3 page essay articulating career and educational goals that demonstrates the applicant’s written communication skills. Documentation of a minimum of two years of full-time work and a resume should be attached as a supplement;
- Three letters of recommendation that attest to the applicant’s readiness for graduate study and document the requisite minimum of two years of work experience;
- Official transcripts from all post-secondary institutions attended (http://www.gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission).
Graduate Record Examination (GRE) scores are not required.

**Master of Science (M.S.)**

Applicants to the M.S. HRER program:

- Must submit a 2-3 page essay articulating career and educational goals that demonstrates the applicant’s written communication skills.
- Must submit scores from the Graduate Record Examinations (GRE) or the Graduate Management Admission Test (GMAT)
- Must submit official transcripts from all post-secondary institutions attended ([http://www.gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission](http://www.gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission)). Applicants with a 3.00 junior/senior grade-point average (on a 4.00 scale) will be considered for admission. Exceptions to the minimum grade-point average may be made at the discretion of the program for students with special backgrounds, abilities, and interests.
- Must submit three letters of recommendation sent from people who can adequately assess the student’s likelihood of completing the graduate program.
- Must have successfully completed an undergraduate statistics course plus a minimum of 12 undergraduate credits in the social sciences as part of their baccalaureate degree.

**Degree Requirements**

**Master of Professional Studies (M.P.S.)**

Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements ([http://gradschool.psu.edu/graduate-education-policies](http://gradschool.psu.edu/graduate-education-policies)).

Students pursuing the M.P.S. in HRER are required to complete a concentration designed to provide the student an opportunity to develop expertise in a specific area of human resources and employment relations.

Students will choose and complete one concentration which will include 6 credits beyond the 27 required core course credits. Students will be required to complete the capstone project in their area of concentration. For example, students choosing the Benefits and Compensation concentration are required to complete a capstone project that focuses on some aspect of benefits and compensation. The program culminates with a research project which is completed through the capstone course, HRER 894.

Total Required Credits for the M.P.S.: 33 credits at the 400-level or higher; at least 18 credits must be at the 500 or 800 level, with at least 6 credits at the 500-level.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HRER 501</td>
<td>Labor and Employment Law</td>
<td>3</td>
</tr>
<tr>
<td>HRER 504</td>
<td>Seminar in Employment Relations</td>
<td>3</td>
</tr>
<tr>
<td>HRER 505</td>
<td>Seminar in Human Resources</td>
<td>3</td>
</tr>
<tr>
<td>HRER 802</td>
<td>Human Behavior and Organizational Performance</td>
<td>3</td>
</tr>
<tr>
<td>HRER 803</td>
<td>Human Resources in Multinational Enterprises</td>
<td>3</td>
</tr>
<tr>
<td>HRER 816</td>
<td>Labor Market Analysis</td>
<td>3</td>
</tr>
<tr>
<td>or HRER 825</td>
<td>Strategic Business Tools for HRER Professionals</td>
<td></td>
</tr>
<tr>
<td>HRER 836</td>
<td>Diversity in the Workplace</td>
<td>3</td>
</tr>
<tr>
<td>HRER 860</td>
<td>Ethical Decision Making for HR Practitioners</td>
<td>3</td>
</tr>
</tbody>
</table>

**Electives**

Select 6 credits in one of the following concentration areas: 6

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>LER 424</td>
<td>Employment Compensation</td>
</tr>
<tr>
<td>LER 425</td>
<td>Employee Benefits</td>
</tr>
</tbody>
</table>

**Employment and Labor Law**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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<tbody>
<tr>
<td>LER 401</td>
<td>The Law of Labor-Management Relations</td>
</tr>
<tr>
<td>HRER 811</td>
<td>Labor and Employment Law II</td>
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</tbody>
</table>

**Ethics and Leadership**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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<tbody>
<tr>
<td>LER 464</td>
<td>Communication Skills for Leaders in Groups and Organizations</td>
</tr>
<tr>
<td>LER 409</td>
<td>Leadership Development: A Life-Long Learning Perspective</td>
</tr>
<tr>
<td>or LER 465</td>
<td>Collective Decision Making</td>
</tr>
</tbody>
</table>

**International Human Resources and Employment Relations**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td>LER 403</td>
<td>International Human Resource Studies</td>
</tr>
<tr>
<td>HRER 801</td>
<td>Comparative and International Employment and Labor Law</td>
</tr>
<tr>
<td>or LER 400</td>
<td>Comparative Employment Relations Systems</td>
</tr>
</tbody>
</table>

**Labor and Collective Bargaining**

<table>
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<tr>
<th>Code</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td>LER 401</td>
<td>The Law of Labor-Management Relations</td>
</tr>
<tr>
<td>LER 435</td>
<td>Labor Relations in the Public Sector</td>
</tr>
</tbody>
</table>

**Staffing, Training, and Development**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>LER 466</td>
<td>Labor Union Structure, Administration and Governance</td>
</tr>
<tr>
<td>LER 468</td>
<td>American Labor Unions</td>
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<tr>
<td>LER 426</td>
<td>Staffing and Training Strategies in Organizations</td>
</tr>
<tr>
<td>or WFED 471</td>
<td>Training in Industry and Business</td>
</tr>
<tr>
<td>WFED 573</td>
<td>Needs Assessment for Workforce Development Professionals</td>
</tr>
</tbody>
</table>

**Culminating Experience**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>HRER 894</td>
<td>Research Topics (Capstone Project)</td>
</tr>
</tbody>
</table>

Total Credits 33

**Master of Science (M.S.)**

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. ([http://gradschool.psu.edu/graduate-education-policies](http://gradschool.psu.edu/graduate-education-policies))

A minimum of 37 credits at the 400, 500, or 800 level is required; with at least 18 credits in the 500 and 600 series. A minimum of 12 credits in course work (400, 500, and 800 series) must be completed in HRER. If the student chooses to write a thesis, at least 6 credits in thesis research (HRER 600 or HRER 610) must be completed. If the student chooses the research paper option, at least 18 credits must be in 500-level courses.

For the degree, an overall 3.00 (B) grade-point average must be earned in the 400, 500, and 800-level courses, and a grade of B or above must be earned in all 500-level courses. Required courses are offered once per academic year and elective courses at least once every two academic years.

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</thead>
<tbody>
<tr>
<td>HRER 501</td>
<td>Labor and Employment Law</td>
</tr>
</tbody>
</table>

**Required Courses**

<table>
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<tr>
<th>Code</th>
<th>Title</th>
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<tbody>
<tr>
<td>HRER 501</td>
<td>Labor and Employment Law</td>
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</tbody>
</table>
HRER 502 Human Behavior at Work 3
HRER 504 Seminar in Employment Relations 3
HRER 505 Seminar in Human Resources 3
HRER 510 Introduction to Graduate Studies in Human Resources and Employment Relations 1
HRER 512 Research Methods in Human Resources and Employment Relations I 3
HRER 513 Research Methods in Human Resources and Employment Relations II 3
HRER 516 Labor Market Analysis 3

Emphasis Courses
An emphasis is an area of study related to a particular aspect or domain of industrial relations and human resources. Students select an emphasis in consultation with their master's advisory committee.

Electives
With the faculty adviser's approval, a student selects at least 3 or more elective credits, depending whether the student completes a thesis or a research paper. A list of approved elective courses is maintained by the graduate program office.

Culminating Experience
Students may choose to complete either a thesis or a research paper.

Total Credits 37

The HRER thesis is intended for students anticipating additional graduate education beyond the master's degree. A student's thesis should reflect their chosen emphasis. The thesis must be accepted by the student's advisers and/or committee members, the head of the graduate program, and the Graduate School, and the student must pass a thesis defense.

The HRER research paper option is intended for students expecting to enter the labor market upon completion of the master's degree. A student's research paper should reflect their chosen emphasis.

Integrated Undergrad-Grad Programs
Integrated B.S. in Labor and Employment Relations and M.P.S. in Human Resources and Employment Relations

Requirements listed here are in addition to requirements listed in GCAC-210 Integrated Undergraduate-Graduate (IUG) Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/integrated-undergraduate-graduate-degree-programs).

The integrated LER B.S. and HRER M.P.S. is a five-year program designed for academically talented World Campus baccalaureate students to obtain both the B.S. and the M.P.S. degrees in LER and HRER in an intense, accelerated program of study. Students will develop expertise in the human resources and employment relations field beyond the B.S. degree. The undergraduate curriculum introduces students to:

1. the roles employers, employees, employee organizations and public policy makers play in the employment relationship,
2. the complex personal and organizational issues inherent in the employment relationship
3. the laws that form the legal framework for the employee-employer relationship, and
4. the tools needed to systematically analyze those complex issues and evaluate research relevant to those analyses.

The graduate curriculum provides for a more intensive, individualized, and focused examination of the human resources and employment relations field. It also provides an opportunity for students to explore a concentrated sub-area of the HRER field in depth. Upon completion of the integrated degree, students will have gained advanced knowledge and expertise from conducting and analyzing empirical work and participating in online classes that can be directly applied to the workplace.

Admission Requirements
Students apply to the program via the Graduate School application for admission (http://www.gradschool.psu.edu/prospective-students/how-to-apply), and must meet the admission requirements of the Graduate School, as well as the admission requirements for the Master of Professional Studies degree in HRER.

Admissions decisions for the B.S./M.P.S. program are based on the quality of the applicant's credentials. The decisions are made after a review of the complete application portfolio. The integrated B.S. /M.P.S. program will be limited to highly talented undergraduates. Applicants to the integrated program:

- must be enrolled in the LER B.S. program;
- shall be admitted no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree, as specified in the proposed IUG plan of study;
- must have an overall GPA of 3.4 (on a 4.0 scale) in undergraduate course work and a minimum GPA of 3.6 in the major;
- must submit 2 letters of recommendation from current or previous Penn State instructors and 1 additional letter of recommendation (either professional or academic);
- must submit a writing sample, a resume, and 2-3 page essay articulating career and educational goals that demonstrates the applicant's written communication skills;
- must present an approved plan of study (to be determined in consultation with the student's undergraduate adviser and the Graduate Director, and to be signed by both; the approved Plan of Study should be reviewed periodically with an adviser as the student advances through the program); and
- must possess the equivalent of two years of full-time work experience prior to admission.

No GRE or GMAT scores are required for admission to the program.

Degree Requirements
To earn the Master of Professional Studies degree in HRER, students in the IUG program must complete all of the degree requirements for the Master of Professional Studies, with one exception. The requirement for the 3-credit course HRER 860 is waived for students accepted into the IUG degree program, as a course required for the B.S. in Labor and Employment Relations covers the same material. Students must choose an additional 3-credit elective in consultation with their advisers to meet the minimum 33 credits required for the M.P.S. degree.

9 credits (400-level and above) can apply to both undergraduate and graduate degrees. Students can choose which 9 credits will double-count for both the undergraduate and graduate degrees from the following list:

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<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>LER 401</td>
<td>The Law of Labor-Management Relations</td>
<td>3</td>
</tr>
<tr>
<td>LER 458Y</td>
<td>History of Work in America</td>
<td>3</td>
</tr>
</tbody>
</table>

Courses Eligible to Double Count for Both Degrees
At least 6 of the 12 double-counted credits must be at the 500- or 800-level. The graduate thesis or other graduate culminating/capstone experience (including any associated credits and/or deliverables) may not be double counted towards any other degree.

If students accepted into the IUG program are unable to complete the M.P.S. degree, they are still eligible to receive their undergraduate degree if all the undergraduate degree requirements have been satisfied.

Integrated B.S. in Labor and Employment Relations and M.S. in Human Resources and Employment Relations

Requirements listed here are in addition to requirements listed in GCAC-210 Integrated Undergraduate-Graduate (IUG) Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/integrated-undergraduate-graduate-degree-programs).

The integrated LER B.S. and HRER M.S. is a five-year program designed for academically talented baccalaureate students to obtain both the B.S. and the M.S. degrees in LER and HRER with five years of study. Students will develop expertise in the human resources and labor relations fields beyond the B.S. degree. The undergraduate curriculum educates students about:

1. the roles of employers, employees, employee organizations and public policy makers play in the employment relationship,
2. the complex personal and organizational issues inherent in the employment relationship
3. and how to systematically analyze those complex issues and evaluate research relevant to those analyses.

The graduate curriculum provides for more individualized, focused learning in a concentrated sub-area of the HRER field. The program culminates with an M.S. thesis or research paper. Upon completion of the integrated degree, students will enter the workforce with advanced knowledge and expertise gained from conducting and analyzing empirical work and participating in seminar-style classes.

Admission Requirements

Students apply to the program via the Graduate School application for admission (http://www.gradschool.psu.edu/prospective-students/how-to-apply), and must meet the admission requirements of the Graduate School, as well as the admission requirements for the Master of Science degree in HRER.

The number of openings in the integrated B.S./M.S. program will be limited to undergraduates with strong academic records. Applicants to the integrated program:

1. must be enrolled in the LER B.S. program;
2. shall be admitted no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer of AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree, as specified in the proposed IUG plan of study;
3. must have an overall GPA of 3.2 (on a 4.0 scale) in undergraduate course work and a minimum GPA of 3.5 in the major;
4. must obtain letters of recommendation from the chairs of the Department’s undergraduate and graduate committees; and
5. must submit a writing sample, 2 transcripts, 1 letter of recommendation (in addition to those from the chairs of the Department’s undergraduate and graduate committees), and a career statement.

In consultation with an adviser, students must prepare a plan of study appropriate to this integrated program. Students must present their plan of study in person to the head of the graduate program or the appropriate committee overseeing the integrated program prior to being admitted to the program. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser as the student advances through the program.

No GRE or GMAT scores are required for admission to the program.

Degree Requirements

To earn the Master of Science degree in HRER, students in the IUG program must complete all of the degree requirements for the Master of Science, with one exception. The requirement for the 1-credit course HRER 510 is waived for students accepted into the IUG degree program. HRER 510 is intended to familiarize new students with the field and the department, and it is anticipated that IUG students will already have a foundation in the field. Therefore, the total minimum credits required for the M.S. for students accepted into the IUG program is 36.

12 credits may be applied to both undergraduate and graduate degree program requirements. Students can choose which 12 credits will double-count for both the undergraduate and graduate degrees from the following list:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>LER 401</td>
<td>The Law of Labor-Management Relations</td>
<td>3</td>
</tr>
<tr>
<td>LER 458Y</td>
<td>History of Work in America</td>
<td>3</td>
</tr>
<tr>
<td>LER 460</td>
<td>Ethics in the Workplace</td>
<td>3</td>
</tr>
<tr>
<td>HRER 501</td>
<td>Labor and Employment Law</td>
<td>3</td>
</tr>
<tr>
<td>HRER 502</td>
<td>Human Behavior at Work</td>
<td>3</td>
</tr>
<tr>
<td>HRER 504</td>
<td>Seminar in Employment Relations</td>
<td>3</td>
</tr>
<tr>
<td>HRER 505</td>
<td>Seminar in Human Resources</td>
<td>3</td>
</tr>
<tr>
<td>HRER 516</td>
<td>Labor Market Analysis</td>
<td>3</td>
</tr>
</tbody>
</table>

At least 6 of the 12 double-counted credits must be at the 500-level. The graduate thesis or other graduate culminating/capstone experience (including any associated credits and/or deliverables) may not be double counted towards any other degree.

If students accepted into the IUG program are unable to complete the M.S. degree, they are still eligible to receive their undergraduate degree if all the undergraduate degree requirements have been satisfied.

Integrated B.S. in Psychology and M.S. in Human Resources and Employment Relations

Requirements listed here are in addition to requirements listed in GCAC-210 Integrated Undergraduate-Graduate (IUG) Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/integrated-undergraduate-graduate-degree-programs).
The integrated Psychology (PSYBS) B.S. and Human Resources and Employment Relations (HRER) M.S. is a five-year program designed for academically-talented undergraduate Psychology baccalaureate students to obtain both the B.S. degree in Psychology and the M.S. degree in HRER in an intense, accelerated program of study. Students will develop expertise in the human resources and employment relations field beyond that provided by their Psychology B.S. degree. The undergraduate psychology curriculum potentially introduces students to:

1. personnel selection,
2. training and development, and
3. organizational psychology.

The graduate curriculum provides for a more intensive, individualized, and focused examination of the human resources and employment relations field, including:

1. the roles employers, employees, employee organizations, and public policy makers play in the employment relationship,
2. the complex personal and organizational issues inherent in the employment relationship,
3. the laws that form the legal framework for the employee-employer relationship,
4. the tools needed to systematically analyze those complex issues and evaluate research relevant to those analyses, and
5. human resource management policies and practices that contribute to individual and organizational success.

It also provides an opportunity for students to explore a concentrated sub-area of the HRER field in depth. The program culminates with the student either completing a thesis or master’s paper. Upon completion of the integrated degree, students will be well-positioned to acquire positions of greater responsibility in Industrial/Organizational Psychology, Human Resource Management, Employment Relations, and related careers as a result of the advanced knowledge and expertise gained through the program.

**Admission Requirements**

Students apply to the program via the Graduate School application for admission (http://www.gradschool.psu.edu/prospective-students/how-to-apply), and must meet the admission requirements of the Graduate School, as well as the admission requirements for the Master of Science degree in HRER.

Admission decisions for the B.S. Psychology /M.S. Human Resources and Employment Relations program are based on the quality of the applicant’s credentials. The decisions are made after a review of the complete application portfolio. The integrated B.S./M.S. program will be limited to highly-talented undergraduates. Applicants to the integrated program:

- Must be enrolled in the PSYBS program, pursuing the Business Option, with the successful completion of PSYCH 281, and one of the following: PSYCH 482, PSYCH 484 or PSYCH 485
- Shall be admitted no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree, as specified in the proposed IUG plan of study;
- Must have an overall GPA of 3.2 (on a 4.0 scale) in undergraduate course work and a minimum GPA of 3.5 in the major;
- Must submit three letters of recommendation; and
- Must submit a writing sample, a resume, and a 2-3 page essay articulating career and educational goals that demonstrates the applicant’s written communication skills.

In consultation with an adviser, students must prepare a plan of study appropriate to this integrated program. Students must present their plan of study in person to the head of the graduate program or the appropriate committee overseeing the integrated program prior to being admitted to the program. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser as the student advances through the program.

No GRE or GMAT scores are required for admission to the program.

**Degree Requirements**

Students must fulfill all degree requirements for each degree in order to be awarded that degree, subject to the double-counting of credits as outlined below. Degree requirements for the Bachelor of Science in Psychology are listed in the Undergraduate Bulletin (http://bulletins.psu.edu/undergraduate). Degree requirements for the Master of Science in Human Resources and Employment Relations degree are listed on the Degree Requirements tab.

12 credits may be applied to both undergraduate and graduate degree program requirements. Students can choose which 12 credits will double-count for both the undergraduate and graduate degrees from the following list:

**Code** | **Title** | **Credits**
--- | --- | ---
LER 401 | The Law of Labor-Management Relations | 3
LER 460 | Ethics in the Workplace | 3
HRER 500 | Topics in Comparative Industrial Relations | 3-6
HRER 501 | Labor and Employment Law | 3
HRER 502 | Human Behavior at Work | 3
HRER 503 | Seminar in International Human Resources Studies | 3
HRER 504 | Seminar in Employment Relations | 3
HRER 505 | Seminar in Human Resources | 3

At least 6 of the 12 double-counted credits must be at the 500-level. The graduate thesis or other graduate culminating/capstone experience (including any associated credits and/or deliverables) may not be double counted towards any other degree. Students accepted into the program can receive their B.S. in Psychology if they are unable to complete the M.S. in HRER.

**Integrated B.S. in Spanish and M.S. in Human Resources and Employment Relations**

Requirements listed here are in addition to requirements listed in GCAC-210 Integrated Undergraduate-Graduate (IUG) Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/integrated-undergraduate-graduate-degree-programs).

The integrated Spanish B.S. and HRER M.S. is a five-year program designed for highly qualified and motivated students seeking employment within a culturally diverse workplace. Students will develop basic skills in speaking, understanding, reading, and writing Spanish. Students will gain familiarity with Hispanic cultures through literature and
the University's international education program, if they choose to have that experience. Students also will learn about:

1. the roles that employers, employees, employee organizations, and public policy makers play in the employment relationship,
2. the complex personal and organizational issues inherent in the employment relationship, and
3. how to systematically analyze those complex issues and evaluate research relevant to those analyses.

**Admission Requirements**

Students apply to the program via the Graduate School application for admission (http://www.gradschool.psu.edu/prospective-students/how-to-apply), and must meet the admission requirements of the Graduate School, as well as the admission requirements for the Master of Science degree in HRER.

The number of openings in the integrated B.S./M.S. program will be limited to undergraduates with strong academic records. Applicants to the integrated program:

- must be enrolled in the Spanish B.S. program
- shall be admitted no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree, as specified in the proposed IUG plan of study;
- must have an overall GPA of 3.2 (on a 4.0 scale) in undergraduate course work and a minimum GPA of 3.5 in the major;
- must obtain letters of recommendation from the chairs of the Spanish undergraduate committee and the HRER graduate committee; and
- must submit a writing sample, 2 transcripts, 1 letter of recommendation (in addition to those from the chairs of the Department's undergraduate and graduate committees), and a career statement.

In consultation with an adviser, students must prepare a plan of study appropriate to this integrated program. Students must present their plan of study in person to the head of the graduate program or the appropriate faculty; and

No GRE or GMAT scores are required for admission to the program.

**Degree Requirements**

To earn the Master of Science degree in HRER, students in the IUG program must complete all of the degree requirements for the Master of Science.

12 credits may be applied to both undergraduate and graduate degree program requirements. Students can choose which 12 credits will double-count for both the undergraduate and graduate degrees from the following list:

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<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>LER 400</td>
<td>Comparative Employment Relations Systems</td>
<td>3</td>
</tr>
<tr>
<td>LER 458Y</td>
<td>History of Work in America</td>
<td>3</td>
</tr>
</tbody>
</table>

At least 6 of the 12 double-counted credits must be at the 500-level. The graduate thesis or other graduate culminating/capstone experience (including any associated credits and/or deliverables) may not be double counted towards any other degree.

If students accepted into the IUG program are unable to complete the M.S. degree, they are still eligible to receive their undergraduate degree if all the undergraduate degree requirements have been satisfied.

**Joint Degrees**

**Joint J.D. / M.S. with Penn State Law**

Requirements listed here are in addition to requirements listed in GCAC-211 Joint Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/joint-degree-programs).

Penn State Law and the Human Resources and Employment Relations graduate program (HRER) offer a joint degree program leading to a Juris Doctor (J.D.) and a Master of Science (M.S.) in Human Resources and Employment Relations.

**Admission Requirements**

The number of openings in the joint degree J.D./M.S. program will be limited to students with an outstanding academic record who have successfully completed the first-year curriculum (https://pennstatelaw.psu.edu/academics/jd-program) at Penn State Law. Admissions requirements and applications for admission to Penn State Law are available at the J.D. Admissions (https://pennstatelaw.psu.edu/penn-state-law-jd-admissions) section of the Penn State Law website.

Students apply to the joint degree program via the Graduate School application for admission (http://www.gradschool.psu.edu/prospective-students/how-to-apply), and must meet the admission requirements of the Graduate School, as well as the admission requirements for the Master of Science degree in HRER.

Applicants to the joint degree program:

- must have been admitted to Penn State Law;
- must have successfully completed the first-year curriculum at Penn State Law with a minimum grade point average of 3.0;
- must complete a plan of study, to be determined in consultation with the student’s Law School Adviser and the Director of the HRER Graduate Program;
- must submit two letters of recommendations from Penn State Law faculty;
- must submit two transcripts from Penn State Law; and
- must submit a career statement outlining the student's objectives and reasons for applying to the program.

Please note that applicants to the J.D./M.S. HRER program are not required to submit GRE or GMAT scores.

**Degree Requirements**

Students must fulfill all requirements for each degree in order to be awarded that degree, subject to the double-counting of credits as outlined below. Degree requirements for the J.D. program are listed on the Penn State Law website (https://pennstatelaw.psu.edu/academics/
jd-program). Degree requirements for the M.S. degree in HRER are listed on the Degree Requirements tab.

If students accepted into the joint degree program are unable to complete the J.D. degree, they are still eligible to receive the M.S. degree if all the M.S. degree requirements have been satisfied.

Double-Counting of Credits
Penn State Law. Twelve (12) credits of relevant course work for the HRER graduate program can be double-counted towards the requirements for the J.D. degree. The only two HRER courses that will not be credited toward the J.D. degree are HRER 501 and HRER 510.

HRER: Twelve (12) credits of relevant course work from Penn State Law can be double-counted toward the 37 credits required for the M.S. degree. The twelve credits can be chosen from the law school courses below:

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<tr>
<th>Code</th>
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<tr>
<td>LABOR 962</td>
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<td>LABOR 964</td>
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<td>LABOR 966</td>
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<tr>
<td>LABOR 970</td>
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Advising
All students in the program will have two advisers, one from Penn State Law and one from the School of Labor and Employment Relations. Periodic interaction between the two advisers is encouraged. A program of study will be developed for each student, taking into account the fact that some courses at both locations are offered on a rotating or intermittent basis.

Student Aid
Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School's website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

World Campus students in graduate degree programs may be eligible for financial aid. Refer to the Tuition and Financial Aid section (http://www.worldcampus.psu.edu/tuition-and-financial-aid) of the World Campus website for more information.

Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Learning Outcomes
Master of Professional Studies (M.P.S.)
1. Graduates will have and be able to demonstrate the necessary advanced knowledge and competence in the fields of human resources and employment relations to excel in their careers.
2. Graduates will be able to recognize and analyze practical, legal, and ethical challenges related to HRER issues in domestic and global workplaces.
3. Graduates will be able to effectively apply relevant theories and practices when solving problems in domestic and global workplaces.
4. Graduates will be able to interact effectively with other organizational leaders in helping to develop and implement organizational strategies in domestic and global workplaces.
5. Graduates will be able to effectively communicate knowledge of current topics in the fields both verbally and in writing to excel as HRER professionals.
6. Graduates will be able to conduct independent inquiries to identify current scholarship and best practices when solving problems related to HRER subject areas.

Master of Science (M.S.)
1. **KNOW:** Students will have and be able to demonstrate the necessary advanced knowledge and competence in the fields to excel in ER and HRM careers.
2. **COMMUNICATE:** Students will be able to effectively communicate knowledge of current topics in the fields both verbally and in writing to excel as ER and HRM professionals.
3. **THINK:** Students will be able to recognize and analyze practical, legal, and ethical challenges related to ER and HRM issues in domestic and global workplaces.
4. **PROFESSIONAL PRACTICE:** Students will be able to respond appropriately to practical, legal, and ethical challenges in domestic and global workplaces using both theoretical and practical approaches of the field.
5. **APPLY/CREATE:** Students will be able to interact effectively with other organizational leaders in helping to develop and implement organizational policies and strategies.

Contact
Graduate Program Head: Paul Clark

University Park Campus
Director of Graduate Studies/Professor-in-Charge: Elaine Farndale

Primary Program Contact: Erin Hetzel
Email: eab27@psu.edu
Mailing Address: 506 Keller Building, University Park, PA 16802
Telephone: (814) 867-4167

Program Website: Human Resources and Employment Relations at University Park (http://ler.la.psu.edu/graduates/masters-of-science)

World Campus
Director of Graduate Studies/Professor-in-Charge: Elaine Farndale

Primary Program Contact: Antone Aboud
Email: eab27@psu.edu
Mailing Address: 506 Keller Building, University Park, PA 16802
Telephone: (814) 867-4167
Program Website: Human Resources and Employment Relations at World Campus (http://www.worldcampus.psu.edu/degrees-and-certificates/human-resources-and-employment-relations-masters/overview)

Humanities

Graduate Program Head: Troy Thomas
Program Code: HUM
Campus(es): Harrisburg (M.A.)
Degrees Conferred: Master of Arts (M.A.)
The Graduate Faculty:

This program is interdisciplinary, emphasizing critical theories and interpretive approaches that transcend disciplinary boundaries as well as providing advanced study within various humanities disciplines. These include art history, communications, history, literature, music history, philosophy, and writing. The program offers small classes, individualized advising, and assistance in developing advanced analytical, synthetic, and interpretive skills. It accommodates both part- and full-time students.

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

In addition, applicants must have earned at least a 3.00 grade-point average in their junior and senior years and have studied in two humanities disciplines (usually a major in one area and some course work in another). Exceptions may be made for those with special backgrounds or abilities who are committed to advanced interdisciplinary study. All applicants must submit the following items:

- a completed Graduate School application (http://gradschool.psu.edu/prospective-students/how-to-apply) and nonrefundable fee;
- official transcripts from all post-secondary institutions attended (http://www.gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission);
- a letter explaining personal or career goals and reasons for wishing to enroll in the program;
- two letters of reference (preferably from previous professors or others familiar with the applicant's intellectual/creative work or interests);
- and a writing sample (an academic paper; if this is not available, consult the graduate coordinator for an alternative).

Students applying for fellowships or assistantships must submit scores from the Graduate Record Examinations (GRE) or similar examination by January 15. An admissions committee often interviews applicants in person or by telephone. Applications are reviewed on a rolling basis.

Degree Requirements

Master of Arts (M.A.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

All students must complete 30 credits, 18 of which must be at the 500 level, achieve a 3.00 grade-point average, and successfully complete an interdisciplinary master’s production (academic thesis or creative production with academic essay). Students work with their faculty advisers and supervisory committees to select courses in accordance with their individual interests.

Courses required of all students include HUM 500, a foundation course in research methods; HUM 560, a course in interdisciplinary theory and research; and HUM 580, the master’s production. Recommended courses include HUM 525 and HUM 535, both multidisciplinary courses, covering the content of various disciplines form the perspective of one discipline. To acquire breadth in the humanities, students must take at least one course in each of two disciplines; single-discipline courses are available as HUM 515 (repeatable for credit). Other courses in particular disciplines are available at the 400 level. Other available 500-level courses are listed in this section. Students planning to teach in a junior or community college may arrange a teaching internship (HUM 550), subject to appropriate preparation and approval by both the program and the community college.

A full-time student can expect to complete the program in four semesters, a part-time student in six or more semesters. Students are expected to complete all requirements for the degree within six years, although the deadline may be extended at the discretion of the graduate coordinator in accordance with policies approved by Graduate Council.

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<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>HUM 500</td>
<td>Research Methods and Scholarly Inquiry in the Humanities</td>
<td>3</td>
</tr>
<tr>
<td>HUM 560</td>
<td>Interrelations in the Humanities</td>
<td>3</td>
</tr>
<tr>
<td>HUM 580</td>
<td>Master’s Production</td>
<td>1-6</td>
</tr>
</tbody>
</table>

Recommended Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HUM 525</td>
<td>Studies in Aesthetics</td>
<td>3</td>
</tr>
<tr>
<td>HUM 535</td>
<td>Topics in Cultural and Intellectual History (3 per semester, maximum of 9)</td>
<td>3-9</td>
</tr>
</tbody>
</table>

Other Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 502</td>
<td>Theory and Teaching of Composition</td>
<td>3</td>
</tr>
<tr>
<td>HUM 515</td>
<td>Seminar (3 per semester, maximum of 9)</td>
<td>3-9</td>
</tr>
</tbody>
</table>

Unit A. Art History

Unit B. History

Unit C. Literature

Unit D. Music and Analysis

Unit E. Philosophy

Unit F. Communications

Unit G. Writing

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HUM 530</td>
<td>Seminar in Comparative Arts (3 per semester, maximum of 9)</td>
<td>3-9</td>
</tr>
<tr>
<td>HUM 550</td>
<td>Junior College Teaching Internship</td>
<td>3</td>
</tr>
<tr>
<td>HUM 590</td>
<td>Colloquium</td>
<td>1-3</td>
</tr>
</tbody>
</table>
Student Aid
Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School's website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact
Graduate Program Head: Troy Thomas
Primary Program Contact: Cynthia Leach
Email: ckl4@psu.edu
Mailing Address: W-356, 777 W. Harrisburg Pike, Middletown, PA 170574898
Telephone: (717) 948-6189
Program Website: Humanities (https://harrisburg.psu.edu/humanities/arts-humanities/master-arts-humanities)

Industrial Engineering
Graduate Program Head: Janis P. Terpenny
Program Code: IE
Campus(es): University Park (Ph.D., M.S.)
Degrees Conferred: Master of Science (M.S.) Dual-Title Ph.D. in M.S. in Industrial Engineering and Operations Research
The Graduate Faculty: View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=IE)

Graduate study and research are conducted in manufacturing process, information engineering operations research-management science, production engineering, process design, systems engineering, human factors, ergonomics, quality engineering, and robotics.

Admission Requirements
Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Scores from the Graduate Record Examination (GRE) are required for admission. To be admitted into the program, an applicant must have received a baccalaureate degree from a regionally accredited institution. Graduates in engineering, physical sciences, and mathematics who present a 3.00 grade-point average will be considered for admission.

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. See GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

Degree Requirements
Master of Science (M.S.)
Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

The M.S. degree program is intended for students to gain advanced knowledge for research, analysis, and design in industrial engineering. The M.S. degree is offered with thesis or research paper tracks, both requiring 32 credits. For both tracks, a core curriculum is required that is composed of IE 505 and IE 511, which all the students must satisfy.

The M.S. degree with thesis track requires 24 credits of course work and two credits of IE 590. Out of the 24 credits of coursework, at least 15 must be IE courses, and at least 12 must be at the 500 level. Of the 12 credits at the 500 level, at least nine must be IE courses. A thesis is required, for which six credits of IE 600 or IE 610 must be taken. The thesis must demonstrate comprehensive and in-depth knowledge of a topic in industrial engineering, and it should be suitable for submission for publication in a refereed journal as approved by the committee.

The M.S. degree with non-thesis track requires 27 credits of course work, two credits of IE 590. Out of the 27 credits of coursework, at least 18 must be IE courses, and at least 18 must be at the 500 level. Of the 18 credits at the 500 level, at least fifteen must be IE courses. A scholarly paper is required for the MS degree with non-thesis track for which three credits of IE 596 must be taken. The paper should demonstrate the ability of the student to integrate and apply concepts and techniques learnt in the courses to solve an engineering problem.

The students seeking the Master of Science degree in Industrial Engineering with non-thesis track are expected to start their degree in the Fall semester of every year and complete their degree including all the required course work and three credits of research resulting in a paper and graduate by the end of summer following the second semester. Students who cannot complete their research paper by this summer can graduate after the summer. The plan of study is as follows:

- Fall semester: Twelve credits of course work, one credit of colloquium and one credit of research (IE 596).
- Spring semester: Twelve credits of coursework, one credit of colloquium and one credit of research (IE 596).
- Summer semester: Three credits of coursework and one credit of research (IE 596).

Continuous registration is required for all graduate students until the thesis or paper is approved.
For the M.S. degree, options are available in Human Factors/Ergonomics Engineering, Manufacturing Engineering and Quality Engineering.

**Human Factors/Ergonomics Engineering Option**
To receive the M.S degree in Industrial Engineering with thesis track and with an Option in Human Factors/Ergonomics Engineering, a student must complete at least 32 credits beyond the bachelor’s degree: 24 credits of course work, 2 credit of colloquium, and 6 credits of research leading to a thesis, as required for the M.S. degree in Industrial Engineering with thesis track.

To receive the M.S degree in Industrial Engineering with non-thesis track and with an Option in Human Factors/Ergonomics Engineering, a student must complete at least 32 credits beyond the bachelor’s degree: 27 credits of course work, 2 credit of colloquium, and 3 credits of research leading to a scholarly paper, as required for the M.S. degree in Industrial Engineering with non-thesis track.

The course credits for the Option in Human Factors/Ergonomics Engineering must include the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IE 549</td>
<td>Design Decision Making</td>
<td>3</td>
</tr>
<tr>
<td>IE 553</td>
<td>Engineering of Human Work</td>
<td>3</td>
</tr>
<tr>
<td>IE 558</td>
<td>Engineering of Cognitive Work</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td><strong>Total Credits</strong></td>
<td><strong>9</strong></td>
</tr>
</tbody>
</table>

**Manufacturing Engineering Option**
To receive the M.S degree in Industrial Engineering with thesis track and with an Option in Human Factors/Ergonomics Engineering, a student must complete at least 32 credits beyond the bachelor’s degree: 24 credits of course work, 2 credit of colloquium, and 6 credits of research leading to a thesis, as required for the M.S. degree in Industrial Engineering with thesis track.

To receive the M.S degree in Industrial Engineering with non-thesis track and with an Option in Human Factors/Ergonomics Engineering, a student must complete at least 32 credits beyond the bachelor’s degree: 27 credits of course work, 2 credit of colloquium, and 3 credits of research leading to a scholarly paper, as required for the M.S. degree in Industrial Engineering with non-thesis track.

The course credits for the Option in Manufacturing Engineering must include the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IE 528</td>
<td>Metal Cutting Theory</td>
<td>3</td>
</tr>
<tr>
<td>IE 550</td>
<td>Manufacturing Systems</td>
<td>3</td>
</tr>
<tr>
<td>IE 563</td>
<td>Computer-Aided Design for Manufacturing</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td><strong>Total Credits</strong></td>
<td><strong>9</strong></td>
</tr>
</tbody>
</table>

**Quality Engineering Option**
To receive the M.S degree in Industrial Engineering with thesis track and with an Option in Human Factors/Ergonomics Engineering, a student must complete at least 32 credits beyond the bachelor’s degree: 24 credits of course work, 2 credit of colloquium, and 6 credits of research leading to a thesis, as required for the M.S. degree in Industrial Engineering with thesis track.

To receive the M.S degree in Industrial Engineering with non-thesis track and with an Option in Human Factors/Ergonomics Engineering, a student must complete at least 32 credits beyond the bachelor’s degree: 27 credits of course work, 2 credit of colloquium, and 3 credits of research leading to a scholarly paper, as required for the M.S. degree in Industrial Engineering with non-thesis track.

The course credits for the Option in Quality Engineering must include the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IE 555</td>
<td>Statistical Process Monitoring and Analysis</td>
<td>3</td>
</tr>
<tr>
<td>IE 566</td>
<td>Quality Control</td>
<td>3</td>
</tr>
<tr>
<td>IE 583</td>
<td>Response Surface Methodology and Process Optimization</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td><strong>Total Credits</strong></td>
<td><strong>9</strong></td>
</tr>
</tbody>
</table>

**Doctor of Philosophy (Ph.D.)**
Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

The Ph.D. program emphasizes scholarly research, and prepares students for research and development careers in industry, government, and academia. Students must pass a written qualifying examination. The Ph.D. is awarded upon completion of a program of advanced study that includes a minimum period of residence, passing the English proficiency and comprehensive examinations, completing a satisfactory dissertation, and passing the final oral examination. The degree requirements consist of 45 credits of course work and four IE 590 credits. Of the 45 credits of required course work, 36 must be prefixed IE, and at least 30 must be at the 500 level. Nine credits must be from outside the Department and must include a six-credit sequence, with at least three credits at the 500 level.

Continuous registration is required for all graduate students until the dissertation is approved.

**Dual-Titles**

**Dual-Title M.S. and Ph.D. in Industrial Engineering and Operations Research**
Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

**Admission Requirements**
Students must apply and be admitted to the graduate program in Industrial Engineering and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Operations Research dual-title program. Refer to the Admission Requirements section of the Operations Research Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/operations-research). Doctoral students must be admitted into the dual-title degree program in Operations Research prior to taking the qualifying examination in their primary graduate program.

**Degree Requirements**
To qualify for the dual-title degree, students must satisfy the degree requirements for the degree they are enrolled in Industrial Engineering. In addition, students must complete the degree requirements for the dual-title in Operations Research, listed on the Operations Research Bulletin
page (http://bulletins.psu.edu/graduate/programs/majors/operations-research).

The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Industrial Engineering and must include at least one Graduate Faculty member from the Operations Research program. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. There will be a single qualifying examination, containing elements of both Industrial Engineering and Operations Research. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of an Industrial Engineering and Operations Research dual-title Ph.D. student must include at least one member of the Operations Research Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in Operations Research, the member of the committee representing Operations Research must be appointed as co-chair. The Operations Research representative on the student’s dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their dissertation committee and reflects their original research and education in Industrial Engineering and Operations Research. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

In addition to the fellowships, traineeships, graduate assistantships, and other forms of financial aid described in the Student Aid (http://bulletins.psu.edu/graduate/generalinformation/tuition2) section of the Graduate Bulletin, the following awards typically has been available to graduate students in this program:

Harold & Inge Marcus Graduate Fellowships
Consideration for these fellowships shall be given to all students exhibiting academic excellence who have been admitted to Penn State as candidates for a graduate degree in the Department of Industrial and Manufacturing Engineering, College of Engineering.

Benjamin W. Niebel Manufacturing Fellowship
Consideration for this fellowship shall be given to all students exhibiting academic excellence who have been admitted to Penn State as candidates for a graduate degree in the Department of Industrial and Manufacturing Engineering, College of Engineering.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact

Graduate Program Head: Janis Terpenny
Director of Graduate Studies/Professor-in-Charge: Robert Voigt
Primary Program Contact: Lisa Fuoss
Email: lk1@psu.edu
Mailing Address: 344 Leonard Building, University Park, PA 16802
Telephone: (814) 863-1269
Program Website: Industrial Engineering (http://www.ime.psu.edu)

Informatics

Graduate Program Head: Mary Beth Rosson
Program Code: INMAC
Campus(es): University Park (Ph.D.)
Degrees Conferred:
  Doctor of Philosophy (Ph.D.)
The Graduate Faculty: View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fae&prog=INMAC)

The graduate program in Informatics offers advanced graduate education for students contemplating careers in academic teaching and research, or research in a non-academic setting. The program is interdisciplinary in nature and expects scholarship at the highest level exhibiting depth of competency in at least one of the core areas of informatics, and an understanding of the integration of the critical constructs that drive the field: people, information, and technology.

Admission Requirements

Applications for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Applications to the program are required to submit scores from the general portions of the Graduate Record Examinations (GRE), three letters of reference, a current resume (including present position and any publications), a 1 to 3 page statement of research background and goals related to pursuing an advanced degree and career in informatics, which also briefly discusses personal motivation for obtaining a Ph.D., and a sample of the applicant’s writing (e.g., technical paper, etc.).
Because the program is multidisciplinary in nature, students from many different disciplines may be accepted for entry into the program. A bachelor's degree in a related area (e.g., engineering and science), while not necessary for admission, is helpful in the successful completion of the degree. It is expected that students will have a basic level of competency in statistics, as well as computer and information technology. Related work experience can be used to demonstrate such competency. A student may be accepted into the program with provisional status (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/provisional-admission) for no more than one year while work is completed to meet these expectations.

It is expected that the successful applicant will have an overall grade point average of 3.00 (on a 4.00 scale) or higher for his or her undergraduate study and/or graduate-level study. However, accomplishments demonstrated through work experience and recommendation letters from the applicant's academic adviser or employer will also play an important role in making the admission decision. The most qualified applicants will be accepted into the program until all spaces for new students are filled.

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. See GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

**Degree Requirements**

**Doctor of Philosophy (Ph.D.)**

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

The doctoral degree in Informatics requires a minimum of 32 credits, including 8 required core credits.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IST 501</td>
<td>Interdisciplinary Research Design for Information Sciences and Technology</td>
<td>3</td>
</tr>
</tbody>
</table>

Select one of the following foundation courses:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IST 510</td>
<td>Foundations in Computational Informatics</td>
<td>3</td>
</tr>
<tr>
<td>IST 520</td>
<td>Foundations in Human-Centered Design</td>
<td></td>
</tr>
<tr>
<td>IST 530</td>
<td>Foundations in Social Informatics</td>
<td></td>
</tr>
<tr>
<td>IST 590</td>
<td>Colloquium</td>
<td>2</td>
</tr>
</tbody>
</table>

**Research Methodology Courses**

12

**Specialization Courses**

12

Total Credits 32

To complete a Ph.D. degree, students must in their first semester take the 3-credit introduction to interdisciplinary research methods (IST 501) and one credit of graduate colloquium (IST 590). In their second semester, students must take a second credit of graduate colloquium. During their first two semesters, students must take at least one of the three foundations courses (IST 510, IST 520, or IST 530).

In addition to these first-year requirements, doctoral students must complete 12 credits of research methodology courses selected to introduce or increase proficiency in methods relevant to their doctoral research agenda, and 12 credits of specialization courses, also selected to reinforce their research training.

In addition, all students must be competent in the English language and must have demonstrated skills in the communication of ideas both verbally and in writing commensurate with the requirement of scholarly and professional work. The qualifying examination will be used as an occasion to assess English proficiency and plan for remediation (including additional courses, mentoring, or experiences) for all students. A brief critical literature review in three complementary research areas will be included as part of the qualifying examination. Students must have completed 18 graduate credits before taking the qualifying exam and must pass the qualifying exam within three semesters. Students must pass the Ph.D. comprehensive examination after completion of most of the course work, usually at the end of the student's second year in the program. A research-based dissertation must be completed under the direction of the dissertation committee, with the student submitting a dissertation proposal and defending that proposal in the defense examination. To earn the Ph.D. degree, doctoral students must write a dissertation that is accepted by the dissertation committee, the head of the graduate program, and the Graduate School, and the student must pass a final oral examination (the dissertation defense).

**Student Aid**

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School's website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**Learning Outcomes**

1. **KNOW:** Demonstrate appropriate breadth and depth of interdisciplinary knowledge, and comprehension of the major issues in information sciences and technology (IST).
2. **APPLY/CREATE:** Use interdisciplinary knowledge and methods of IST to plan and conduct a research thesis.
3. **COMMUNICATE:** Communicate the major issues of IST effectively, including publications in high quality journals and presentations at high value conferences.
4. **THINK:** Demonstrate analytical and critical thinking within IST, including across disciplines.
5. **PROFESSIONAL PRACTICE:** Know and conduct themselves in accordance with the highest ethical standards, values, and, where these are defined, the best practices of IST (as expressed in SARI training modules).

**Contact**

Graduate Program Head: Mary Beth Rosson

Primary Program Contact: Bettyjo Houser
The graduate program in Information Science is designed to enable students to contribute to the development, implementation, and utilization of information technologies by providing a balance of theory and practice. Students gain insight in the role and management of emerging information technologies to gain competitive advantage.

Admission Requirements

Applicants apply for admission to the program via the Graduate School application (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Students who have a baccalaureate degree in information systems, information science or other quantitative, scientific, or business discipline and those with experience in information technology will be considered and practice. Students gain insight in the role and management of emerging information technologies to gain competitive advantage.

Degree Requirements

Master of Science (M.S.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

The requirement for the degree is 33 credits, consisting of 18 credits of required core courses, 12 credits approved electives, selected with the assistance of a graduate adviser, followed by an integrative course, which includes a master’s paper:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>INSC 431</td>
<td>Information Systems Architecture</td>
<td>3</td>
</tr>
<tr>
<td>INSC 521</td>
<td>Database Design Concepts</td>
<td>3</td>
</tr>
<tr>
<td>INSC 525</td>
<td>Applied Data Mining</td>
<td>3</td>
</tr>
<tr>
<td>INSC 526</td>
<td>Business Process Management and Integration</td>
<td>3</td>
</tr>
<tr>
<td>INFSY 860</td>
<td>Data Communications Systems and Networks</td>
<td>3</td>
</tr>
<tr>
<td>INFSY 863</td>
<td>Network Security</td>
<td>3</td>
</tr>
</tbody>
</table>

Electives

12 credits of approved electives

Culminating Experience

12 credits of approved electives

Total Credits

33

A grade-point average of at least 3.0 must be achieved, with at least 18 credits at the 500 level. Students lacking adequate preparation may be required to take one or both of the pre-program requirement courses (IST 441 and SWENG 400). Pre-program requirements do not count toward the 33-credit program total.

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Learning Outcomes

1. KNOW: Graduates will be able to understand the information needs of organizations and identify optimal IT solutions.
2. APPLY: Graduates will be able to apply known and emerging information systems theories and principles to improve and enhance deployed IT solutions.
3. APPLY: Graduates will design and maintain practically viable solutions to support information retrieval, data analysis, and decision-making.
4. COMMUNICATE: Graduates will be able to effectively communicate their technical perspective solutions to diverse audience.
5. THINK: Graduates will able to identify the security concerns of and determine effective protection solutions to organizational information assets.
6. PROFESSIONAL PRACTICE: Graduates will demonstrate knowledge of and ability to practice the professional standards of IT professional behavior.
Contact
Graduate Program Head: Colin Neill
Director of Graduate Studies/Professor-in-Charge: Raghu Sangwan
Primary Program Contact: Sharon Patterson
Email: svp40@psu.edu
Mailing Address: Penn State Great Valley, 30 East Swedesford Road, Malvern, PA 19355
Telephone: (610) 648-3250
Program Website: Information Science (http://greatvalley.psu.edu/academics/masters-degrees/information-science)

Information Sciences
Graduate Program Head: Mary Beth Rosson
Program Code: INSCI
Campus(es): University Park (M.P.S.)
World Campus (M.P.S.)
Degrees Conferring: Master of Professional Studies (M.P.S.)
The Graduate Faculty: View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=INSCI)

The Master of Professional Studies in Information Sciences (MPS-INSCI) is an innovative program that targets professionals and organizational leaders who seek a professional education and training program. The purpose of the professional master’s program is to produce professionals and organizational leaders who not only can select and draw upon the necessary foundations within the information sciences and information technology areas, test the applicability of these foundations for addressing a given issue, and apply the resulting solutions, but also can be aware of the multitude of technological trends and environmental factors that organizations must address in the changing global economy.

The MPS-INSCI equips students to:

1. Understand and analyze the profound information and technological changes sweeping the world;
2. Meet challenges by developing innovative solutions using the foundations of information sciences and technology; and
3. Have a clear advantage in today’s highly competitive and dynamic environment by continuously learning new trends, issues, and innovations.

Admission Requirements
Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Applicants to the program are required to submit scores from the general portions of the Graduate Record Examinations (GRE) or the Graduate Management Admissions Test (GMAT), three letters of reference, and a one-three page personal statement of relevant experience and goals. The GRE or GMAT requirement may be waived for applicants to the Master of Professional Studies Program at the discretion of the program if the student has five or more years of relevant information sciences and technology working experience.

Because the program is multidisciplinary in nature, students from many different disciplines may be accepted for entry into the program. A bachelor’s degree in a related area (e.g., engineering and science), while not necessary for admission, is helpful in the successful completion of the degree. It is expected that students will have a basic level of competency in statistics, as well as computer and information technology. Related work experience can be used to demonstrate such competency. A student may be accepted into the program with provisional status (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/provisional-admission) for no more than one year while work is completed to meet these expectations.

It is expected that the successful applicant will have an overall grade point average of 3.00 (on a 4.00 scale) or higher for his or her undergraduate study and/or graduate-level study. However, accomplishments demonstrated through work experience and recommendation letters from the applicant’s academic adviser or employer will also play an important role in making the admission decision. The most qualified applicants will be accepted into the program until all spaces for new students are filled.

Degree Requirements
Master of Professional Studies (M.P.S.)
Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

The MPS-INSCI program requires a minimum of 33 credits, 24 of which must be earned at Penn State. A maximum of 9 transfer credits of high-quality graduate work may be applied toward the requirements for the degree, subject to restrictions outlined in the Transfer Courses (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/transfer-credit) section of the Graduate Bulletin. At least 18 credits must be courses at the 500 or 800 level, with at least 6 credits at the 500 level. A student can choose to be in the Base Program or in the Cybersecurity and Information Assurance (CIA) Option.

The 33 credits are distributed among the following requirements. A student first takes 9-credits of core courses. The student then takes 12 credits of prescribed courses for either the base program or the Cybersecurity and Information Assurance Option. An additional 9 credits are elective courses. Lastly, the student must complete a master’s project guided by the student’s adviser and completed while enrolled in IST 594.

Core Courses
The core of the MPS-IS consists of three courses – IST 852, IST 554, and IST 816. These courses represent the core technical foundations to study Information Sciences and Technology.

The Base Program
The base program consists of four required courses - IST 815, IST 521, IST 532, and IST 564 - and 9 credits of elective courses, in addition to the 9-credit core and 3-credit capstone course. It is designed for students who do not have a special interest in mind. The elective courses are chosen in consultation with the student’s adviser. Hence, it offers the flexibility that enables the student to build an in-depth knowledge and skills about information sciences tailored to his/her interests.
and background. Students from the Harrisburg region can also select courses from Penn State Harrisburg to fulfill the prescribed courses (by substitution) and 9 credits of electives.

Master’s Project
The project requires all students in the MPS-IS to focus on a well-defined issue or problem relevant to the information sciences and technology. The student will submit a project proposal to his/her faculty adviser for approval. Upon completion of the project, the student will share or present the project results at a final presentation as a component of IST 594.

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<tr>
<td>IST 816</td>
<td>Web Fundamentals</td>
<td>3</td>
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<tr>
<td>IST 815</td>
<td>Foundations of Information Security and Assurance</td>
<td>3</td>
</tr>
<tr>
<td>IST 521</td>
<td>Human-Computer Interaction: The User and Technology</td>
<td>3</td>
</tr>
<tr>
<td>IST 532</td>
<td>Organizational Informatics</td>
<td>3</td>
</tr>
<tr>
<td>IST 564</td>
<td>Crisis, Disaster and Risk Management</td>
<td>3</td>
</tr>
</tbody>
</table>

Electives
Select 9 credits of elective courses chosen in consultation with the adviser.

Culminating Experience
IST 594 Research Topics (Master’s Project) 3

Total Credits 33

Cybersecurity and Information Assurance (CIA) Option
The CIA option consists of four prescribed courses, IST 815, IST 555, IST 456, and IST 885, and 9 credits of elective courses selected from a list of approved electives available from the program office, in addition to the 9-credit core and 3-credit master’s project courses. These courses enable the student to focus on developing knowledge and skills for information analysis, information assurance, and decision support including theories, techniques, and applications of data mining, data fusion, information search, information security, and intelligent resource allocation.

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<td>IST 555</td>
<td>Intelligent Agents and Distributed Decision Making</td>
<td>3</td>
</tr>
<tr>
<td>IST 456</td>
<td>Information Security Management</td>
<td>3</td>
</tr>
<tr>
<td>IST 885</td>
<td>Introduction to Multisensor Data Fusion</td>
<td>3</td>
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</table>

Electives
Select 9 credits of electives from a list of approved electives available from the program office.

Culminating Experience
IST 594 Research Topics (Master’s Project) 3

Total Credits 33

Student Aid
Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

World Campus students in graduate degree programs may be eligible for financial aid. Refer to the Tuition and Financial Aid section (http://www.worldcampus.psu.edu/tuition-and-financial-aid) of the World Campus website for more information.

Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Learning Outcomes
1. [KNOW] Recognize, understand, identify and assess potential threats, vulnerabilities, and consequences in a context from local to global environments.
2. [APPLY/CREATE] Integrate the use of disciplinary methods, techniques, and knowledge to solve practical, real-world problems.
3. [COMMUNICATE] Present scientific evidence and best practice to inform and improve practical, real-world decisions.
4. [THINK] Search, evaluate, and synthesize literature to integrate cyber security principles into disciplines and professional fields.
5. [PROFESSIONAL PRACTICE] Make use of ethical standards and principles of integrity as a foundation in decision-making.

Contact
Graduate Program Head: Mary Beth Rosson
Director of Graduate Studies/Professor-in-Charge: David Fusco
Primary Program Contact: Sherry Hartman

Email: slr8@psu.edu

Mailing Address: Education Strategy and Planning Office, College of IST/E143 Westgate Building, University Park, PA 16802

Telephone: (814) 863-9461

Program Website: Information Sciences (http://www.worldcampus.psu.edu/degrees-and-certificates/information-sciences-masters/overview)
Information Sciences and Technology

Graduate Program Head
Mary Beth Rosson

Campus(es)
University Park (M.S.)

Degrees Conferred
Master of Science (M.S.)
Integrated B.S. in Information Sciences and Technology
M.S. in Information Sciences and Technology
Integrated B.S. in Security and Risk Analysis and M.S. in Information Sciences and Technology

The Graduate Faculty
View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=IST)

The Master of Science in Information Sciences and Technology is an interdisciplinary degree program that focuses on the theoretical, application-oriented, and educational issues facing a digital, global economy. The program is designed to build an understanding of how information and technology fundamentally impact (and are impacted by) people, organizations, and the world community. Topical areas within IST span a broad range including: human computer interaction, computational techniques, applications (e.g., bio-informatics and geographical information systems), societal issues (such as digital divide issues), user issues (e.g., computer-aided cognition), and information systems design and development providing exposure and grounding in many of the aspects of the information sciences. The program is especially attractive to students interested in gaining state-of-the-art understanding of information technology and its use as a solution in multiple venues.

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Applicants to the M.S. program are required to submit scores from the general portions of the Graduate Record Examinations (GRE), three letters of reference, a current resume (including present position and any publications), 1 to 3 page statement of goals related to pursuing an advanced degree and career in IST and provide a sample of the applicant’s writing (e.g. technical paper, etc.).

Because the program is multidisciplinary in nature, students from many different disciplines may be accepted for entry into the program. A bachelor’s degree in a related area (e.g., engineering and science), while not necessary for admission, is helpful in the successful completion of the degree. It is expected that students will have a basic level of competency in statistics, as well as computer and information technology. Related work experience can be used to demonstrate such competency. A student may be accepted into the program with provisional status (http://bulletins.psu.edu/graduate-education-policies/gcac/gcac-300/provisional-admission/bulletins/whitebook/general_information.cfm?section=admission4) for no more than one year while work is completed to meet these expectations.

It is expected that the successful applicant will have an overall grade point average of 3.00 (on a 4.00 scale) or higher for his or her undergraduate study and/or graduate-level study. However, accomplishments demonstrated through work experience and recommendation letters from the applicant’s academic adviser or employer will also play an important role in the admission decision. The most qualified applicants will be accepted into the program until all spaces for new students are filled.

Degree Requirements

Master of Science (M.S.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

The M.S. in Information Sciences and Technology requires a minimum of 30 credits at the 400, 500, 600, or 800 level, with at least 18 credits at the 500 or 600 series combined; 27 of the 30 credits must be earned at Penn State. These 30 credits are distributed among the following requirements:

Core Courses (3-6 credits)

All candidates are expected to develop a broad understanding of the core constructs of people, information, technology, and the significant interactions among those elements by taking IST 504. Candidates may also take IST 505 to gain a deeper understanding of research design.

Specialization Courses (12-18 credits)

In consultation with his/her adviser, a candidate is expected to choose courses in one or more areas customized to support the thesis or scholarly paper. In addition to advanced courses in IST, a support area could be in cybersecurity, data science, law, business, education, engineering, the liberal arts, science, or any area that is linked to the information sciences. A list of suggested specialization courses is maintained by the graduate program office.

Research Methods (6 credits)

All candidates must develop a basic understanding of the research methods utilized in the information sciences, by taking at least two research methods courses offered in IST or elsewhere. The focus of the course must be on the methods being learned rather than application of some method to a research topic. A list of courses that will satisfy this requirement is maintained by the graduate program office.

Thesis or Scholarly paper (3-6 credits)

Students may choose a thesis or scholarly paper option. Students who choose the thesis option must register for 6 credits of IST 600 or IST 610, write a satisfactory thesis accepted by the master’s committee, the head of the graduate program, and the Graduate School, and pass a thesis defense. The thesis should focus on a well-defined problem relevant to the information sciences. Students who choose the thesis option must also complete IST 505. Students who choose the scholarly paper option must register for 3 credits of IST 594 and complete the scholarly paper. The scholarly paper will be a focused piece of technical work that applies the student’s expertise and knowledge base, and that is documented and presented as a scholarly paper report. Students who choose the scholarly paper option must write a scholarly paper that is accepted by their M.S. committee. An oral presentation may be required at the discretion of the student’s adviser.
Integrated Undergrad-Grad Programs

Integrated B.S. in Information Sciences and Technology and M.S. in Information Sciences and Technology

Requirements listed here are in addition to requirements listed in GCAC-210 Integrated Undergraduate-Graduate (IUG) Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/integrated-undergraduate-graduate-degree-programs).

The Integrated Undergraduate Graduate (IUG) program is available for strong undergraduate students who wish to pursue a bachelor's and master's degree in a shorter period of time than would be necessary if the degrees were pursued separately.

The first two to three years of undergraduate course work follow the same undergraduate curriculum that other students follow in the Information Sciences and Technology major. Information Sciences and Technology undergraduates may apply for admission to the IUG program no earlier than February 15th of their sophomore year and no later than February 15 of their junior year after completing a minimum of 60 credits, if they meet the following admission requirements:

1. Must be enrolled in a College of IST undergraduate degree program.
2. Must have completed 60 credits of an IST undergraduate degree program.
3. Must apply to the IUG program by February 15 of their junior year.
4. Must apply to and be accepted without reservation into the Graduate School and M.S. program in IST.
   Students must complete the Graduate School application (http://www.gradschool.psu.edu/apply/?CFID=4347157&CFTOKEN=809212809140639-22E9BF85-AF21-D9DA-933F35E90FB10EAB&jsessionid=84304e7b7ae255ec9a524e5b1e591250183e).
   Admission requirements for the M.S. in IST are listed on the Admission Requirements tab.
5. Must have an overall GPA of 3.5 (on a 4.0 scale) in undergraduate course work and a minimum GPA of 3.5 in all course work completed for the major.
6. Must present an approved plan of study. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser.
7. Must present two letters of recommendation from faculty members.
8. Must meet with both the Director of Undergraduate Academic Affairs and the Graduate Program Coordinator to declare interest and receive information about the IUG program.

Students must fulfill all degree requirements for each degree in order to be awarded that degree, subject to the double-counting of credits as outlined below. Degree requirements for the Bachelor of Science in Information Sciences and Technology are listed in the Undergraduate Bulletin (http://bulletins.psu.edu/undergraduate). Degree requirements for the Master of Science in Information Sciences and Technology degree are listed on the Degree Requirements tab. Students must sequence their courses so all undergraduate degree requirements are fulfilled before taking courses to count solely towards the graduate degree. If students accepted into the IUG program are unable to complete the M.S. degree, they are still eligible to receive their undergraduate degree if all the undergraduate degree requirements have been satisfied.

Up to 12 credits may be double-counted towards the degree requirements for both the graduate and undergraduate degrees; a minimum of 50% of the double-counted courses must be at the 500 or 800 level. Credits associated with the culminating experience for the graduate degree cannot be double-counted. The required 3 credits of IST 504 will apply to both the graduate program and the undergraduate program. Students may choose an additional 9 credits to double-count for both the undergraduate and graduate degrees from the following:

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<td>Foundations of Research Design in Information Sciences and Technology</td>
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Integrated B.S. in Security and Risk Analysis and M.S. in Information Sciences and Technology

Requirements listed here are in addition to requirements listed in GCAC-210 Integrated Undergraduate-Graduate (IUG) Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/integrated-undergraduate-graduate-degree-programs).

The Integrated Undergraduate Graduate (IUG) program is available for strong undergraduate students who wish to pursue a bachelor's and master's degree in a shorter period of time than would be necessary if the degrees were pursued separately.

The first two to three years of undergraduate course work follow the same undergraduate curriculum that other students follow in the Security and Risk Analysis major. Security and Risk Analysis undergraduates may apply for admission to the IUG program no earlier than February 15th of their sophomore year and no later than February 15 of their junior year after completing a minimum of 60 credits, if they meet the following admission requirements:

1. Must be enrolled in a College of IST undergraduate degree program.
2. Must have completed 60 credits of an IST undergraduate degree program.
3. Must apply to the IUG program by February 15 of their junior year.
4. Must apply to and be accepted without reservation into the Graduate School and M.S. program in IST.
   Students must complete the Graduate School application (http://www.gradschool.psu.edu/apply/?CFID=4347157&CFTOKEN=809212809140639-22E9BF85-AF21-D9DA-933F35E90FB10EAB&jsessionid=84304e7b7ae255ec9a524e5b1e591250183e).
   Admission requirements for the M.S. in IST are listed on the Admission Requirements tab.
5. Must have an overall GPA of 3.5 (on a 4.0 scale) in undergraduate course work and a minimum GPA of 3.5 in all course work completed for the major.
6. Must present an approved plan of study. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser.
7. Must present two letters of recommendation from faculty members.
8. Must meet with both the Director of Undergraduate Academic Affairs and the Graduate Program Coordinator to declare interest and receive information about the IUG program.

Students must fulfill all degree requirements for each degree in order to be awarded that degree, subject to the double-counting of credits as outlined below. Degree requirements for the Bachelor of Science in Information Sciences and Technology are listed in the Undergraduate Bulletin (http://bulletins.psu.edu/undergraduate). Degree requirements for the Master of Science in Information Sciences and Technology degree are listed on the Degree Requirements tab. Students must sequence their courses so all undergraduate degree requirements are fulfilled before taking courses to count solely towards the graduate degree. If students accepted into the IUG program are unable to complete the M.S. degree, they are still eligible to receive their undergraduate degree if all the undergraduate degree requirements have been satisfied.

Up to 12 credits may be double-counted towards the degree requirements for both the graduate and undergraduate degrees; a minimum of 50% of the double-counted courses must be at the 500 or 800 level. Credits associated with the culminating experience for the graduate degree cannot be double-counted. The required 3 credits of IST 504 will apply to both the graduate program and the undergraduate program. Students may choose an additional 9 credits to double-count for both the undergraduate and graduate degrees from the following:

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6. Must present an approved plan of study. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser.

7. Must present two letters of recommendation from faculty members.

8. Must meet with both the Director of Undergraduate Academic Affairs and the Graduate Program Coordinator to declare interest and receive information about the IUG program.

Students must fulfill all degree requirements for each degree in order to be awarded that degree, subject to the double-counting of credits as outlined below. Degree requirements for the Bachelor of Science in Security and Risk Analysis are listed in the Undergraduate Bulletin (http://bulletins.psu.edu/undergraduate). Degree requirements for the Master of Science in Information Sciences and Technology degree are listed on the Degree Requirements tab. Students must sequence their courses so all undergraduate degree requirements are fulfilled before taking courses to count solely towards the graduate degree. If students accepted into the IUG program are unable to complete the M.S. degree, they are still eligible to receive their undergraduate degree if all the undergraduate degree requirements have been satisfied.

Up to 12 credits may be double-counted towards the degree requirements for both the graduate and undergraduate degrees; a minimum of 50% of the double-counted courses must be at the 500 or 800 level. Credits associated with the culminating experience for the graduate degree cannot be double-counted. The required 3 credits of IST 504 will apply to both the graduate program and the undergraduate program. Students may choose an additional 9 credits to double-count for both the undergraduate and graduate degrees from the following:

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### Learning Outcomes

1. **KNOW:** Demonstrate appropriate breadth and depth of interdisciplinary knowledge, and comprehension of the major issues in information sciences and technology (IST).

2. **APPLY/CREATE:** Use interdisciplinary knowledge and methods of IST to plan and conduct a research thesis or scholarly paper.

3. **COMMUNICATE:** Communicate the major issues of IST effectively.

4. **THINK:** Demonstrate analytical and critical thinking within IST, including across disciplines.

5. **PROFESSIONAL PRACTICE:** Know and conduct themselves in accordance with the highest ethical standards, values, and, where these are defined, the best practices of IST (as expressed in SARI training modules).

### Contact

**Graduate Program Head:** Mary Beth Rosson

**Primary Program Contact:** Betty Jo Houser

**Email:** bxh201@psu.edu

**Mailing Address:** Westgate Building, University Park, PA 16802

**Telephone:** (814) 876-5787

**Program Website:** Information Sciences and Technology (https://ist.psu.edu/education/degree/ms)

### Information Systems

**Graduate Program Head:** Stephen Schappe

**Program Code:** INFSY

**Campus(es):** Harrisburg (M.S.)

**Degrees Conferred:** Master of Science (M.S.)

**Integrated B.S. in Information Systems and M.S. in Information Systems**

**The Graduate Faculty**

View (https://secure.gradsch.psu.edu/gcps/index.cfm?searchType=fac&prog=INFSY)

Operating under the auspices of the School of Business Administration, Penn State Harrisburg's Master of Science degree program in information systems is designed to meet the rapidly increasing need for technically grounded, upper-level information resources managers within business organizations. With the exception of a small percentage of students who are full-time, the students served by the M.S.I.S. program are employees of area businesses, state and local governments, and not-for-profit organizations who study on a part-time basis. In order to accommodate both full- and part-time students, courses are primarily offered in the evening.

The two-fold nature of the program requires a manager to have competence both in information technology and in management theory; therefore, the curriculum combines the highly technical content of

### Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School's website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

### Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.
information science with the managerial emphasis of information systems. Unlike computer science programs, which tend to focus on computer hardware and architecture, this program is organized around applied computer-based activities, the development of communication skills, and managerial principles.

**Admission Requirements**

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Admission decisions are based primarily on undergraduate junior-senior grade-point average and the Graduate Management Admissions Test (GMAT) scores or Graduate Record Exam (GRE) scores. Post-baccalaureate course work, professional experience, and the statements provided in the application are also taken into account.

Students are also required to submit the following:

- a completed Graduate School application (http://www.gradschool.psu.edu/prospective-students/how-to-apply) with application fee
- official transcripts from all post-secondary institutions attended (http://www.gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission);
- official scores from the GMAT test or GRE test (the test must have been taken within the past five years); and
- letters of recommendation (optional)

**Application Dates**

Candidates may enter the program at the beginning of the fall, spring, or summer session. To allow time for applications to be processed, all information, including GMAT or GRE score, must be received by Graduate Enrollment Services no later than:

- July 18 for admission to the fall semester
- November 18 for admission to the spring semester, and
- April 18 for admission to the summer session.

Applicants from outside the United States must follow the early admission dates in order to allow the necessary clearances and paperwork to be processed in time. International application deadline dates are:

- Fall Semester–May 31
- Spring Semester–September 30
- Summer Session–February 28

To be considered for a graduate assistantship, applicants must submit a complete application by March 1.

**Entry Requirements**

Credits obtained to fulfill entry and pre-program requirements cannot be applied towards the requirements for the degree.

**Analytic Skills Requirement**

Prior to enrolling in their M.S.I.S. course work, students are required to demonstrate competence in Analytic skills. This requirement may be demonstrated by:

1. satisfactory completion of college-level mathematics course or
2. successful completion of a mathematics proficiency examination approved by the M.S.I.S. program. This requirement must be taken either during the first semester or summer session before the student’s matriculation and completed with a grade of C or better.

**Computer Skills Requirement**

Students are required to demonstrate proficiency in the use of computer applications. This requirement can be satisfied through completion of a college-level computer applications or information systems course within the past five years with a grade of B or higher or by documented significant computer-related work experience. If this requirement has not been met prior to admission, a college-level computer-based information systems course such as MIS 204 is required. Course work must be taken either during the first semester or summer session before the student’s matriculation and completed with a grade of B or higher.

**Communication Skills Requirement**

Successful completion of the M.S.I.S. program requires the ability to think clearly and to write and speak persuasively. Part of this requirement can be met by obtaining a score of “4” or more on the Graduate Management Admission Test (GMAT) or Graduate Record Exam (GRE) Analytical Writing Assessment (AWA). If this score is not achieved, students must satisfy this requirement through additional course work in writing skills or other work developed in consultation with the M.S.I.S. Program. This requirement must be satisfied during the first semester or summer session before the student’s matriculation and completed with a grade of B or higher. The speech component of this requirement is satisfied through individual and group presentations in courses in the M.S.I.S. Program.

**Pre-Program Requirement**

The pre-program requirement provides a basic foundation in theory, tools and techniques required for the management of profit and non-profit organizations. It also provides a basic understanding of applications of financial accounting, the creation and distribution of goods and services, business and how people relate to others in various organizations, helping to merge two related disciplines: business and information systems. Students who have completed the appropriate pre-program courses previously must have completed the courses with a grade of B or higher within seven years prior to admission, or through equivalent graduate course work completed with a B or higher within seven years prior to admission or college level course work validated by recent work experience. Students who have not met these tests of relevancy, grade, or currency prior to admission to the program must take these courses at the graduate level and early in program.

**Code** | **Title** | **Credits**
---|---|---
**Pre-Program Requirement**
BUS 505 | Data Analysis for Business Decisions | 3
ACCT 501 | Financial Statement Analysis | 3
BUSEC 502 | Economics for Managers | 3
| Total Credits | 9

**Degree Requirements**

**Master of Science (M.S.)**

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)
The M.S.I.S. degree program requires, excluding pre-program requirements, 30 credits of course work at the 500 or 800 level, with a minimum of 18 credits at the 500 level.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>INFSY 535</td>
<td>Object-Oriented Design and Programming in Business</td>
<td>3</td>
</tr>
<tr>
<td>INFSY 540</td>
<td>Information Technology and Knowledge Management</td>
<td>3</td>
</tr>
</tbody>
</table>

15 credits of Information Systems courses from an approved list available in the program office

<table>
<thead>
<tr>
<th>Electives</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 credits of electives from the 500-level courses offered by Penn State Harrisburg’s School of Business Administration</td>
<td>6</td>
</tr>
</tbody>
</table>

Culminating Experience

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>INFSY 554</td>
<td>Master's Project</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits 30

1. The INFSY 554 Master's Project course involves development of an original master's project in the student's field of interest and preparation of a scholarly paper.

Data Analytics Track

The objective of this Track is to provide the student with data analytical skills that enable them to gain data insights and transform data into strategic decisions.

In consultation with their adviser, a student shall select 9 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BUS 510</td>
<td>Business Analytics and Decision Modeling</td>
<td>3</td>
</tr>
<tr>
<td>INFSY 555</td>
<td>Data Management Systems</td>
<td>3</td>
</tr>
<tr>
<td>INFSY 556</td>
<td>Data Warehousing</td>
<td>3</td>
</tr>
<tr>
<td>INFSY 565</td>
<td>Intelligent Systems in Business</td>
<td>3</td>
</tr>
<tr>
<td>INFSY 566</td>
<td>Data Mining and Knowledge Discovery</td>
<td>3</td>
</tr>
<tr>
<td>INFSY 547</td>
<td>WEB Enabled Technologies</td>
<td>3</td>
</tr>
</tbody>
</table>

Transfer Credits

Credits earned at other institutions but not used to earn a degree may be applied toward the requirements for a graduate degree, subject to restrictions outlined in GCAC-309 Transfer Credit (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/transfer-credit). It must be the opinion of the reviewing faculty that these courses are equivalent in quality to those offered at Penn State Harrisburg. Credit will not be given for any class used to complete a previous degree.

Course Substitutions

Because some students enter the Program with advanced knowledge in one or more subject areas, up to six credits in prescribed or additional courses may be replaced with more advanced undergraduate or graduate courses in the same subject area. Except for INFSY 554, which must be taken at the College, INFSY prescribed and additional courses, in cases where there is equivalent knowledge, must be replaced with more advanced courses in the same field. Substitutions are based on a minimum of six credits of advanced undergraduate course work in an area of concentration or credits earned in an equivalent graduate-level program at a regionally accredited, college-level institution. These courses must have been completed within the past five years and have earned a grade of B or better. Substituted courses must be replaced with other advanced graduate courses in the field for which the substitute is the foundation/prerequisite. Substitutions are based on past academic performance. An examination cannot be used for earned graduate course credit.

Integrated Undergrad-Grad Programs

Integrated B.S. in Information Systems and M.S. in Information Systems

Requirements listed here are in addition to requirements listed in GCAC-210 Integrated Undergraduate-Graduate (IUG) Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/integrated-undergraduate-graduate-degree-programs).

The School of Business Administration offers a limited number of academically superior Bachelor of Science in Information Systems students the opportunity to enroll in an integrated, continuous program of study leading to both the Bachelor of Science in Information Systems and the Master of Science in Information Systems. The ability to coordinate as well as concurrently pursue the two degree programs enables the students to earn both degrees in five years. Specifically, as many as twelve of the credits required for the master’s degree may be applied to both undergraduate and graduate degree programs.

If for any reason students admitted to the IUG program are unable to complete the requirements for the Master of Science in Information Systems degree, the students will be permitted to receive the Bachelor of Science in Information Systems degree assuming all the undergraduate degree requirements have been satisfactorily completed.

ADMISSION REQUIREMENTS

Students apply to the program via the Graduate School application for admission (http://www.gradschool.psu.edu/prospective-students/how-to-apply), and must meet the admission requirements of the Graduate School, as well as the admission requirements for the Master of Science degree in Information Systems. Students should mention in the notes section that the application is for the IUG program in Information Systems.

Students must submit:

- a resume,
- a personal statement including career goals and how the M.S.I.S. will enhance their career goals,
- official transcripts from all post-secondary institutions attended (http://www.gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission) except for Penn State,
- two letters of recommendation, with at least one from the School of Business Administration faculty, and
- a plan of study that integrates both undergraduate and graduate requirements.

The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser as the student advances through the program. A Graduate Faculty adviser in collaboration with the Director of M.S.I.S. Program will help undergraduate candidates determine a sequence of courses that will prepare them for acceptance into the Integrated Undergraduate-Graduate (IUG) degree program.
The Graduate Management Admission Test (GMAT) or Graduate Record Examination (GRE) is not required for admission into the program; however, if students are interested in a graduate assistantship, GMAT or GRE scores must be submitted by the end of the eighth semester.

The number of openings in the IUG program is limited. Applicants to the IUG program must have completed a minimum of 60 credits. Students must be admitted to an IUG program no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree. In addition, the applicants must earn a minimum of cumulative grade point average of 3.5 and complete the following Entry to Major courses or equivalent:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCTG 211</td>
<td>Financial and Managerial Accounting for Decision Making</td>
<td>4</td>
</tr>
<tr>
<td>ECON 102</td>
<td>Introductory Microeconomic Analysis and Policy</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 15</td>
<td>Rhetoric and Composition</td>
<td>3</td>
</tr>
<tr>
<td>or ENGL 30</td>
<td>Honors Freshman Composition</td>
<td></td>
</tr>
<tr>
<td>FIN 301</td>
<td>Corporation Finance</td>
<td>3</td>
</tr>
<tr>
<td>MATH 110</td>
<td>Techniques of Calculus I</td>
<td>4</td>
</tr>
<tr>
<td>or MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td></td>
</tr>
<tr>
<td>MGMT 301</td>
<td>Basic Management Concepts</td>
<td>3</td>
</tr>
<tr>
<td>MKTG 301</td>
<td>Principles of Marketing</td>
<td>3</td>
</tr>
<tr>
<td>STAT 200</td>
<td>Elementary Statistics</td>
<td>4</td>
</tr>
<tr>
<td>or SCM 200</td>
<td>Introduction to Statistics for Business</td>
<td></td>
</tr>
</tbody>
</table>

Student applications will be evaluated based on their overall portfolio, in addition to the above requirements. In all cases, admission to the program will be at the discretion of the Graduate Admissions Committee in Information Systems.

**DEGREE REQUIREMENTS**

Students must fulfill all degree requirements for each degree in order to be awarded that degree, subject to the double-counting of credits as outlined below. Degree requirements for the Bachelor of Science in Information Systems are listed in the Undergraduate Bulletin (http://bulletins.psu.edu/undergraduate). Students must sequence their courses so all undergraduate degree requirements are fulfilled before taking courses to count towards the graduate degree.

Up to 12 credits may be double-counted towards the degree requirements for both undergraduate and graduate degrees. All courses counted for both degrees must be at the 500- or 800-level. Credits associated with the culminating experience for the graduate degree cannot be double-counted.

<table>
<thead>
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</tr>
</thead>
<tbody>
<tr>
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<td>3</td>
</tr>
<tr>
<td>INFSY 540</td>
<td>Information Technology and Knowledge Management</td>
<td>3</td>
</tr>
<tr>
<td>INFSY 555</td>
<td>Data Management Systems</td>
<td>3</td>
</tr>
<tr>
<td>INFSY 860</td>
<td>Data Communications Systems and Networks</td>
<td>3</td>
</tr>
<tr>
<td>INFSY 547</td>
<td>WEB Enabled Technologies</td>
<td>3</td>
</tr>
<tr>
<td>INFSY 543</td>
<td>Electronic Commerce</td>
<td>3</td>
</tr>
</tbody>
</table>

**Student Aid**

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School's website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

There are a limited number of scholarships, fellowships, and research grants available, as well as several graduate assistantships. For more information on these, contact Penn State Harrisburg's School of Business Administration.

Many students work full-time and take classes part-time. In many cases, employers have a tuition-reimbursement plan paying for partial or full tuition. To find other options available to you, contact one of the following offices:

1. Financial Aid Office, 717-948-6307
2. Admissions, 717-948-6250

**Graduate School Assistantships**

Full time graduate students who are interested in an assistantship should contact the graduate program coordinator. Students must be nominated for an assistantship by their program coordinator. Students applying for an assistantship should submit scores from the Graduate Management Admissions Test (GMAT), Graduate Record Exam (GRE) or similar examinations by January 30.

**Courses**

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**Contact**

**Graduate Program Head:** Stephen Schappe

**Director of Graduate Studies/Professor-in-Charge:** Girish Subramanian

**Primary Program Contact:** Amy Atkins (akj11@psu.edu)

**Program Email:** MSIShbg@psu.edu (M.S.I.S.hbg@psu.edu)

**Mailing Address:** Graduate Admissions, 777 West Harrisburg Pike, Middletown, PA 17057

**Telephone:** (717) 948-6140

**Program Website:** Information Systems (https://harrisburg.psu.edu/business-administration/information-systems/master-science-information-systems)
The Intercollege Graduate Degree Program (IGDP) in Integrative and Biomedical Physiology will enable students to obtain interdisciplinary training encompassing both the fundamentals of biomedical physiology and advanced training in a specialized area, in preparation for varied biomedical careers in academia or industry. This IGDP is uniquely focused on the study of integrative mechanisms of mammalian body systems at the molecular, cellular, tissue, and organ levels, and the application of that knowledge to study a number of human diseases and conditions. A broad range of research is conducted by faculty, all of whom are widely regarded in their respective fields. Subspecialization areas include aging, exercise and muscle biology, biophysics, cancer, cardiovascular regulation and disease, energy and nutrient regulation, immunology and inflammation, obesity and diabetes, and reproductive biology. The master's program, including courses, laboratory experience, and original research, is designed for completion in approximately two years, while the doctoral degree requires approximately five years.

Graduate instruction in integrative and biomedical physiology is under the direction of graduate faculty from multiple colleges and departments at University Park—including animal science, biochemistry, biology, bioengineering, biomedical engineering, kinesiology, and nutrition, as well as veterinary and biomedical sciences.

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Scores from the Graduate Record Examinations (GRE) are required for admission. At the discretion of the graduate program, a student may be admitted provisionally (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/provisional-admission) for graduate study in a program without these scores if MCAT scores are available.

Students with a 3.00 junior/senior average (on a 4.00 scale) and with appropriate course backgrounds will be considered for admission. The best-qualified applicants will be accepted up to the number of spaces that are available for new students. Exceptions to the minimum 3.00 grade-point average may be made at the discretion of the program for students with special backgrounds, abilities, and interests. Deficiencies in chemistry, biological science, mathematics (through a second course in calculus), and physics must be made up early in the student’s graduate program. The majority of students are admitted directly into the Ph.D. program.

Degree Requirements

Master of Science (M.S.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

M.S. degree students must complete a minimum of 30 credits for the degree, including 20 core credits in:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHSIO 571</td>
<td>Integrative and Cellular Mammalian Physiology I</td>
<td>3</td>
</tr>
<tr>
<td>PHSIO 572</td>
<td>Integrative and Cellular Mammalian Physiology II</td>
<td>3</td>
</tr>
<tr>
<td>NUTR 501</td>
<td>Regulation of Nutrient Metabolism I</td>
<td>4</td>
</tr>
<tr>
<td>MCIBS 591</td>
<td>Ethics in the Life Sciences</td>
<td>1</td>
</tr>
<tr>
<td>STAT 500</td>
<td>Applied Statistics</td>
<td>3</td>
</tr>
<tr>
<td>3 credit course in immunology</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>3-credit course in molecular biology</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

Total Credits 20

At least 6 credits in thesis research (PHSIO 600 or PHSIO 610) must be taken in conjunction with the thesis. The thesis must be accepted by the adviser(s) and/or committee members, the head of the graduate program, and the Graduate School, and the student must pass a thesis defense which includes a public presentation. Students in the non-thesis option must write a satisfactory scholarly paper, while enrolled in PHSIO 596.

Doctor of Philosophy (Ph.D.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

All candidates must complete rotations in physiology laboratories before choosing an area of specialization. Possible areas of specialization include cellular, molecular, animal or human aspects of the following:

- cardiovascular and respiratory physiology
- comparative physiology
- environmental physiology
- exercise physiology
- muscle physiology
- physiology of nutrition and metabolism
- immunology
- neurophysiology
- reproductive physiology

Students in the Ph.D. program must successfully pass the qualifying, comprehensive, and final oral examination (the dissertation defense) required by Graduate Council. To earn the Ph.D. degree, doctoral students must also write a dissertation that is accepted by the dissertation committee, the head of the graduate program, and the Graduate School. The dissertation committee shall be appropriately represented by members of the Integrative and Biomedical Physiology faculty and those of the area of specialization who shall have the responsibility and jurisdiction for determining the course program and research acceptable in satisfying degree requirements.
The doctoral degree in Integrative and Biomedical Physiology requires a minimum of 30 credits, including:

<table>
<thead>
<tr>
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<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHSIO 571</td>
<td>Integrative and Cellular Mammalian Physiology I</td>
<td>3</td>
</tr>
<tr>
<td>PHSIO 572</td>
<td>Integrative and Cellular Mammalian Physiology II Endocrine Physiology</td>
<td>3</td>
</tr>
<tr>
<td>NUTR 501</td>
<td>Regulation of Nutrient Metabolism I</td>
<td>4</td>
</tr>
<tr>
<td>MCIBS 591</td>
<td>Ethics in the Life Sciences</td>
<td>1</td>
</tr>
<tr>
<td>PHSIO 590</td>
<td>Colloquium</td>
<td>2</td>
</tr>
<tr>
<td>STAT 501</td>
<td>Regression Methods</td>
<td>3</td>
</tr>
<tr>
<td>STAT 502</td>
<td>Analysis of Variance and Design of Experiments</td>
<td>3</td>
</tr>
<tr>
<td>3-credit course in immunology</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>3-credit course in molecular biology</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td><strong>Electives</strong></td>
<td><strong>5</strong></td>
<td></td>
</tr>
<tr>
<td>The remaining 5 credits may be chosen from 500-level Physiology courses or other relevant 400- or 500-level course. For a list of suggested courses, contact the graduate program.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total Credits 30

Students must earn a grade of B or better in each course and maintain an overall average of 3.00.

**Minor**

Requirements listed here are in addition to requirements for minors in Graduate Council policies listed under GCAC-600 Research Degree Requirements (http://gradschool.psu.edu/graduate-education-policies) and GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

The objective of the doctoral minor in Integrative and Biomedical Physiology is to augment the training of doctoral students with a coordinated group of courses that provide an integrated perspective of physiology from the molecular to the organismal level. It is expected that most students pursuing the minor will be graduate degree candidates in basic biological sciences, health sciences, or bioengineering.

The doctoral minor in Integrative and Biomedical Physiology requires the following:

- Students must earn a grade of C or better in each course in the minor and maintain an overall average of 3.00 in the minor.
- One member of the dissertation committee must be a faculty member in the Intercollege Graduate Degree Program in Integrative and Biomedical Physiology.

**Student Aid**

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School's website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

**Courses**

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**Contact**

Graduate Program Head: Donna Korzick

Primary Program Contact: Tyler Wasson

Email: tvw5161@psu.edu

Mailing Address: 101 Life Sciences Building, University Park, PA 16802

Program Website: Integrative and Biomedical Physiology (http://www.huck.psu.edu/education/physiology)

- BIOL 472 - If the student took a one-semester, upper-level undergraduate mammalian physiology course as an undergraduate, then this requirement may be waived with approval by the chair of the Integrative and Biomedical Physiology program.
- PHSIO 571 and PHSIO 572 - If these courses are required for the major, then substitute an equal number of credits in 500-level Integrative and Biomedical Physiology elective courses.
- A 3-credit, 500-level Integrative and Biomedical Physiology elective course.
- Select additional credits from 500-level Integrative and Biomedical Physiology courses or a relevant 400- or 500-level course so that the total course credits for the minor is 15. These 15 credits cannot include course work that is used to fulfill requirements in the student’s major.
- Elective courses for the minor must be approved by the chair of the Integrative and Biomedical Physiology program. For a list of suggested courses, contact the graduate program.


International Affairs

Graduate Program Head
Scott Gartner

Program Code
INTAF

Campus(es)
University Park (M.I.A.)

Degrees Conferred
Master of International Affairs (M.I.A.)
Integrated B.A. in Asian Studies and M.I.A. in International Affairs
Integrated B.A. in Chinese and M.I.A. in International Affairs
Integrated B.A. in German and M.I.A. in International Affairs
Integrated B.S. in German and M.I.A. in International Affairs
Integrated B.A. in International Politics and M.I.A. in International Affairs
Integrated B.A. in Japanese and M.I.A. in International Affairs
Integrated B.A. in Political Science and M.I.A. in International Affairs
Integrated B.A. in Russian and M.I.A. in International Affairs
Joint J.D./M.I.A. with Penn State

The Graduate Faculty

The School of International Affairs (SIA) is designed to prepare students for occupations involving public service, private enterprise, nonprofit organizations, and international organizations worldwide. The Master of International Affairs (MIA) degree program will provide students with a substantial knowledge base in international systems, institutions, issues and history and the advanced analytical tools and cross-cultural skills and competencies necessary for these occupations. Students will work closely with faculty to design a curriculum around their core course work, which incorporates a functional or regional theme and provides the opportunity to apply and enhance the core knowledge component with a thematically based set of graduate courses from across Penn State’s existing graduate and professional curriculum.

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

All applicants will submit GRE scores, two letters of recommendation, and a personal statement addressing their reasons for pursuing a graduate degree in international affairs and discussing their plans and goals.

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. See GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

Applicants with a score of 19 or higher on the speaking section of the TOEFL Internet-based test will be considered for admission, though a score of 23 or higher is desirable.

Admissions will be based on a review of all submitted materials and spaces will be offered to the best qualified applicants, taking into account academic achievement, relevant work experience and other indices of aptitude for advanced study in international affairs.

Degree Requirements

Master of International Affairs (M.I.A.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

The program requires six courses which are designed to establish a base of knowledge in key subject areas which reflect the basic mission of the SIA. These courses will form the core curriculum for the M.I.A. This core curriculum is designed to provide students with a strong foundation in the ethical dimensions of international exchange, with skills essential to perform quantitative and qualitative analysis in cross-cultural contexts and with leadership training designed to understand and bridge the cultural differences. A minimum of 42 credits at the 400, 500 or 800 level will be required for completion of the program, at least 18 of which must be from courses at the 500 and 800 level. A minimum of 6 credits must be at the 500 level. Students are required to take 18 credits of core courses in: INTAF 506(3), INTAF 801(3), INTAF 802(3), INTAF 803(3), INTAF 804(3), and INTAF 890(3).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTAF 801</td>
<td>Actors, Institutions, and Legal Frameworks in International Affairs</td>
<td>3</td>
</tr>
<tr>
<td>INTAF 802</td>
<td>Foundations of Diplomacy and International Relations Theory</td>
<td>3</td>
</tr>
<tr>
<td>INTAF 803</td>
<td>Multi-sector and Quantitative Analysis</td>
<td>3</td>
</tr>
<tr>
<td>INTAF 804</td>
<td>Global Cultures and Leadership</td>
<td>3</td>
</tr>
<tr>
<td>INTAF 890</td>
<td>Colloquium</td>
<td>3</td>
</tr>
</tbody>
</table>

Electives

Students will choose their remaining courses, with faculty guidance, from a substantial list of elective courses for a total of 21 credits. A list of approved elective courses is maintained by the graduate program office. The courses usually will be clustered around areas of concentration designated by the SIA faculty, but students also will be permitted to design an independent interdisciplinary curriculum with faculty approval. The areas of concentration, which will be pre-approved by the faculty, will take advantage of Penn State’s rich graduate curriculum by aggregating in appropriate thematic clusters pre-existing and specially-created graduate-level classes.

Culminating Experience

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTAF 594</td>
<td>Research Topics (Master’s Paper)</td>
</tr>
</tbody>
</table>

or INTAF 595 Internship

Total Credits

42

In addition to the core curriculum and elective courses, degree candidates must complete either.
Integrated Undergrad-Grad Programs
Integrated B.A. in Asian Studies and M.I.A. in International Affairs

Requirements listed here are in addition to requirements listed in GCAC-210 Integrated Undergraduate-Graduate (IUG) Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/integrated-undergraduate-graduate-degree-programs).

The integrated undergraduate-graduate (IUG) degree program (B.A. in Asian Studies / M.I.A. in International Affairs) provides an opportunity for strong students in this major to complete a master's degree with 5 total years of study.

An increasingly globalized economy is likely to escalate the demand for graduate training in international affairs. The career choices for graduates with this training will also expand sharply.

The integrated degree program prepares students for a variety of careers requiring an interdisciplinary background in Asian Studies or Asian languages and international affairs. Examples of types of entities hiring in these areas are federal, state, and local governments, international organizations, multinational corporations, international banking and financial institutions, media organizations and journalism, consulting firms, policy research centers, and development assistance programs and foundations. The School of International Affairs (SIA) Master of International Affairs (M.I.A.) represents a professional degree designed to prepare students to thrive in these increasingly global career paths.

Admission Requirements
Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

The number of openings in the integrated B.A./M.I.A. program is limited. Admission will be selective based on specific criteria set by the School of International Affairs. Students shall be admitted to an IUG program no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree, as specified in the proposed IUG plan of study. Students must be admitted to the program prior to taking the first course they intend to count towards the graduate degree. Specific requirements:

1. Must be enrolled in the Asian Studies B.A. program.
2. Must apply to and be accepted into The Graduate School and the M.I.A. program in the School of International Affairs. Students must complete the Graduate School application (http://www.gradschool.psu.edu/prospective-students/how-to-apply). All applicants will submit GRE scores, two letters of recommendation, and a personal statement addressing their reasons for pursuing a graduate degree in international affairs and discussing their plans and goals.
3. Although the program has no fixed minimum grade point average, an applicant is generally expected to have a minimum overall GPA of 3.5 (on a 4.0 scale) in undergraduate course work and a minimum GPA of 3.5 in all course work completed for the major.
4. Must include a plan of study identifying undergraduate credits to be applied to the M.I.A. degree elective requirements. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser.
5. Must provide written endorsement from the head of Asian Studies.

Degree Requirements
Students must fulfill all requirements for each degree in order to be awarded that degree, subject to the double-counting of credits as outlined below. Degree requirements for the Bachelor of Arts in Asian Studies are listed in the Undergraduate Bulletin (http://bulletins.psu.edu/undergraduate). Degree requirements for the M.I.A. degree are listed on the Degree Requirements tab. If students accepted into the IUG program are unable to complete the M.I.A. degree, they are still eligible to receive their undergraduate degree if all the undergraduate degree requirements have been satisfied.

Up to 12 credits may be double-counted towards the degree requirements for both the graduate and undergraduate degrees; a minimum of 50% of the double-counted courses must be at the 500 or 800 level.

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<td>ASIA 400</td>
<td>International Culture in East Asia</td>
<td>3</td>
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<td>Technology &amp; Society in Modern Asia</td>
<td>3</td>
</tr>
<tr>
<td>ASIA 430</td>
<td>Japan in the World</td>
<td>3</td>
</tr>
<tr>
<td>ASIA 463</td>
<td>Government and Politics of China</td>
<td>3</td>
</tr>
<tr>
<td>ASIA 465Y</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ASIA 469</td>
<td>Government and Politics of South Asia</td>
<td>3</td>
</tr>
<tr>
<td>ASIA 475Y</td>
<td>The Making and Emergence of Modern India</td>
<td>3</td>
</tr>
<tr>
<td>ASIA 481</td>
<td>Modern Japan Since 1800</td>
<td>3</td>
</tr>
<tr>
<td>ASIA 486</td>
<td>China in Revolution</td>
<td>3</td>
</tr>
<tr>
<td>ASIA 501</td>
<td>Proseminar in Asian Studies I</td>
<td>1-3</td>
</tr>
<tr>
<td>ASIA 502</td>
<td>Proseminar in Asian Studies II</td>
<td>1-3</td>
</tr>
<tr>
<td>ASIA 577</td>
<td>Critical Perspectives on Modern Chinese Literature</td>
<td>3</td>
</tr>
</tbody>
</table>
The graduate thesis or other graduate culminating/capstone experience (including any associated credits and/or deliverables) may not be double counted towards any other degree.

**Tuition Charges, Grant-in-Aid, and Assistantships**

Students admitted to the School of International Affairs through the IUG with a B.A. in Asian Studies may be considered to receive financial assistance. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

**Integrated B.A. in Chinese and M.I.A. in International Affairs**

Requirements listed here are in addition to requirements listed in GCAC-210 Integrated Undergraduate-Graduate (IUG) Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/integrated-undergraduate-graduate-degree-programs).

The integrated undergraduate-graduate (IUG) degree program (B.A. in Chinese/M.I.A. in International Affairs) provides an opportunity for strong students in this major to complete a master’s degree with 5 total years of study.

An increasingly globalized economy is likely to escalate the demand for graduate training in international affairs. The career choices for graduates with this training will also expand sharply.

The integrated degree program prepares students for a variety of careers requiring an interdisciplinary background in Asian languages and international affairs. Examples of types of hiring in these areas are federal, state, and local governments, international organizations, multinational corporations, international banking and financial institutions, media organizations and journalism, consulting firms, policy research centers, and development assistance programs and foundations. The School of International Affairs (SIA) Master of International Affairs (M.I.A.) represents a professional degree designed to prepare students to thrive in these increasingly global career paths.

**Admission Requirements**

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

The number of openings in the integrated B.A./M.I.A. program is limited. Admission will be selective based on specific criteria set by the School of International Affairs. Students shall be admitted to an IUG program no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree, as specified in the proposed IUG plan of study. Students must be admitted to the program prior to taking the first course they intend to count towards the graduate degree. Specific requirements:

1. Must be enrolled in the Chinese B.A. program.
2. Must apply to and be accepted into The Graduate School and the M.I.A. program in the School of International Affairs. Students must complete the Graduate School application (http://www.gradschool.psu.edu/prospective-students/how-to-apply). All applicants will submit GRE scores, two letters of recommendation, and a personal statement addressing their reasons for pursuing a graduate degree in international affairs and discussing their plans and goals.
3. Although the program has no fixed minimum grade point average, an applicant is generally expected to have a minimum overall GPA of 3.5 (on a 4.0 scale) in undergraduate course work and a minimum GPA of 3.5 in all course work completed for the major.
4. Must include a plan of study identifying undergraduate credits to be applied to the M.I.A. degree elective requirements. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser.
5. Must provide written endorsement from the head of Asian Studies.

**Degree Requirements**

Students must fulfill all requirements for each degree in order to be awarded that degree, subject to the double-counting of credits as outlined below. Degree requirements for the Bachelor of Arts in Asian Studies, Chinese, and Japanese are listed on the Undergraduate Bulletin (http://bulletins.psu.edu/undergraduate). Degree requirements for the M.I.A. degree are listed on the Degree Requirements tab. If students accepted into the IUG program are unable to complete the M.I.A. degree, they are still eligible to receive their undergraduate degree if all the undergraduate degree requirements have been satisfied.

Up to 12 credits may be double-counted towards the degree requirements for both the graduate and undergraduate degrees; a minimum of 50% of the double-counted courses must be at the 500 or 800 level.

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The graduate thesis or other graduate culminating/capstone experience (including any associated credits and/or deliverables) may not be double counted towards any other degree.

**Tuition Charges, Grant-in-Aid, and Assistantships**

Students admitted to the School of International Affairs through the IUG with a B.A. in Chinese may be considered to receive financial assistance. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

**Integrated B.A. in German and M.I.A. in International Affairs**

Requirements listed here are in addition to requirements listed in GCAC-210 Integrated Undergraduate-Graduate (IUG) Degree Programs.
The integrated undergraduate-graduate (IUG) degree program (B.A. in German/M.I.A. in International Affairs) provides an opportunity for strong students in this major to complete a master’s degree with 5 total years of study.

An increasingly globalized economy is likely to escalate the demand for graduate training in international affairs. The career choices for graduates with this training will also expand sharply. The integrated degree program prepares students for a variety of careers requiring an interdisciplinary background in German and international affairs. Examples of types of entities hiring in these areas are federal, state, and local governments, international organizations, multinational corporations, international banking and financial institutions, media organizations and journalism, consulting firms, policy research centers, and development assistance programs and foundations. The School of International Affairs (SIA) Master of International Affairs (M.I.A.) represents a professional degree designed to prepare students to thrive in these increasingly global career paths.

**Admission Requirements**

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

The number of openings in the integrated B.A./M.I.A. program is limited. Admission will be selective based on specific criteria set by the School of International Affairs. Students shall be admitted to an IUG program no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree, as specified in the proposed IUG plan of study. Students must be admitted to the program prior to taking the first course they intend to count towards the graduate degree. Specific requirements:

1. Must be enrolled in the German B.A. program.
2. Must apply to and be accepted into The Graduate School and the M.I.A. program in the School of International Affairs. Students must complete the Graduate School application (http://www.gradschool.psu.edu/prospective-students/how-to-apply). All applicants will submit GRE scores, two letters of recommendation, and a personal statement addressing their reasons for pursuing a graduate degree in international affairs and discussing their plans and goals.
3. Although the program has no fixed minimum grade point average, an applicant is generally expected to have a minimum overall GPA of 3.5 (on a 4.0 scale) in undergraduate course work and a minimum GPA of 3.5 in all course work completed for the major.
4. Must include a plan of study identifying undergraduate credits to be applied to the M.I.A. degree elective requirements. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser.
5. Must provide written endorsement from the head of Germanic and Slavic Languages and Literatures.

**Degree Requirements**

Students must fulfill all requirements for each degree in order to be awarded that degree, subject to the double-counting of credits as outlined below. Degree requirements for the Bachelor of Arts in German are listed in the Undergraduate Bulletin (http://bulletins.psu.edu/undergraduate).

Degree requirements for the M.I.A. degree are listed on the Degree Requirements tab. If students accepted into the IUG program are unable to complete the M.I.A. degree, they are still eligible to receive their undergraduate degree if all the undergraduate degree requirements have been satisfied.

Up to 12 credits may be double-counted towards the degree requirements for both the graduate and undergraduate degrees; a minimum of 50% of the double-counted courses must be at the 500 or 800 level.

**Courses Eligible to Double Count for Both Degrees**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GER 408</td>
<td>Advanced German Business Communications</td>
<td>3</td>
</tr>
<tr>
<td>GER 431</td>
<td>History of German Literature and Culture I</td>
<td>3</td>
</tr>
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<td>3</td>
</tr>
<tr>
<td>GER 489</td>
<td>Introduction to German Film History and Theory in Context</td>
<td>3</td>
</tr>
<tr>
<td>GER 494</td>
<td>Research Project</td>
<td>1-12</td>
</tr>
<tr>
<td>GER 540</td>
<td>Seminar in German Culture and Civilization</td>
<td>3-12</td>
</tr>
<tr>
<td>GER 581</td>
<td>Topics in Literary Genres</td>
<td>3-12</td>
</tr>
<tr>
<td>GER 592</td>
<td>Seminar in German Literature</td>
<td>3</td>
</tr>
</tbody>
</table>

The graduate thesis or other graduate culminating/capstone experience (including any associated credits and/or deliverables) may not be double counted towards any other degree.

**Tuition Charges, Grant-in-Aid, and Assistantships**

Students admitted to the School of International Affairs through the IUG with a B.A. in German may be considered to receive financial assistance. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

**Integrated B.S. in German and M.I.A. in International Affairs**

Requirements listed here are in addition to requirements listed in GCAC-210 Integrated Undergraduate-Graduate (IUG) Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/integrated-undergraduate-graduate-degree-programs).

The integrated undergraduate-graduate (IUG) degree program (B.S. in German/M.I.A. in International Affairs) provides an opportunity for strong students in this major to complete a master’s degree with 5 total years of study.

An increasingly globalized economy is likely to escalate the demand for graduate training in international affairs. The career choices for graduates with this training will also expand sharply. The integrated degree program prepares students for a variety of careers requiring an interdisciplinary background in German and international affairs. Examples of types of entities hiring in these areas are federal, state, and local governments, international organizations, multinational corporations, international banking and financial institutions, media organizations and journalism, consulting firms, policy research centers, and development assistance programs and foundations. The School of International Affairs (SIA) Master of International Affairs (M.I.A.) represents a professional degree designed to prepare students to thrive in these increasingly global career paths.
Admission Requirements
Applicants apply for admission to the program via the Graduate School application (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

The number of openings in the integrated B.S./M.I.A. program is limited. Admission will be selective based on specific criteria set by the School of International Affairs. Students shall be admitted to an IUG program no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree, as specified in the proposed IUG plan of study. Students must be admitted to the program prior to taking the first course they intend to count towards the graduate degree. Specific requirements:

1. Must be enrolled in the German B.S. program.
2. Must apply to and be accepted into The Graduate School and the M.I.A. program in the School of International Affairs. Students must complete the Graduate School application (http://www.gradschool.psu.edu/prospective-students/how-to-apply). All applicants will submit GRE scores, two letters of recommendation, and a personal statement addressing their reasons for pursuing a graduate degree in international affairs and discussing their plans and goals.
3. Although the program has no fixed minimum grade point average, an applicant is generally expected to have a minimum overall GPA of 3.5 (on a 4.0 scale) in undergraduate course work and a minimum GPA of 3.5 in all course work completed for the major.
4. Must include a plan of study identifying undergraduate credits to be applied to the M.I.A. degree elective requirements. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser.
5. Must provide written endorsement from the head of Germanic and Slavic Languages and Literatures.

Degree Requirements
Students must fulfill all requirements for each degree in order to be awarded that degree, subject to the double-counting of credits as outlined below. Degree requirements for the Bachelor of Science in German are listed in the Undergraduate Bulletin (http://bulletins.psu.edu/undergraduate). Degree requirements for the M.I.A. degree are listed on the Degree Requirements tab. If students accepted into the IUG program are unable to complete the M.I.A. degree, they are still eligible to receive their undergraduate degree if all the undergraduate degree requirements have been satisfied.

Up to 12 credits may be double-counted towards the degree requirements for both the graduate and undergraduate degrees; a minimum of 50% of the double-counted courses must be at the 500 or 800 level.

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<td>GER 494</td>
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GER 540 Seminar in German Culture and Civilization 3-12
GER 581 Topics in Literary Genres 3-12
GER 592 Seminar in German Literature 3

The graduate thesis or other graduate culminating/capstone experience (including any associated credits and/or deliverables) may not be double counted towards any other degree.

Tuition Charges, Grant-in-Aid, and Assistantships
Students admitted to the School of International Affairs through the IUG with a B.S. in German may be considered to receive financial assistance. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

Integrated B.A. in International Politics and M.I.A. in International Affairs
Requirements listed here are in addition to requirements listed in GCAC-210 Integrated Undergraduate-Graduate (IUG) Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-210/integrated-undergraduate-graduate-degree-programs).

The integrated undergraduate-graduate (IUG) degree program (B.A. in International Politics/M.I.A. in International Affairs) provides an opportunity for strong students in International Politics to complete a master’s degree with 5 total years of study. The demand for graduate training in international affairs will grow significantly in the near future along with the burgeoning requirements for international knowledge and professional experience in commerce, humanitarian service, and public affairs. The career choices for graduates with this training will also expand sharply. The integrated degree program prepares students for a variety of careers requiring an interdisciplinary background in politics and international affairs. Examples of types of entities hiring in these areas are federal, state, and local governments, international organizations, multinational corporations, international banking and financial institutions, media organizations and journalism, consulting firms, policy research centers, and development assistance programs and foundations.

Admission Requirements
Applicants apply for admission to the program via the Graduate School application (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

The number of openings in the integrated B.A./M.I.A. program is limited. Admission will be selective based on specific criteria set by the School of International Affairs. Students shall be admitted to an IUG program no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree, as specified in the proposed IUG plan of study. Students must be admitted to the program prior to taking the first course they intend to count towards the graduate degree. Specific requirements:

1. Must be enrolled in the International Politics B.A. program.
2. Must apply to and be accepted into The Graduate School and the M.I.A. program in the School of International Affairs. Students must complete the Graduate School application (http://www.gradschool.psu.edu/prospective-students/how-to-apply). All
applicants will submit GRE scores, two letters of recommendation and a personal statement addressing their reasons for pursuing a graduate degree in international affairs and discussing their plans and goals.

3. Although the program has no fixed minimum grade-point average, an applicant is generally expected to have a minimum overall GPA of 3.5 (on a 4.0 scale) in undergraduate course work and a minimum GPA of 3.5 in all course work completed for the major.

4. Must include a plan of study identifying undergraduate credits to be applied to the M.I.A. degree elective requirements. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser as the student advances through the program.

5. Must provide written endorsement from the head of the undergraduate program/department.

Degree Requirements
Students must fulfill all requirements for each degree in order to be awarded that degree, subject to the double-counting of credits as outlined below. Degree requirements for the Bachelor of Arts in International Politics are listed in the Undergraduate Bulletin (http://bulletins.psu.edu/undergraduate). Degree requirements for the M.I.A. degree are listed on the Degree Requirements tab. If students accepted into the IUG program have been satisfied.

Up to 9 credits may be double-counted towards the degree requirements for both the graduate and undergraduate degrees; a minimum of 50% of the double-counted courses must be at the 500 or 800 level. The following 9 credits may be double-counted toward the B.A. and the M.I.A.:

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<td>PLSC 415</td>
<td>International Organization: Political and Security Functions</td>
<td>3</td>
</tr>
<tr>
<td>PLSC 550</td>
<td>Comparative Politics: Theory and Methodology</td>
<td>3</td>
</tr>
<tr>
<td>PLSC 554</td>
<td>The Politics of Development</td>
<td>3</td>
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<td><strong>Total Credits</strong></td>
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<td><strong>9</strong></td>
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</table>

The graduate thesis or other graduate culminating/capstone experience (including any associated credits and/or deliverables) may not be double counted towards any other degree.

Tuition Charges, Grant-in-Aid, and Assistantships
Students admitted to the School of International Affairs through the IUG with International Politics may be considered to receive financial assistance. Students on graduate assistantships must adhere to the policies set by The Graduate School.

Integrated B.A. in Japanese and M.I.A. in International Affairs
Requirements listed here are in addition to requirements listed in GCAC-210 Integrated Undergraduate-Graduate (IUG) Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200-integrated-undergraduate-graduate-degree-programs).

The integrated undergraduate-graduate (IUG) degree program (B.A. in Japanese/M.I.A. in International Affairs) provides an opportunity for strong students in this major to complete a master's degree with 5 total years of study.

An increasingly globalized economy is likely to escalate the demand for graduate training in international affairs. The career choices for graduates with this training will also expand sharply.

The integrated degree program prepares students for a variety of careers requiring an interdisciplinary background in Asian languages and international affairs. Examples of types of entities hiring in these areas are federal, state, and local governments, international organizations, multinational corporations, international banking and financial institutions, media organizations and journalism, consulting firms, policy research centers, and development assistance programs and foundations. The School of International Affairs (SIA) Master of International Affairs (M.I.A.) represents a professional degree designed to prepare students to thrive in these increasingly global career paths.

Admission Requirements
Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

The number of openings in the integrated B.A./M.I.A. program is limited. Admission will be selective based on specific criteria set by the School of International Affairs. Students shall be admitted to an IUG program no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of expected conferal of the undergraduate degree, as specified in the proposed IUG plan of study. Students must be admitted to the program prior to taking the first course they intend to count towards the graduate degree. Specific requirements:

1. Must be enrolled in the Asian Studies, Chinese, or Japanese B.A. program.

2. Must apply to and be accepted into The Graduate School and the M.I.A. program in the School of International Affairs. Students must complete the Graduate School application (http://www.gradschool.psu.edu/prospective-students/how-to-apply). All applicants will submit GRE scores, two letters of recommendation, and a personal statement addressing their reasons for pursuing a graduate degree in international affairs and discussing their plans and goals.

3. Although the program has no fixed minimum grade point average, an applicant is generally expected to have a minimum overall GPA of 3.5 (on a 4.0 scale) in undergraduate course work and a minimum GPA of 3.5 in all course work completed for the major.

4. Must include a plan of study identifying undergraduate credits to be applied to the M.I.A. degree elective requirements. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser.

5. Must provide written endorsement from the head of Asian Studies.

Degree Requirements
Students must fulfill all requirements for each degree in order to be awarded that degree, subject to the double-counting of credits as outlined below. Degree requirements for the Bachelor of Arts in Japanese are listed on the Undergraduate Bulletin (http://bulletins.psu.edu/undergraduate). Degree requirements for the M.I.A. degree are listed in the Degree Requirements tab. If students accepted into the IUG program are
unable to complete the M.I.A. degree, they are still eligible to receive their undergraduate degree if all the undergraduate degree requirements have been satisfied.

Up to 12 credits may be double-counted towards the degree requirements for both the graduate and undergraduate degrees; a minimum of 50% of the double-counted courses must be at the 500 or 800 level.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASIA 400</td>
<td>International Culture in East Asia</td>
<td>3</td>
</tr>
<tr>
<td>ASIA 401</td>
<td>Technology &amp; Society in Modern Asia</td>
<td>3</td>
</tr>
<tr>
<td>ASIA 430</td>
<td>Japan in the World</td>
<td>3</td>
</tr>
<tr>
<td>ASIA 463</td>
<td>Government and Politics of China</td>
<td>3</td>
</tr>
<tr>
<td>ASIA 465Y</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ASIA 469</td>
<td>Government and Politics of South Asia</td>
<td>3</td>
</tr>
<tr>
<td>ASIA 475Y</td>
<td>The Making and Emergence of Modern India</td>
<td>3</td>
</tr>
<tr>
<td>ASIA 481</td>
<td>Modern Japan Since 1800</td>
<td>3</td>
</tr>
<tr>
<td>ASIA 486</td>
<td>China in Revolution</td>
<td>3</td>
</tr>
<tr>
<td>ASIA 501</td>
<td>Proseminar in Asian Studies I</td>
<td>1-3</td>
</tr>
<tr>
<td>ASIA 502</td>
<td>Proseminar in Asian Studies II</td>
<td>1-3</td>
</tr>
<tr>
<td>ASIA 577</td>
<td>Critical Perspectives on Modern Chinese Literature</td>
<td>3</td>
</tr>
</tbody>
</table>

The graduate thesis or other graduate culminating/capstone experience (including any associated credits and/or deliverables) may not be double counted towards any other degree.

### Tuition Charges, Grant-in-Aid, and Assistantships

Students admitted to the School of International Affairs through the IUG with a B.A. in Asian Studies, Chinese, or Japanese may be considered to receive financial assistance. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

### Integrated B.A. in Political Science and M.I.A. in International Affairs

Requirements listed here are in addition to requirements listed in GCAC-210 Integrated Undergraduate-Graduate (IUG) Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/integrated-undergraduate-graduate-degree-programs).

The integrated undergraduate-graduate (IUG) degree program (B.A. in Political Science/M.I.A. in International Affairs) provides an opportunity for strong students in Political Science to complete a master’s degree with 5 total years of study.

An increasingly globalized economy is likely to escalate the demand for graduate training in international affairs. The career choices for graduates with this training will also expand sharply. The integrated degree program prepares students for a variety of careers requiring an interdisciplinary background in politics and international affairs. Examples of types of entities hiring in these areas are: federal, state, and local governments, international organizations, multinational corporations, international banking and financial institutions, media organizations and journalism, consulting firms, policy research centers, and development assistance programs and foundations. The School of International Affairs (SIA) Master of International Affairs (M.I.A.) represents a professional degree designed to prepare students to thrive in these increasingly global career paths.

### Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

The number of openings in the integrated B.A./M.I.A. program is limited. Admission will be selective based on specific criteria set by the School of International Affairs. Students shall be admitted to an IUG program no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree, as specified in the proposed IUG plan of study. Students must be admitted to the program prior to taking the first course they intend to count towards the graduate degree. Specific requirements:

1. Must be enrolled in the Political Science B.A. program.
2. Must apply to and be accepted into The Graduate School and the M.I.A. program in the School of International Affairs. Students must complete the Graduate School application (http://www.gradschool.psu.edu/prospective-students/how-to-apply). All applicants will submit GRE scores, two letters of recommendation and a personal statement addressing their reasons for pursuing a graduate degree in international affairs and discussing their plans and goals.
3. Although the program has no fixed minimum grade-point average, an applicant is generally expected to have a minimum overall GPA of 3.5 (on a 4.0 scale) in undergraduate course work and a minimum GPA of 3.5 in all course work completed for the major.
4. Must include a plan of study identifying undergraduate credits to be applied to the M.I.A. degree elective requirements. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser as the student advances through the program.
5. Must provide written endorsement from the head of Political Science.

### Degree Requirements

Students must fulfill all requirements for each degree in order to be awarded that degree, subject to the double-counting of credits as outlined below. Degree requirements for the Bachelor of Arts in Political Science are listed in the Undergraduate Bulletin (http://bulletins.psu.edu/undergraduate). Degree requirements for the M.I.A. degree are listed on the Degree Requirements tab. If students accepted into the IUG program are unable to complete the M.I.A. degree, they are still eligible to receive their undergraduate degree if all the undergraduate degree requirements have been satisfied.

Up to 9 credits may be double-counted towards the degree requirements for both the graduate and undergraduate degrees; a minimum of 50% of the double-counted courses must be at the 500 or 800 level. The following 9 credits may be double-counted toward the B.A. and the M.I.A. degree:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLSC 415</td>
<td>International Organization: Political and Security Functions</td>
<td>3</td>
</tr>
<tr>
<td>PLSC 550</td>
<td>Comparative Politics: Theory and Methodology</td>
<td>3</td>
</tr>
</tbody>
</table>
PLSC 554  The Politics of Development  3

Total Credits  9

The graduate thesis or other graduate culminating/capstone experience (including any associated credits and/or deliverables) may not be double counted towards any other degree.

**Tuition Charges, Grant-in-Aid, and Assistantships**

Students admitted to the School of International Affairs through the IUG with Political Science may be considered to receive financial assistance. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

**Integrated B.A. in Russian and M.I.A. in International Affairs**

Requirements listed here are in addition to requirements listed in GCAC-210 Integrated Undergraduate-Graduate (IUG) Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/integrated-undergraduate-graduate-degree-programs).

The integrated undergraduate-graduate (IUG) degree program (B.A. in Russian/M.I.A. in International Affairs) provides an opportunity for strong students in this major to complete a master’s degree with 5 total years of study.

An increasingly globalized economy is likely to escalate the demand for graduate training in international affairs. The career choices for graduates with this training will also expand sharply. The integrated degree program prepares students for a variety of careers requiring an interdisciplinary background in Russian and international affairs. Examples of types of entities hiring in these areas are federal, state, and local governments, international organizations, multinational corporations, international banking and financial institutions, media organizations and journalism, consulting firms, policy research centers, and development assistance programs and foundations. The School of International Affairs (SIA) Master of International Affairs (M.I.A.) represents a professional degree designed to prepare students to thrive in these increasingly global career paths.

**Admission Requirements**

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

The number of openings in the integrated B.A./M.I.A. program is limited. Admission will be selective based on specific criteria set by the School of International Affairs. Students shall be admitted to an IUG program no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree, as specified in the proposed IUG plan of study. Students must be admitted to the program prior to taking the first course they intend to count towards the graduate degree. Specific requirements:

1. Must be enrolled in the Russian B.A. program.
2. Must apply to and be accepted into The Graduate School and the M.I.A. program in the School of International Affairs. Students must complete the Graduate School application (http://www.gradschool.psu.edu/prospective-students/how-to-apply).

All applicants will submit GRE scores, two letters of recommendation, and a personal statement addressing their reasons for pursuing a graduate degree in international affairs and discussing their plans and goals.

3. Although the program has no fixed minimum grade point average, an applicant is generally expected to have a minimum overall GPA of 3.5 (on a 4.0 scale) in undergraduate course work and a minimum GPA of 3.5 in all course work completed for the major.

4. Must include a plan of study identifying undergraduate credits to be applied to the M.I.A. degree elective requirements. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser.

5. Must provide written endorsement from the head of Germanic and Slavic Languages and Literatures.

**Degree Requirements**

Students must fulfill all requirements for each degree in order to be awarded that degree, subject to the double-counting of credits as outlined below. Degree requirements for the Bachelor of Arts in Russian are listed in the Undergraduate Bulletin (http://bulletins.psu.edu/undergraduate). Degree requirements for the M.I.A. degree are listed on the Degree Requirements tab. If students accepted into the IUG program are unable to complete the M.I.A. degree, they are still eligible to receive their undergraduate degree if all the undergraduate degree requirements have been satisfied.

**Courses Eligible to Double Count for Both Degrees**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>RUS 400</td>
<td>Senior Seminar in Russian Culture</td>
<td>3</td>
</tr>
<tr>
<td>RUS 405</td>
<td>Seminar in Russian Literature</td>
<td>3-6</td>
</tr>
<tr>
<td>RUS 406</td>
<td>Russian Film</td>
<td>3</td>
</tr>
<tr>
<td>RUS 412</td>
<td>Russian Translation</td>
<td>3</td>
</tr>
<tr>
<td>RUS 494</td>
<td>Research Project</td>
<td>1-12</td>
</tr>
<tr>
<td>RUS 501</td>
<td>Readings in Russian Literature</td>
<td>3-6</td>
</tr>
<tr>
<td>RUS 525</td>
<td>Pushkin</td>
<td>3</td>
</tr>
</tbody>
</table>

Up to 12 credits may be double-counted towards the degree requirements for both the graduate and undergraduate degrees; a minimum of 50% of the double-counted courses must be at the 500 or 800 level. The graduate thesis or other graduate culminating/capstone experience (including any associated credits and/or deliverables) may not be double counted towards any other degree.

**Tuition Charges, Grant-in-Aid, and Assistantships**

Students admitted to the School of International Affairs through the IUG with Russian may be considered to receive financial assistance. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

**Joint Degrees**

**Joint J.D./M.I.A. with Penn State Law**

Requirements listed here are in addition to requirements listed in GCAC-211 Joint Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/joint-degree-programs).

Penn State Law and the School of International Affairs (SIA) offer a joint degree program that will enable a student to complete in four academic years both a Juris Doctor degree (J.D.) and a Master of International Affairs (M.I.A.). A J.D./M.I.A. graduate will have the education and
skills background to practice law in the United States, to work in an international context and to assume a leadership role in international affairs.

Admission Requirements
Students must apply to and meet the admission requirements of both the graduate program in which they intend to receive their graduate degree and the professional degree program. Admissions requirements and applications for admission for Penn State Law are available at the J.D. Admissions (https://pennstatelaw.psu.edu/penn-state-law-jd-admissions) section of the Penn State Law website.

Students applying to the joint degree program must be admitted separately into both Penn State Law and the School of International Affairs.

Residency
A typical J.D./M.I.A. joint degree student will be in residence at Penn State Law for six semesters and at SIA for two semesters.

Liaisons
The respective liaisons for Penn State Law and SIA shall be as follows: the department and faculty liaisons for Penn State Law shall be the Associate Dean for Academic Affairs and the student adviser will be the Associate Dean for Academic Affairs or such other faculty member(s) as may be designated by the Dean. The liaison for SIA shall be the Director or such faculty member(s) as may be designated by the Director.

Double-Counting of Credits

Penn State Law
A maximum of twelve credits of M.I.A. course work may be double-counted for credit toward the J.D. degree at Penn State Law. Courses eligible for double-counting towards the J.D. and M.I.A. include the courses on the M.I.A. Electives list and any other courses taken as M.I.A. electives with the express written permission of the M.I.A. and J.D. advisers. Students must obtain a grade satisfactory to Penn State Law for the course work to be credited towards the J.D. degree.

SIA
A maximum of twelve credits of law school course work may be double-counted for credit toward the M.I.A. degree. Courses eligible for double-counting towards the J.D. and M.I.A. include the courses on the M.I.A. Electives list and any other courses taken as M.I.A. electives with the express written permission of the M.I.A. and J.D. advisers.

Sequence
Joint degree students will complete their SIA core courses by the end of the second year of the joint degree program. The third and fourth year of the joint program will be in residence with Penn State Law and will include both required law classes and remaining electives to fulfill the M.I.A.

Recommended Program of Study and Advising
All students in the program will have two advisers, one from Penn State Law and one from SIA. Periodic interaction between the two advisers is encouraged. A program of study is developed for each student, taking into account the fact that some courses at both locations are offered on a rotating or intermittent basis. Many courses are offered every year but some are offered every two or three years. Advisers will have available a list of projected relevant courses or educational experiences in order to work with the student on an individualized program of study. The standard committee structure will apply to the SIA programs.

Tuition
Students will be charged the applicable Penn State Law tuition to cover the J.D. program and the applicable SIA tuition to cover the M.I.A. degree program. The Penn State Law tuition will be paid for the semesters that the student is in residence at Penn State Law, and the SIA tuition will be paid for the semesters that the student is in residence there. A student may take up to one course (3 credit hours) per semester in the school where the student is not in residence without any change in tuition, but must pay additional tuition to the non-residential program if he or she wishes to take additional course work in that program during that semester.

Financial Aid and Assistantships
Decisions on financial aid and assistantships are made by each school according to that school's procedures. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

Fulfillment of Degree Requirements and Graduation
A student in the program may complete the requirements for one of the degrees and be awarded that degree prior to completing all the requirements for the other degree; provided, however, that the student shall have successfully completed at least two semesters of work towards the other degree. All courses in one program that will count towards meeting the requirements of the other must be completed before the awarding of either degree. Students will be required to fulfill all requirements for each degree in order to be awarded that degree, subject to the inter-program transfer of credits. If students accepted into the joint degree program are unable to complete the J.D. degree, they are still eligible to receive the M.I.A. degree if all the M.I.A. degree requirements have been satisfied.

Important Note: If the joint degree student is using law (900-level) credits toward the graduate degree during their last semester of enrollment, they should be prepared to extend their graduate degree graduation to a subsequent semester (the following semester at a minimum). This is due to the graduate degree approval deadline falling before the law (900-level) course grading processes are complete.

Student Aid
Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Learning Outcomes
1. KNOW: International Affairs students will demonstrate a basic cross-disciplinary knowledge of the components and dynamics of the
international system, international economics, international actors and institutions, and processes of globalization.

2. **KNOW:** International Affairs students will acquire concentrated knowledge in a specific area of focus that will enable them to respond creatively and effectively to local and global challenges.

3. **APPLY/CREATE:** International Affairs students will develop techniques of research in International Affairs.

4. **COMMUNICATE:** International Affairs will demonstrate competence in the techniques of scholarly writing in international affairs.

5. **COMMUNICATE:** International Affairs will develop skills in oral and written communication to articulate ideas and arguments clearly and effectively.

6. **COMMUNICATE:** International Affairs students will demonstrate competence at the ACTFL intermediate level or higher in the use of a modern foreign language.

7. **THINK:** International Affairs students will be able to analyze an international problem or issue in a manner that demonstrates global or regional understanding and sensitivity to cultural difference.

8. **PROFESSIONAL PRACTICE/ETHICS:** International Affairs students will develop the capacities for self-reflection, ethical reasoning and effective interaction with others so as to act responsibly and to promote justice and sustainability in professional and communal life.

### Contact

**Graduate Program Head:** Scott Gartner

**Primary Program Contact:** Christie Persio

**Email:** czp76@psu.edu

**Mailing Address:** 250D Lewis Katz, University Park, PA 16802

**Telephone:** (814) 863-0788

**Program Website:** International Affairs (http://www.sia.psu.edu)

### International Agriculture and Development

**Graduate Program Head**

Edwin Rajotte

**Program Code**

INTAD

**Campus(es)**

University Park

**Degrees Conferred**

Dual-Title

**The Graduate Faculty**

View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=INTAD)

Students electing this degree program through participating programs will earn a degree with a dual-title at the Master’s or Ph.D. level. Students receive a degree that lists their major program and International Agriculture and Development (INTAD).

The International Agriculture and Development (INTAD) program is offered through the Departments of Agricultural Economics, Sociology, and Education, Entomology, Forest Resources, Environmental Systems Management, Plant Pathology and Environmental Microbiology, and Plant Sciences. The dual-title degree enables qualified students from the College of Agricultural Sciences (CAS) and other select programs at Penn State to combine their major degree with an internationally focused program of study to gain global competency skills and techniques for application of their discipline in a global environment.

The following graduate programs offer the dual-title in INTAD:

- M.S. and Ph.D. in Agricultural and Biological Engineering (ABENG)
- M.S. and Ph.D. in Agricultural and Extension Education (AEE)
- M.S. and Ph.D. in Agronomy (AGRO)
- M.S. and Ph.D. in Entomology (ENT)
- M.S. and Ph.D. in Food Science (FDSC)
- M.S. and Ph.D. in Forest Resources (FORR)
- M.S. and Ph.D. in Horticulture (HORT)
- M.S. and Ph.D. in Plant Pathology (PPATH)
- M.S. and Ph.D. in Rural Sociology (RSOC)
- M.S. and Ph.D. in Soil Sciences (SOILS)

The INTAD dual-title graduate degree program is administered by the INTAD Academic Program Management Committee. The committee maintains the curriculum, identifies courses appropriate for the program, and develops and recommends policy and procedures for the program's operation to the dean of the College of Agricultural Sciences and the dean of the Graduate School. Members of the Graduate Faculty in INTAD also serve on master’s and doctoral committees for students who are accepted into the dual-title program. This dual-title program enables students to learn about international agriculture while maintaining a close association with their primary area of interest in their home department.

### Admission Requirements

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

Students must apply and be admitted to their primary graduate program and The Graduate School before they can apply for admission to the INTAD dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of INTAD dual-title program. The student will submit an application to the INTAD Academic Program Committee. The application will include a written personal statement indicating the career goals they hope to accomplish by earning a dual-title degree. Doctoral students must be admitted into the dual-title degree program in INTAD prior to taking the qualifying examination in their primary graduate program.

### Degree Requirements

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

To qualify for the INTAD dual-title degree, students must satisfy the requirements of the primary graduate program in which they are enrolled. In addition, they must satisfy the minimum requirements of the INTAD dual-title degree specified here.

Graduates of the dual-title INTAD master’s degree program who wish to pursue an INTAD doctoral degree must re-apply to the INTAD program for admission. INTAD master’s degree credits may be carried over to the doctoral program. Six additional INTAD credits will be required. INTAD
master's degree graduates who pursue an INTAD Ph.D. are required to take INTAD 820 a second time.

**Master's Degrees**

**Course Requirements**

Students are required to complete a minimum of 12 INTAD course credits (400, 500, or 800) for a dual-title master's degree. Nine credits will form the core curriculum:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTAD 820</td>
<td>International Agricultural Development Seminar</td>
<td>3</td>
</tr>
<tr>
<td>AEE 450</td>
<td>Program Design and Delivery</td>
<td>3</td>
</tr>
<tr>
<td>CEDEV 505</td>
<td>Leadership Development</td>
<td>3</td>
</tr>
</tbody>
</table>

**Electives**

The remaining three credits must be taken as an internship or applied course/independent study with international development content.

**Total Credits**

12

Final course selection is determined by the students, their major program advisers and their INTAD advisers. These advisers will discuss with the student a program of study that meets the student's career goals and that is in accord with the policies of the Graduate Council and the INTAD dual-title program. Some courses may satisfy both the major graduate program requirements and those of the INTAD dual-title program.

**Thesis**

Students pursuing a M.S. degree that requires a master's thesis, in addition to the 12 credits specified above, must write the thesis on a topic that reflects both their primary graduate program and the dual-title in INTAD. At least 6 thesis research credits (600 or 610) must be taken in the student's primary graduate program.

All members of the student's committee for the dual-title master's degree will be members of the Graduate Faculty. The committee must include at least one Graduate Faculty member from INTAD.

**Doctoral Degrees**

Students admitted to the doctoral INTAD dual-title offering must exhibit high research competence, including ability to identify, conceptualize, and execute a significant research project that makes a significant addition to the body of knowledge in the field. Students also must be fluent in reading, writing, and speaking English.

**Course Requirements**

Students are required to complete a minimum of 18 INTAD credits for a dual-title Ph.D. degree. The 18 required credits must be at the 500 or 800 level. Nine credits will form the core curriculum:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTAD 820</td>
<td>International Agricultural Development Seminar</td>
<td>3</td>
</tr>
<tr>
<td>RSOC 517</td>
<td>International Rural Social Change</td>
<td>3</td>
</tr>
<tr>
<td>RSOC 508</td>
<td>Sociology of Agriculture</td>
<td>3</td>
</tr>
<tr>
<td>or RSOC 555</td>
<td>Human Dimensions of Natural Resources</td>
<td>3</td>
</tr>
</tbody>
</table>

**Electives**

The remaining 9 credits must be taken from among INTAD electives.

**Total Credits**

18

In addition, students will be encouraged to pursue proficiency in a language other than English, as appropriate.

Final course selection is determined by the students and their dissertation committees. The dissertation committee will discuss with the student a program of study that meets the student's career goals and that is in accord with the policies of the Graduate Council and the INTAD dual-title program. Some courses may satisfy both the major graduate program requirements and those of the INTAD dual-title program.

Permission from a student's dissertation committee, in consultation with the program chair, is required to substitute a 400-level course for a 500-level course.

**Qualifying Examination**

The qualifying examination committee for the dual-title Ph.D. degree must include at least one Graduate Faculty member from INTAD program. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. There will be a single qualifying examination, containing elements of both the primary graduate degree program and INTAD. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

**Committee Composition**

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of an INTAD dual-title doctoral degree student must include at least one member of the INTAD Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in INTAD, the member of the committee representing INTAD must be appointed as co-chair.

**Comprehensive Exam**

At the end of their course work, students must pass a comprehensive examination that follows the guidelines established by the primary program and reflects both their primary program and the dual-title degree curriculum. International agriculture must be one of the key areas of the exam and the INTAD representative on the student's dissertation committee must have input into the development of and participate in the evaluation of the comprehensive examination.

**Dissertation and Dissertation Defense**

Doctoral students enrolled in the dual-title degree program are required to write and orally defend a dissertation on a topic that reflects their original research and education in both their primary program and the INTAD dual-title program. The dissertation should contribute to the body of knowledge in international agriculture. A public oral presentation of the dissertation is required. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School, and the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree.

**Student Aid**

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding section of The Graduate School's website. Students on graduate assistantships must adhere to the course load limits set by The Graduate School.
A limited number of Research Assistantships are also available through the College of Agricultural Sciences.

**Courses**

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**Learning Outcomes**

**Master’s Degrees**

1. In addition to competency in the core discipline, INTAD graduates will demonstrate in-depth knowledge of political, economic, social and environmental components of global food systems.

2. In addition to competency in the core discipline, INTAD graduates will apply knowledge and skills to implement sophisticated, appropriate and workable solutions to address complex global agricultural problems using interdisciplinary perspectives in both independent and collaborative situations.

3. In addition to competency in the core discipline, INTAD graduates will be able to identify, organize and synthesize information from appropriate scholarly sources, engage in collaboration with diverse partners, and effectively communicate the critical issues of global food issues with diverse audiences.

4. In addition to competency in the core discipline, INTAD graduates will learn, critically evaluate and apply diverse perspectives to complex subjects within natural and human systems.

5. In addition to competency in the core discipline, INTAD graduates will take informed and responsible action to address ethical, social and environmental challenges in global food systems and evaluate the local and broader consequences of individual and collective interventions.

**Doctoral Degrees**

1. In addition to competency in the core discipline, INTAD graduates will demonstrate in-depth knowledge of political, economic, social and environmental components of global food systems.

2. In addition to competency in the core discipline, INTAD graduates will apply knowledge and skills to implement sophisticated, appropriate and workable solutions to address complex global agricultural problems using interdisciplinary perspectives in both independent and collaborative situations.

3. In addition to competency in the core discipline, INTAD graduates will be able to identify, organize and synthesize information from appropriate scholarly sources, engage in collaboration with diverse partners, and effectively communicate the critical issues of global food issues with diverse audiences.

4. In addition to competency in the core discipline, INTAD graduates will learn, critically evaluate and apply diverse perspectives to complex subjects within natural and human systems.

5. In addition to competency in the core discipline, INTAD graduates will take informed and responsible action to address ethical, social and environmental challenges in global food systems and evaluate the local and broader consequences of individual and collective interventions.

**Contact**

Graduate Program Head: Edwin Rajotte  
Director of Graduate Studies/Professor-in-Charge: Leland Glenna  
Primary Program Contact: Melanie Miller Foster  
Email: mjm727@psu.edu  
Mailing Address: 106 Ag Admin, University Park, PA 16802  
Telephone: (814) 867-3831  
Program Website: International Agriculture and Development (http://agsci.psu.edu/international/graduatestudents/intad)

**Kinesiology**

**Graduate Program Head**  
Nancy I. Williams  
**Program Code**  
KINES  
**Campus(es)**  
University Park (Ph.D., M.S.)  
**Degrees Conferred**  
Doctor of Philosophy (Ph.D.)  
Master of Science (M.S.)  
Dual-Title Ph.D. in Kinesiology and Clinical and Translational Sciences

**The Graduate Faculty**

View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=KINES)

The graduate programs in Kinesiology are research oriented and are designed to meet the specific goals and interests of the student. The primary goal of the overall program is to provide students the opportunity to study in depth one area of specialization and to develop necessary research skills to enhance their professional competence. The master’s program is designed to prepare students for future graduate study, while the doctoral program is directed toward careers in research and in teaching at the advanced undergraduate and graduate levels in colleges and universities. Six areas of study are available at both the master’s and doctoral levels:

1. Athletic training and sports medicine  
2. Biomechanics  
3. Exercise physiology  
4. History and philosophy of sport  
5. Motor control  
6. Psychology of physical activity

Several well-equipped research facilities are available to support graduate study, including the Biomechanics Laboratory, Motor Behavior Laboratory, and Noll Physiological Research Center.

**Admission Requirements**

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).
Scores from the Graduate Record Examinations (GRE) are required for admission. The minimum requirements for admission to the master’s program include:

- a 3.00 junior/senior grade-point average (on a 4.00 scale),
- satisfactory recommendations,
- a total of 1000 or higher on the verbal and quantitative sections of the GRE,
- and appropriate background courses in physical, biological, behavioral, and/or social science, depending on the intended area of specialization.

Candidates from majors other than exercise and sport science/physical education are welcome to apply. In addition, doctoral applicants are expected to meet more stringent admission standards, including documented research capabilities (e.g., from an M.S. degree). Experience is highly desirable. Admission is highly competitive and the best-qualified students will be admitted subject to space availability and compatibility of the student with the department’s research mission.

**Degree Requirements**

**Master of Science (M.S.)**

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

The M.S. program of study in the Department of Kinesiology requires a minimum of 30 credits, including:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Required Courses</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 credits from the six Department of Kinesiology areas of graduate study 1</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>6 credits of classes offered outside the Department of Kinesiology 1</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>KINES 590</td>
<td>Colloquium (two semesters)</td>
<td>2</td>
</tr>
<tr>
<td><strong>Electives</strong></td>
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</tr>
<tr>
<td>10 elective credits</td>
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<td></td>
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<tr>
<td><strong>Culminating Experience</strong></td>
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<td></td>
</tr>
<tr>
<td>KINES 600</td>
<td>Thesis Research</td>
<td>6</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td></td>
<td>30</td>
</tr>
</tbody>
</table>

1 For all of which the student must receive a quality letter grade.

Each specialization may require additional, specific courses. At least 18 credits in the 500 and 600 series combined must be included in the program. A minimum of 12 credits in course work (400, 500, and 800 series), as contrasted with research, must be completed in the major.

M.S. degree students must complete Scholarship and Research Integrity (SARI) training (10 hours) and demonstrate proficiency in the English language.

The M.S. degree also requires the formation of a master’s committee, the writing of a satisfactory thesis accepted by the master’s committee, the head of the graduate program, and the Graduate School, and the passing of a thesis defense. The final public oral examination, conducted by the candidate’s committee members, must be scheduled and passed after all other work, including the M.S. thesis, has been completed.

**Doctor of Philosophy (Ph.D.)**

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

A program to meet the individual needs of each student is planned with the adviser in consultation with the doctoral committee members. Regardless of the area of study, the following are required of all Kinesiology doctoral degree candidates:

<table>
<thead>
<tr>
<th>Code</th>
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<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>15 credits from the six Department of Kinesiology areas of graduate study 1, 2</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>6 credits of classes offered outside the Department of Kinesiology 1</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>KINES 590</td>
<td>Colloquium (all semesters until after the comprehensive exam has been passed)</td>
<td>Varies</td>
</tr>
</tbody>
</table>

| Scholarship and Research Integrity (SARI) training (10 hours) | |

**Total Credits** 21

1 For all of which the student must receive a quality letter grade.

2 A maximum of six (6) credits only from KINES 596 Independent Studies may count toward the 15 departmental credits required for the degree.

Beyond this minimum of 21 credits, the student’s adviser, and dissertation committee in consultation with the student set the structure and content of the doctoral program.

All doctoral students must pass a qualifying examination, a comprehensive written and oral examination, and a final oral examination (the dissertation defense). To earn the Ph.D. degree, doctoral students also must write a dissertation that is accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

**Dual-Titles**

**Dual-Title Ph.D. in Kinesiology and Clinical and Translational Sciences**

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

Doctoral students with research and educational interests in clinical and translational science may apply for the Dual-Title Ph.D. in Kinesiology and Clinical and Translational Sciences following admission to the Graduate School and Kinesiology and prior to taking the qualifying examination in Kinesiology. An admissions committee comprised of faculty affiliated with the dual-title program will evaluate applicants. Applicants must have a graduate GPA of at least 3.5 in a research area related to human health. Prospective dual-title program students will write a statement of purpose that addresses the ways in which their research and professional goals will be enhanced by an interdisciplinary course of study in clinical and translational sciences.

This dual-title degree program emphasizes interdisciplinary scholarship at the interface of basic sciences, clinical sciences, and human health. Students in the dual-title program are required to have two advisers from separate disciplines: one individual serving as the primary mentor in the Graduate Program in Kinesiology and another individual serving as the...
secondary mentor in an area covered by the dual-title program who is a member of the Clinical and Translational Sciences faculty.

To qualify for the dual-title degree in Kinesiology and Clinical and Translational Sciences, students must satisfy the Kinesiology Ph.D. degree requirements listed on the Degree Requirements tab. In addition, the Dual-Title Ph.D. Degree in Kinesiology and Clinical and Translational Sciences requires the completion of 18 credits of course work from an approved list of courses. Students must select three credits in each of the following six areas:

1. Epidemiology
2. Bioinformatics
3. Experimental design and interpretation
4. Statistics
5. Regulatory environment
6. Scientific communication

At least half of the 18 credits must be at the 500 level or above. Up to 12 credits of course work may overlap with required elective courses of the Graduate Program in Kinesiology.

For students in the dual-title program, the qualifying examination will include content from both Kinesiology and Clinical and Translational Sciences, and must be completed within four semesters (summer sessions do not count) of entry into the Kinesiology graduate program. The qualifying examination committee must include at least one member of the Clinical and Translational Sciences Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role.

The dissertation committee of a Kinesiology and Clinical and Translational Sciences dual-title Ph.D. student must include at least one member of the CTS Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in Clinical and Translational Sciences, the member of the committee representing Clinical and Translational Sciences must be appointed as co-chair. The fields of Kinesiology and CTS will be integrated in the student's comprehensive exam, and the dissertation committee member representing CTS is responsible for constructing and grading the parts of the comprehensive exam that cover the CTS field of study.

Ph.D. candidates must complete a dissertation on a topic that reflects their original research and education in both Kinesiology and Clinical and Translational Sciences. In order to earn the dual-title Ph.D. degree, the dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School, and the student must pass a final oral examination (the dissertation defense).

**Courses**

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**Learning Outcomes**

**Master of Science (M.S.)**

1. Graduates will be able to critically analyze work by others in their field of specialty.
2. Graduates will be able to carry out research independently with a secondary mentor in an area covered by the dual-title program who is a member of the Clinical and Translational Sciences faculty.
3. Graduates will be able to carry out an original research project and disseminate their research effectively via publication and/or presentation.
4. Graduates will demonstrate the ability to work in a collegial and ethical manner with other professionals within their own sub-discipline and across other kinesiology sub-disciplines.

**Doctor of Philosophy (Ph.D.)**

1. Graduates will demonstrate in-depth knowledge of the theories and methods of one of the six graduate areas of study in the Department of Kinesiology.
2. Graduates will be able to critically analyze work by others in their field of specialty.
3. Graduates will be able to identify worthwhile research questions and plan research studies to address these questions.
4. Graduates will be able to carry out multiple original and independent research studies and disseminate their research effectively via publication and/or presentation.
5. Graduates will demonstrate the ability to work in a collegial and ethical manner with other professionals within their own sub-discipline and across other kinesiology sub-disciplines and across disciplines outside of kinesiology.

**Contact**

**Graduate Program Head:** Nancy Williams  
**Director of Graduate Studies/Professor-in-Charge:** Stephen Piazza  
**Primary Program Contact:** Sharon Grassi (slg19@psu.edu)  
**Program Email:** kinesgrad@psu.edu  
**Mailing Address:** 276 Recreation Building, University Park, PA 16802  
**Telephone:** (814) 863-0847  
**Program Website:** Kinesiology (http://www.hhdev.psu.edu/kines/graduate)
Labor and Global Workers' Rights

Graduate Program Head
Mark S. Anner

Program Code
LGWR

Campus(es)
University Park (M.P.S.)

Degrees Conferred
Master of Professional Studies (M.P.S.)

The Graduate Faculty
View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=LGWR)

Labor and Global Workers' Rights is a Master of Professional Studies (M.P.S.) program of study for professionals working in the area of global labor and workers’ rights issues who would like to continue or pursue a career working on global labor and worker rights with a national or international labor union or a related organization, such as a labor research institute.

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Students who do not have a GPA of 3.0 or higher will be considered on a case-by-case basis depending on the quality of their overall application. Applicants who are still completing their baccalaureate/postsecondary requirements at the time of application may be admitted to the Graduate School provisionally (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/provisional-admission) based on the awarding of the baccalaureate degree. Students are also expected to have a minimum of three years of full-time work experience in some area related to labor unions or worker-oriented research/employment for admission. Exceptions may be made by the program chair.

Admissions decisions for the program are based on the quality of the applicant's credentials as determined by a review of the complete application portfolio. During the admission process, students who seem better suited for a different graduate program will be encouraged to apply to the appropriate program. Applicants to the M.P.S. in LGWR must submit the following materials:

- Completed online Penn State Graduate School application (http://gradschool.psu.edu/prospective-students/how-to-apply) and payment of the nonrefundable application fee;
- A 2-3 page essay articulating career and educational goals that demonstrates the applicant’s written communication skills. Documentation of a minimum of three years of full-time work and a resume should be attached as a supplement;
- Three letters of recommendation that attest to the applicant’s readiness for graduate study and document the requisite minimum of three years of work experience;
- official transcripts from all post-secondary institutions attended. (http://www.gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission)

Graduate Record Examination (GRE) scores are not required. The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. See GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

Degree Requirements

Master of Professional Studies (M.P.S.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

Total Required Credits for the MPS: 30 credits at the 400, 500, or 800 level; at least 18 credits must be at the 500 or 800 level, with at least 6 credits at the 500 level. A culminating experience is required (3 credits of LGWR 894 are included in the 30 total required credits).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>HRER 500</td>
<td>Topics in Comparative Industrial Relations</td>
<td>3</td>
</tr>
<tr>
<td>HRER 513</td>
<td>Research Methods in Human Resources and Employment Relations</td>
<td>3</td>
</tr>
<tr>
<td>LER 475</td>
<td>Labor in the Global Economy: U.S. and South African Perspectives</td>
<td>3</td>
</tr>
<tr>
<td>LGWR 510</td>
<td>International Labor Law</td>
<td>3</td>
</tr>
<tr>
<td>LGWR 520</td>
<td>Global Workers’ Rights</td>
<td>3</td>
</tr>
<tr>
<td>LGWR 596</td>
<td>Individual Studies</td>
<td>3</td>
</tr>
<tr>
<td>LGWR 895</td>
<td>Internship (strongly recommended)</td>
<td>3</td>
</tr>
<tr>
<td>Other 3 credit course approved in advance by the program chair</td>
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<tr>
<td></td>
<td>Electives</td>
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<tr>
<td>HIST 556</td>
<td>Social Movements in the Twentieth Century US</td>
<td></td>
</tr>
<tr>
<td>HRER 504</td>
<td>Seminar in Employment Relations</td>
<td></td>
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<tr>
<td>HRER 512</td>
<td>Research Methods in Human Resources and Employment Relations I</td>
<td></td>
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<td>HRER 516</td>
<td>Labor Market Analysis</td>
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<td>HRER 536</td>
<td>Diversity in the Workplace</td>
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<td>LER 435</td>
<td>Labor Relations in the Public Sector</td>
<td></td>
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<tr>
<td>LER 437</td>
<td>Workplace Dispute Resolution</td>
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</tr>
<tr>
<td>LER 458Y</td>
<td>History of Work in America</td>
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<td></td>
<td>Culminating Experience</td>
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<tr>
<td>LGWR 894</td>
<td>Capstone Experience</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Total Credits</td>
<td>30</td>
</tr>
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</table>

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may
be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Learning Outcomes
1. **KNOW:** Students will have and be able to demonstrate the necessary advanced knowledge and competence in the fields to excel in careers related to labor and workers’ rights.
2. **COMMUNICATE:** Students will be able to effectively communicate knowledge of current topics in the fields both verbally and in writing to excel in careers related to labor and workers’ rights.
3. **THINK:** Students will be able to recognize and analyze practical, legal, and ethical challenges related to labor and workers’ rights in the global workplace and society.
4. **PRACTICE:** Students will be able to respond appropriately to practical, legal, and ethical challenges in domestic and global workplaces and society using both theoretical and practical approaches of the field.
5. **APPLY/CREATE:** Students will be able to interact effectively with other organizational representatives in the private and public spheres in helping to develop and implement policies and strategies.

Contact
Graduate Program Head: Mark Anner
Director of Graduate Studies/Professor-in-Charge: x
Primary Program Contact: Erin Hetzel
Email: eab27@psu.edu
Mailing Address: 506 Keller Building, University Park, PA 16802
Telephone: (814) 867-4167
Program Website: Labor and Global Worker’s Rights (http://ler.la.psu.edu/graduates/mps-in-labor-and-global-workers-rights)

Laboratory Animal Medicine
Graduate Program Head: Ronald P. Wilson
Program Code: LAM
Campus(es): Hershey (M.S.)
Degrees Conferred: Master of Science (M.S.)
The Graduate Faculty

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>CMED 501</td>
<td>Biology and Care of Laboratory Animals</td>
<td>3</td>
</tr>
<tr>
<td>CMED 503</td>
<td>Laboratory Animal Genetics</td>
<td>3</td>
</tr>
<tr>
<td>CMED 507</td>
<td>Techniques of Laboratory Animal Experimentation</td>
<td>3</td>
</tr>
<tr>
<td>CMED 515</td>
<td>Experimental Surgery of Laboratory Animals</td>
<td>3</td>
</tr>
<tr>
<td>CMED 530</td>
<td>Diseases of Laboratory Animals I</td>
<td>3</td>
</tr>
<tr>
<td>CMED 531</td>
<td>Diseases of Laboratory Animals II</td>
<td>3</td>
</tr>
<tr>
<td>CMED 535</td>
<td>Comparative Pathology</td>
<td>3</td>
</tr>
<tr>
<td>CMED 590</td>
<td>Colloquium (1 credit per semester)</td>
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<tr>
<td>CMED 596</td>
<td>Individual Studies</td>
<td>1-3</td>
</tr>
<tr>
<td>BMS 591</td>
<td>Biomedical Research Ethics</td>
<td>1</td>
</tr>
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**Culminating Experience**
Students completing a thesis enroll in CMED 600; students in the non-thesis option enroll in CMED 596. 1

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>CMED 600</td>
<td>Thesis Research (for M.S. thesis) 2</td>
<td>9</td>
</tr>
<tr>
<td>or CMED 596</td>
<td>Individual Studies</td>
<td>9</td>
</tr>
</tbody>
</table>

Total Credits: 36-38

1 A non-thesis option may be elected by the student but must be approved in writing by the Program Director. A scholarly paper on a topic relevant to the fields of laboratory animal medicine or laboratory animal science must be written and presented. Up to 9 credits of independent study (CMED 596) may be earned for this work.

2 The submission and defense of a thesis based on an original hypothesis-driven research project is required. A minimum of 9 credits of thesis research (CMED 600) are required (a maximum of 6 credits may receive a quality grade).
Students may, with the approval of the Program Director, enroll in graduate level courses offered at the Penn State College of Medicine, Penn State Harrisburg, University Park, or Penn State’s World Campus.

Student Aid
Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact
Graduate Program Head: Ronald Wilson
Director of Graduate Studies/Professor-in-Charge: Tiffany Whitcomb
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Email: nmk3@psu.edu
Mailing Address: College of Medicine, Dept of Comparative Medicine, H054, 500 University Drive, Hershey, PA 17033
Telephone: (717) 531-8460
Program Website: Laboratory Animal Medicine (http://med.psu.edu/laboratory-animal-medicine-ms)

Landscape Architecture
Graduate Program Head: Eliza Pennypacker
Program Code: LARCH
Campus(es): University Park (M.L.A., M.S.)
Degrees Conferred: Master of Science (M.S.), Master of Landscape Architecture (M.L.A.), Dual-Title M.S. in Landscape Architecture and Human Dimensions of Natural Resources and the Environment (HDNRE)

The Graduate Faculty
View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=LARCH)

Landscape Architecture is the art of design, planning, or management of the land and of the natural and built elements upon it. As an academic discipline, it embodies creative, cultural, philosophical, and scientific knowledge bases. As a professional endeavor, the practice of landscape architecture includes site design, urban design, master planning, community planning, regional planning, resource conservation, and environmental and social stewardship.

Master of Landscape Architecture (M.L.A.)
The M.L.A. program is an accredited professional degree program focused on preparation to practice Landscape Architecture for students who hold a bachelor's degree in another field. The Master of Landscape Architecture program prepares students to enter the profession of Landscape Architecture. It provides individuals who do not already have a practice-oriented design degree with a professionally accredited education in landscape architecture. The program prepares graduates for entry into professional offices or further study in Landscape Architecture or related disciplines.

M.S. in Landscape Architecture
The Master of Science in Landscape Architecture is a 2-year program that provides enhanced professional/scientific expertise to individuals who hold a professionally-accredited degree in Landscape Architecture or in Architecture. It’s a great opportunity for those who seek to gain research skills, whether for professional practice or as preparation for success in academic positions.

This research-focused degree lets you work with outstanding faculty across Penn State on a targeted research agenda that may range from Landscape Performance Assessment to Built Environment and Active Living to Integrative Conservation—you and your adviser craft a tailored curricular path to suit your goals.

Admission Requirements
Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

To be admitted to the program, applicants must meet the following requirements:

- For admission to the M.L.A. program, applicants must have completed a bachelor's degree from any discipline prior to entry into the M.L.A. program.
- For admission to the M.S. in Landscape Architecture, applicants must have completed a bachelor's degree in Landscape Architecture or a closely related discipline.

All submissions for admission must include:

- Evidence of creativity (portfolio or other), evidence of analytical ability (research paper or other), and an essay explaining why the individual seeks to study landscape architecture at Penn State
- Official transcripts from all post-secondary institutions attended (http://gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission).
- GRE scores
- 3 letters of recommendation

Scores from the Graduate Record Examinations (GRE), or from a comparable substitute examination, are required for admission.

Students with a 3.00 junior/senior average (on a 4.00 scale) will be considered for admission. The best-qualified applicants will be accepted up to the number of spaces available for new students. Exceptions to
the minimum 3.00 grade-point average may be made for students with special backgrounds, abilities, and interests, at the discretion of the program.

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. See GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

## Degree Requirements

### Master of Landscape Architecture (M.L.A.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

The M.L.A. curriculum develops creative insight and the knowledge, skills, and abilities essential to professional practice, fulfilling the education requirement needed in all states to be eligible to take the Landscape Architecture licensing examination. Students in the M.L.A. degree program must also develop research understanding characteristic of graduate education, undertaking a research-based design project as a final cumulative experience to demonstrate their understanding and application of appropriate and professional research and design expertise.

The M.L.A. curriculum requires completion of 57 credits of graduate work at the 400, 500, or 800 level, including a minimum of 47 credits at the 500 or 800 level, with at least 6 credits at the 500 level. In addition, to fulfill the requirements of professional accreditation, students must undertake 15 credits of prerequisite courses that do not count towards the M.L.A. degree requirements.

### Required Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>LARCH 365</td>
<td>Contemporary Trends in Landscape Architecture</td>
<td>3</td>
</tr>
<tr>
<td>LARCH 366</td>
<td>Professional Practice</td>
<td>3</td>
</tr>
<tr>
<td>LARCH 501</td>
<td>Graduate Seminar in Landscape Architecture</td>
<td>12</td>
</tr>
<tr>
<td>LARCH 510</td>
<td>Grad Studio I</td>
<td>6</td>
</tr>
<tr>
<td>LARCH 511</td>
<td>Grad Studio II</td>
<td>6</td>
</tr>
<tr>
<td>LARCH 512</td>
<td>Grad Studio III</td>
<td>6</td>
</tr>
<tr>
<td>LARCH 513</td>
<td>Grad Implementation I: Grading</td>
<td>3</td>
</tr>
<tr>
<td>LARCH 514</td>
<td>Grad Implementation II: Materials</td>
<td>3</td>
</tr>
<tr>
<td>LARCH 515</td>
<td>Grad Implementation III: Plants</td>
<td>3</td>
</tr>
<tr>
<td>LARCH 516</td>
<td>Grad Implementation IV: Stormwater</td>
<td>3</td>
</tr>
<tr>
<td>LARCH 517</td>
<td>Research and Writing in Landscape Architecture</td>
<td>3</td>
</tr>
<tr>
<td>LARCH 518</td>
<td>Intellectual History and Theory of Landscape Architecture</td>
<td>3</td>
</tr>
<tr>
<td>LARCH 519</td>
<td>Graduate Seminar in Landscape Architecture</td>
<td>3</td>
</tr>
<tr>
<td>LARCH 590</td>
<td>Colloquium</td>
<td>1</td>
</tr>
</tbody>
</table>

The final culminating experience for the M.L.A. is a capstone project completed while enrolled in LARCH 551, LARCH 552, and LARCH 553.

## Culminating Experience

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>LARCH 551</td>
<td>Final Culminating Experience Proposal ①</td>
<td>1</td>
</tr>
<tr>
<td>LARCH 552</td>
<td>Final Culminating Experience Production ①</td>
<td>4</td>
</tr>
<tr>
<td>LARCH 553</td>
<td>Final Culminating Experience Documentation &amp; Presentation ①</td>
<td>2</td>
</tr>
</tbody>
</table>

Total Credits 57

① The final culminating experience for the M.L.A. is a capstone project complete

## Master of Science (M.S.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

The core curriculum is a two-year research-focused program requiring a minimum of 40 credits including a minimum of 18 credits at the 500 or 600 level. Students are required to take graduate level coursework, including 12 credits of Graduate Seminar, 4 credits of Graduate Colloquium, 3 credits of Research Writing in Landscape Architecture, 3 credits in Intellectual History and Theory of Landscape Architecture, 3 credits in quantitative/qualitative analysis at the 500 level (which must be approved in advance by the student’s adviser and/or the graduate program professor-in-charge), and at least 6 credits in thesis research (600 and 610). The student and the student’s adviser, subject to the approval of the departmental Graduate Program Committee, determine specific course requirements. The thesis must be accepted by the adviser(s) and/or committee members, the head of the graduate program, and the Graduate School, and the student must pass a thesis defense.

### Electives

The remaining elective credits may be chosen from a list of approved electives maintained by the program office.

### Culminating Experience

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>LARCH 600</td>
<td>Thesis Research (On Campus)</td>
<td>6</td>
</tr>
</tbody>
</table>

Total Credits 40

## Dual-Titles

### Dual-Title M.S. in Landscape Architecture and Human Dimensions of Natural Resources and the Environment

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

Graduate students with research and educational interests in landscape architecture or a closely related discipline (e.g., architecture, geography, ecology, anthropology, etc.) may apply to the dual-title M.S. degree in Landscape Architecture and Human Dimensions of Natural Resources and the Environment Program. The goal of the dual-title M.S. degree

The remaining elective credits may be chosen from a list of approved electives maintained by the program office.
Landscape Architecture and Human Dimensions of Natural Resources and the Environment is to enable graduate students from Landscape Architecture to acquire the knowledge and skills of their major area of specialization in Landscape Architecture, while at the same time gaining the perspective and methods of Human Dimensions of Natural Resources and the Environment.

Admission Requirements
Students must apply and be admitted to the graduate program in Landscape Architecture and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the HDNRE dual-title program. Refer to the Admission Requirements section of the HDNRE Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/human-dimensions-natural-resources-environment).

Degree Requirements
To qualify for this dual-title degree, students must satisfy the requirements of the Landscape Architecture Master of Science degree program, listed on the Degree Requirements tab. In addition, they must satisfy the HDNRE program requirements for the dual-title master’s degree. Refer to the Master’s Degree Requirements section of the HDNRE Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/human-dimensions-natural-resources-environment). Some courses may satisfy both the graduate primary program requirements and those of the HDNRE program. Final course selection is determined by the student after consulting, in advance, with their Landscape Architecture and HDNRE advisers.

For the dual-title M.S. degree in Landscape Architecture and HDNRE, the thesis must reflect the student’s education and interest in both Landscape Architecture and HDNRE. All members of the student’s committee must be members of the Graduate Faculty. The master’s committee must include at least one Graduate Faculty member from HDNRE. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role.

Student Aid
Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact
Graduate Program Head: Eliza Pennypacker
Director of Graduate Studies/Professor-in-Charge: Stuart Echols
Primary Program Contact: Nina Bumgarner

Email: ndb2@psu.edu
Mailing Address: 121 Stuckeman Family Building, University Park, PA 16802
Telephone: (814) 865-0991
Program Website: Landscape Architecture (https://stuckeman.psu.edu/larch)

Language Science
Graduate Program Head: John Lipski
Program Code: LNGSC
Campus(es): University Park
Degrees Conferred: Dual-Title
The Graduate Faculty: View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=LNGSC)

Students electing this degree program through participating programs earn a degree with a dual-title at the Ph.D. level, i.e., Ph.D. in (graduate program name) and Language Science.

The following graduate programs offer dual-title Ph.D. degrees in Language Science:
- Communication Sciences and Disorders
- German
- Psychology
- Spanish

A dual-title degree program in participating programs and Language Science will prepare students to combine the theoretical and methodological approaches of several disciplines in order to contribute to research in the rapidly growing area of Language Science. This inherently interdisciplinary field draws on linguistics, psychology, speech-language pathology, and cognitive neuroscience, as well as other disciplines, to address both basic and applied research questions in such areas as first and second language acquisition, developmental and acquired language disorders, literacy, and language pedagogy. Dual-title degree students will receive interdisciplinary training that will enable them to communicate and collaborate productively with a wide range of colleagues across traditional discipline boundaries. Such training will open up new employment opportunities for students and give them the tools to foster a thriving interdisciplinary culture in their own future students. The dual-title program will facilitate the formation of a cross-disciplinary network of peers for participating students as part of their professional development.

Admission Requirements
Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

To pursue a dual-title degree under this program, the student must first apply to the Graduate School and be admitted through one of the participating graduate degree programs. Upon admission to one of the those programs and with a recommendation from a Language Science program faculty member in that department, the student’s
application will be forwarded to a committee that will include the Director of the Linguistics Program, one of the Co-Directors of the Center for Language Science, and a third elected faculty member within the Center for Language Science. All three committee members will be affiliated with the Program in Linguistics. Upon the recommendation of this committee, the student will be admitted to the dual-title degree program in Language Science. Doctoral students must be admitted into the dual-title degree program in Language Science prior to taking the qualifying examination in their primary graduate program.

**Degree Requirements**

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Titled Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

The dual-title Ph.D. degree in Language Science will have the following requirements.

Course work (21 credits of 500-level courses):

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>LING 521</td>
<td>Proseminar in the Language Science of Bilingualism</td>
<td>3</td>
</tr>
<tr>
<td>LING 522</td>
<td>Proseminar in Professional Issues in Language Science</td>
<td>3</td>
</tr>
<tr>
<td>LING 500</td>
<td>Syntax II</td>
<td>3</td>
</tr>
<tr>
<td>or LING 504</td>
<td>Phonology II</td>
<td></td>
</tr>
<tr>
<td>3 credits, Research methods/statistics in Language Science (such as LING 525, PSY 507, PSY 508)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>3 credits, Cognitive Neuroscience or Psycholinguistics (such as PSY 520/LING 520, PSY 511)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>6 credits, Research internships (students will choose one course among the following: CSD 596, GER 596, LING 596, PSY 596, SPAN 596)</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Total Credits</td>
<td></td>
<td>21</td>
</tr>
</tbody>
</table>

**Language Science Research Meetings**

Students must participate in weekly Language Science Research meetings each semester in residence.

**Foreign Language and English Competency Requirements**

The student will fulfill the language requirement specified by the participating department through which the student is admitted to the dual-title degree program.

**Qualifying Examination**

Students will take a qualifying examination that is administered by the primary program. However, the dual-title degree student may require an additional semester or more to fulfill requirements for the primary program and dual-title program; therefore, the qualifying examination may be delayed one semester beyond the normal period allowable. In addition, the student will be required to present a portfolio of work in Language Science to their committee. Such a portfolio would include a statement of the student’s interdisciplinary research interests, a plan of future study, and examples of writing that indicate the student’s work in Language Science. The qualifying examination committee will be composed of faculty from the primary program, as well as at least one faculty member affiliated with Language Science. The designated Language Science faculty member may be appointed in the student’s primary program, but he or she may also hold a formal appointment with Linguistics. The Language Science member will participate in constructing and grading qualifying examination questions in the area of Language Science.

**Doctoral Committee Composition**

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of a Language Science dual-title Ph.D. student will include a representative of the Language Science dual-title program. The student's dissertation committee will include faculty from the primary program as well as faculty from Language Science. Faculty members who hold appointments in both the primary program and Language Science may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in Language Science, the member of the committee representing Language Science must be appointed as co-chair.

**Comprehensive Examination**

The Language Science representative(s) will help to insure that the field of Language Science is integrated into the comprehensive examination.

**Dissertation**

A dissertation on a topic related to Language Science is required for a dual-title Ph.D. degree in Language Science. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

**Minor**

Requirements listed here are in addition to requirements for minors in Graduate Council policies listed under GCAC-600 Research Degree Requirements (http://gradschool.psu.edu/graduate-education-policies) and GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

The doctoral minor provides interested students with an opportunity to complete a program of scientific study focused on the nature, structure, and use of human language. The minor is designed to cover the foundations of the discipline of linguistics by reviewing fundamental core areas such as phonology and syntax. Course work is also available in many additional areas of linguistics such as semantics, morphology, language variation, historical linguistics, and syntax. Course work is also available in many additional areas of linguistics such as semantics, morphology, language variation, historical linguistics, and discourse analysis.

The minor requires a minimum of 15 credits, 6 of which must be at the 500 level. Nine credits are prescribed in syntax (LING 402), phonology (LING 404), and a general introduction to linguistics (LING 401), although a linguistics course at the 500 level may be substituted for LING 401 with the approval of the director of the program in Linguistics.

**Student Aid**

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.
Most students will be funded through their primary departments, and will be considered for graduate assistantships according to the procedures of those departments. The Center for Language Science currently has two graduate assistantships for which dual-title degree students will be eligible.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact

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Telephone: (814) 863-9628
Program Website: Language Science (http://bulletins.psu.edu/graduate/programs/majors/language-science/linguistics.la.psu.edu)

Leadership Development

Graduate Program Head: James A. Nemes
Program Code: LEAD
Campus(es): Great Valley (M.L.D.)
Degrees Conferred: Master of Leadership Development (M.L.D.)
The Graduate Faculty: View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=LEAD)

The Penn State Great Valley Master of Leadership Development (M.L.D.) program is an interdisciplinary professional program that blends the social and behavioral sciences with ethical studies to develop outstanding organizational and community leaders. As part of the School’s Management Division, the program is accredited under the specialized accreditation received from the Association to Advance Collegiate Schools of Business International (AACSBI). The program is designed to meet the educational needs of professionals at the middle to senior levels of management.

Note that the focus of this program is different from that of the M.B.A. offered by the School: While the M.B.A. program provides an overview of leadership, the purpose of the M.L.D. program is to provide an in-depth analysis of the theory and practice of authentic transformational leadership by providing an environment in which faculty and students can have a complete and open collaboration on what constitutes exemplary leadership. The M.L.D. curriculum emphasizes strategic leadership and the creation of wealth in organizations, balancing financial measure of performance with learning and growth, and customer and external process perspectives. The program builds on the mid- and high-level managerial and administrative experience of students in order to achieve its goal of promoting positive change in individuals, teams, organizations, and communities.

The program provides training in leadership-relevant research, and some students continue on to pursue a doctoral degree. Required research may be conducted in Penn State Great Valley’s Library and Computer Center, which provide local research support as well as access to the library and computer resources of the entire Penn State system.

The M.L.D. program is geared primarily toward the needs of part-time students who are employed full-time. Courses in the program, which are offered at Great Valley, are scheduled for the convenience of adult learners, mainly in the evening or on Saturdays.

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Admission is granted only to candidates who demonstrate high promise of success for graduate work.

An undergraduate and/or graduate GPA of at least 3.0 on a 4.0 scale is required for admission. It is strongly preferred that applicants present at least five years of related professional work experience.

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. See GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

Applicants to the Leadership Development program must have a minimum of 80 points on the Internet-based test with a minimum of 23 points on the speaking portion, or a 570 on the paper-based test.

Admission decisions are based on a review of the applicant’s professional and academic accomplishments as presented in the Admissions Dossier and the quality of the applicant’s credentials in relation to those of other applicants who meet the requirements for admission. A complete Admissions Dossier includes the following:

- Online Graduate School application (http://gradschool.psu.edu/prospective-students/how-to-apply) and non-refundable application fee;
- current resume, preferably indicating at least five years of related work experience;
- official transcripts from all post-secondary institutions attended (http://www.gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission);
- completion of two 300-word leadership essay questions developed by the faculty to assess an applicant’s logical reasoning and writing skills;
- two confidential evaluation forms/letters of endorsement from executives or community leaders detailing their evaluation of the applicant’s leadership ability and potential.
Application Filing Dates
Penn State Great Valley’s M.L.D. program has a rolling admissions policy. Students may be admitted and enroll in classes in early September or early January.

Degree Requirements
Master of Leadership Development (M.L.D.)
Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

Thirty-six (36) credits are required to complete the M.L.D. degree. A series of leadership cornerstone (12 credits) and leadership competency courses (9 credits) are required to provide all MLD students with a common body of knowledge. Leadership Context courses (12 credits) and a Capstone course (3 credits) round out the program.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>LEAD 501</td>
<td>Leadership Across the Lifespan</td>
<td>3</td>
</tr>
<tr>
<td>BUSAD/LEAD 555</td>
<td>Full Range Leadership Development</td>
<td>3</td>
</tr>
<tr>
<td>BUSAD/LEAD 556</td>
<td>Diversity Leadership</td>
<td>3</td>
</tr>
<tr>
<td>LEAD 557</td>
<td>Leadership Models and Methods</td>
<td>3</td>
</tr>
<tr>
<td>LEAD 561</td>
<td>Dynamic Communication in Leadership Contexts</td>
<td>3</td>
</tr>
<tr>
<td>MGMT 873</td>
<td>Corporate Innovation Strategies</td>
<td>3</td>
</tr>
<tr>
<td>SYSEN 550</td>
<td>Creativity and Problem Solving I</td>
<td>3</td>
</tr>
<tr>
<td>BUSAD/LEAD 519</td>
<td>Developing Creative High Performance Organizations</td>
<td>3</td>
</tr>
<tr>
<td>BUSAD 834</td>
<td>Ethical Dimensions of Management in the Biotechnology and Health Industry</td>
<td>3</td>
</tr>
<tr>
<td>PHIL 597</td>
<td>Special Topics</td>
<td>3</td>
</tr>
<tr>
<td>BUSAD 876</td>
<td>Ethical Issues in Information Technology</td>
<td>3</td>
</tr>
<tr>
<td>LEAD 862</td>
<td>Strategic Leadership</td>
<td>3</td>
</tr>
<tr>
<td>BUSAD 551</td>
<td>Business, Ethics, and Society</td>
<td>3</td>
</tr>
<tr>
<td>or BUSAD 830</td>
<td>Biotechnology and Health Industry Overview</td>
<td>3</td>
</tr>
<tr>
<td>Two context-specific electives</td>
<td>6</td>
<td></td>
</tr>
</tbody>
</table>

Culminating Experience
All students must complete a capstone course that provides students with an opportunity to enact what they have learned in their course work in the context of promoting positive change in their community.

LEAD 882 Social Entrepreneurship and Community Leadership 3

Total Credits 36

Student Aid
Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

There are a limited number of scholarships, fellowships, and graduate assistantships available. For more information on these, contact the Financial Aid Office at Penn State Great Valley.

Most students work full-time and take classes part-time. In many cases, employers have a tuition-reimbursement plan paying for partial or full tuition. To learn more about payment options for students who receive employer tuition reimbursement benefits, or for more information on other payment options that may be available to you, contact the Great Valley Financial Aid Office at 610-648-3311.

Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Learning Outcomes
Learning Goal 1: Build one's own personal authentic transformational leadership competencies through self-reflection and behavioral display.

- Develop and implement a personal diversity leadership improvement plan to build expertise in relating with diverse individuals in the workplace.
- Prepare a personal leadership development plan incorporating feedback from others, and personal strengths and weaknesses with respect to specific leadership behaviors.

Learning Goal 2: Build communication and critical thinking skills as they relate to authentic transformational leadership concepts and processes.

- Write three short essays applying communication theory to specific leadership contexts, situations, and opportunities.
- Demonstrate skills required for conducting research in organizations.

Learning Goal 3: Foster a commitment to high integrity practices.

- Evaluate and analyze the ethical dimension of decision making.

Learning Goal 4: Value differences in people as a vital force in work groups, teams and organizations.

- Develop and implement a personal diversity leadership improvement plan to build expertise in relating with diverse individuals in the workplace.
• Discuss how concepts of transformational leadership and authentic leadership relate to social entrepreneurship, and add value to personal relationships, community, and society at large.

Contact
Graduate Program Head: James Nemes
Director of Graduate Studies/Professor-in-Charge: Karen Duhala
Primary Program Contact: Leanne Wallace
Email: lxw31@psu.edu
Mailing Address: Penn State Great Valley, 30 E. Swedesford Road, Malvern, PA 19355
Telephone: (610) 648-3336
Program Website: Leadership Development (http://greatvalley.psu.edu/academics/masters-degrees/leadership-development)

Learning, Design, and Technology
Graduate Program Head: Roy Clariana
Program Code: LDT
Campus(es): University Park (Ph.D., M.S., M.Ed.) World Campus (M.Ed.)
Degrees Conferred: Doctor of Philosophy (Ph.D.) Master of Science (M.S.) Master of Education (M.Ed.) Dual-Title Ph.D., M.S., and M.Ed. in Learning, Design, and Technology and Comparative and International Education
The Graduate Faculty: View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=LDT)

This program provides advanced professional preparation in the development of effective, efficient instructional materials and the use of technology to support learning in a variety of educational settings. The program of study applies skill and knowledge from the fields of the learning sciences, instructional design, computer technologies, and research methodologies to study educational designs and their effect on learning. Graduates are employed as instructional designers by corporate, agency, and military training departments; entrepreneurial consulting companies; public school districts; museums, nature centers, and other informal learning settings; community college learning resource centers; and colleges and universities.

Admission Requirements
Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Scores from the Graduate Record Examinations (GRE) (for master’s or doctorate) or Miller Analogies Test (for master’s), transcripts, letters of reference, application letter, and writing assignment are required for admission.

Requests to waive the GRE requirement may be submitted by applicants for the M.Ed. who have successfully completed coursework for the Postbaccalaureate Certificate in Educational Technology Integration with a GPA greater than 3.5. However, GRE scores will be required to apply to the doctoral program.

Degree Requirements
Master of Education (M.Ed.)
Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

At least 18 credits must be taken at the 500 level or above, with at least 6 credits at the 500 level. Students in the M.Ed. program are required to complete a program of a minimum of 30 approved credits including:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>LDT 415</td>
<td>Emerging Web Technologies and Learning</td>
<td>3</td>
</tr>
<tr>
<td>LDT 467</td>
<td>Designing Constructivist Learning Environments (or equivalent)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>21 credits of professional application courses chosen in consultation with an adviser. These courses can be chosen from, but are not limited to:</td>
<td></td>
</tr>
<tr>
<td>LDT 401</td>
<td>Gaming 2 Learn</td>
<td></td>
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<tr>
<td>LDT 433</td>
<td>Teaching and Learning Online in K-12 Settings</td>
<td></td>
</tr>
<tr>
<td>LDT 440</td>
<td>Educational Technology Integration</td>
<td></td>
</tr>
<tr>
<td>LDT 449</td>
<td>Video in the Classroom</td>
<td></td>
</tr>
<tr>
<td>LDT 505</td>
<td>Integrating Mobile Technologies into Learning Environments</td>
<td></td>
</tr>
<tr>
<td>LDT 550</td>
<td>Learning Design Studio</td>
<td></td>
</tr>
<tr>
<td>LDT 566</td>
<td>Computers as Learning Tools</td>
<td></td>
</tr>
<tr>
<td>LDT 581</td>
<td>Theoretical Foundations of Learning, Design, and Technology</td>
<td></td>
</tr>
<tr>
<td>LDT 832</td>
<td>Designing e-learning Within Course Management Systems</td>
<td></td>
</tr>
</tbody>
</table>

Culminating Experience
All students will compile a portfolio as they move through the courses, and this portfolio will be presented to the adviser as the capstone experience (students do not need to enroll in any additional courses to complete the capstone experience).

Total Credits 30

Master of Science (M.S.)
Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

At least 18 credits must be taken at the 500 level or above, with at least 6 credits at the 500 level. Students in the M.S. degree program are required to complete a minimum of 36 approved credits including:
Doctor of Philosophy (Ph.D.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

Credit and course requirements: Ph.D. students in LDT must complete a set of core competencies in instructional design, learning sciences and technology, research methodology, and research apprenticeship. Doctoral students must complete a minimum of 30 LDT credits to include 9 credits of LDT doctoral core courses, 9 credits of LDT 594, and at least 12 credits of 500-level graduate LDT courses based on competency selection.

Doctoral exams and committees

The qualifying exam is recommended to be taken early in a student’s program, after a minimum of 18 credits of post-baccalaureate work, and within three semesters (not including summers and assuming full-time study) of entry into the doctoral program. Students must submit an application to take the qualifying exam, and the LDT faculty must approve the application. In order to complete the qualifying exam, students must be registered either full- or part-time during the semester in which it is completed and show no deferred or failing grades in courses related to the degree program on their graduate transcript.
Prior to the comprehensive exam, the student, in consultation with his or her adviser, will convene a dissertation committee that meets all Graduate Council requirements (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation). After the completion of all course work, the doctoral student must complete a comprehensive examination. All doctoral candidates must produce and write a doctoral dissertation and hold a final oral examination in defense of the dissertation.

**Dual-Titles**

*Dual-Title M.Ed., M.S., and Ph.D. in Learning, Design, and Technology and Comparative and International Education*

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

**Admission Requirements**

Students must apply and be admitted to the graduate program in Learning, Design, and Technology and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Comparative and International Education dual-title program. Refer to the Admission Requirements section of the Comparative and International Education Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/comparative-international-education). Doctoral students must be admitted into the dual-title degree program in Comparative and International Education prior to taking the qualifying examination in their primary graduate program.

**Degree Requirements**

To qualify for the dual-title degree, students must satisfy the degree requirements for the degree they are enrolled in Learning, Design, and Technology. In addition, students must complete the degree requirements for the dual-title in Comparative and International Education, listed on the Comparative and International Education Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/comparative-international-education).

The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Learning, Design, and Technology and must include at least one Graduate Faculty member from the Comparative and International Education program. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. There will be a single qualifying examination, containing elements of both Learning, Design, and Technology and Comparative and International Education. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of a Learning, Design, and Technology and Comparative and International Education dual-title Ph.D. student must include at least one member of the Comparative and International Education Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in Comparative and International Education, the member of the committee representing Comparative and International Education must be appointed as co-chair. The Comparative and International Education representative on the student’s dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their dissertation committee and reflects their original research and education in Learning, Design, and Technology and Comparative and International Education. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

**Student Aid**

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

A limited number of graduate assistantships are available to students in this program.

**Courses**

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**Learning Outcomes**

**Master’s Degrees**

1. Know/Think: Graduates will demonstrate practical knowledge of the core theories and best practices in the field of learning, design, & technology (LDT).
2. Apply/Create: Graduates will be able to design and develop educational resources in accordance with the core theories and best practices in LDT.
3. Apply/Create: Graduates will demonstrate the ability to analyze and integrate teaching/learning technologies to unique educational contexts in accordance with the core theories and best practices in LDT.
4. Communicate/Think: Graduates will be able to convey ideas or arguments in clear, concise, well-organized papers, proposals, and portfolios as well as in formal, oral presentations.
5. Professional practice: Graduates will demonstrate knowledge of the professional standards, and values, integrity, and ethics in the LDT field and at Penn State through written or oral products, and professional interactions with colleagues.

**Doctor of Philosophy (Ph.D.)**

1. Know/Think: Graduates will demonstrate in-depth knowledge of the core theories and research methods in the field of learning, design, & technology (LDT). The core demonstration will include
the comprehension of theories of learning sciences and LDT to conceptualize problems of educational practice.

2. Apply/Create: Graduates will be able to formulate and execute an independent research project that significantly furthers knowledge and theories in LDT.

3. Apply/Create: Graduates will demonstrate the ability to apply theories to inform/develop unique designs and solutions to educational problems.

4. Communicate/Think: Graduates will be able to convey ideas or arguments in clear, concise, well-organized papers and proposals as well as in formal, oral presentations.

5. Professional practice: Graduates will demonstrate knowledge of the professional standards, and values, integrity, and ethics in the field and at Penn State through written and oral products, and professional interactions with colleagues.

Contact

Graduate Program Head: Roy Clariana

Director of Graduate Studies/Professor-in-Charge: Susan Land

University Park Campus

Primary Program Contact: Jennifer McLaughlin

Email: jem73@psu.edu

Mailing Address: 301 Keller, University Park, PA 16802

Telephone: (814) 863-2596

Program Website: Learning, Design, and Technology at University Park (http://ed.psu.edu/lps/ldt)

World Campus

Primary Program Contact: Whitney Deshong

Email: wad5021@psu.edu

Mailing Address: 303 Keller Building, University Park, PA 16802

Telephone: (814) 865-0473

Program Website: Learning, Design, and Technology at World Campus (http://www.worldcampus.psu.edu/degrees-and-certificates/instructional-systems-educational-technology-masters/overview)

Lifelong Learning and Adult Education

Graduate Program Head: Roy Clariana

Campus(es): Harrisburg (D.Ed., M.Ed.)

University Park (Ph.D., D.Ed., M.Ed.)

World Campus (M.Ed.)

Degrees Conferred

Doctor of Philosophy (Ph.D.)

Doctor of Education (D.Ed.)

Master of Education (M.Ed.)

Dual-Title Ph.D., D.Ed., and M.Ed. in Lifelong Learning and Adult Education and Comparative and International Education

Joint M.D. / M.Ed. with the College of Medicine

The Graduate Faculty

View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=LLAED)

Lifelong Learning and Adult Education extends through the life span from late adolescence to advanced age and takes place in a rich diversity of organizational as well as informal settings. The purpose of the Lifelong Learning and Adult Education program is to increase the knowledge and competence of those who work with adult learners. Course work, reading assignments, research projects, internships, informal discussions, and the dissertation all provide opportunities for in-depth and challenging learning experiences. The Lifelong Learning and Adult Education program is interdisciplinary, and students are advised to take courses in supporting fields within the University.

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

The candidate must apply to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Scores from the Graduate Record Examinations (GRE), or the Miller Analogies Test (MAT), are required for admission. Either the GRE or MAT score is accepted for the D.Ed. and M.Ed. programs, but GRE scores are preferred. The Ph.D. program accepts only the GRE. At the discretion of a graduate program, a student may be admitted provisionally (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/provisional-admission) for graduate study in the program without these scores.

The best-qualified applicants will be accepted up to the number of spaces that are available for new students. Applicants with a total Verbal and Quantitative score above 302 on the GRE or 398 or above on the MAT, a junior/senior grade point average (GPA) of 3.00 or above on a 4.00 scale, and a graduate GPA of 3.50 or above will be highly considered applications to the program. However, applicants with strong backgrounds and abilities in areas of particular interest or relevance to adult education practice may be admitted to either of the doctoral programs with a baccalaureate degree only (provided the junior/senior
GPA is at least 3.0), or with master’s-level studies in which the graduate GPA is at least 3.2 and the GRE total score is at least 297.

A sample of student writing is required for each degree. M.Ed. applicants submit a recent writing sample, such as a term paper, report, or publication of 3000 words or more. Ph.D. and D.Ed. applicants should submit either a published article, master’s paper, master’s thesis, or a paper from their master’s studies.

Three letters of reference are required from people who are best qualified to evaluate the applicant’s ability to succeed in graduate study. These letters may be from an academic adviser, instructors who are familiar with the applicant’s academic record, a research project supervisor, an employment supervisor, or others who are able to provide a substantive evaluation of the applicant’s work. Letters of recommendation must address the applicant’s academic ability, motivation, and likelihood of success in completing the program.

A statement of purpose describing the applicant’s short and long range career objectives is required. This statement includes an explanation of how the proposed study of adult education relates to the stated career objectives.

Applicants who exhibit exceptional qualities without meeting all of the stated requirements for admission may be considered for provisional admission (http://gradschool.psu.edu/graduate-education-policies/gcac-gcac-300/provisional-admission) while they remove the identified deficiencies. Deficiencies must be rectified within the first two semesters of enrollment in the degree program; courses taken to remove deficiencies are considered to be prerequisites and do not earn credit toward the degree.

**Degree Requirements**

**Master of Education (M.Ed.)**

Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

A minimum of 30 credits is required for the M.Ed. degree. A minimum of 18 credits out of the 30 must be taken at the 500- or 800-level, with a minimum of 6 credits at the 500-level, and a minimum of 24 credits must be in ADTED prefix courses. The M.Ed. program in Lifelong Learning and Adult Education consists of a required core of 12 credits in ADTED courses and 18 credits in ADTED or other electives.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADTED 460</td>
<td>Introduction to Lifelong Learning and Adult Education</td>
<td>3</td>
</tr>
<tr>
<td>ADTED 505</td>
<td>The Teaching of Adults</td>
<td>3</td>
</tr>
<tr>
<td>ADTED 542</td>
<td>Perspectives on Adult Learning Theory</td>
<td>3</td>
</tr>
</tbody>
</table>

**Electives**

Select an additional 18 credits (six courses) from the following ADTED courses in consultation with your adviser.¹

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADTED 456</td>
<td>Introduction to Family Literacy</td>
<td></td>
</tr>
<tr>
<td>ADTED 457</td>
<td>Adult Literacy</td>
<td></td>
</tr>
<tr>
<td>ADTED 470</td>
<td>Introduction to Distance Education</td>
<td></td>
</tr>
<tr>
<td>ADTED 480</td>
<td>Teaching Math and Numeracy to Adults</td>
<td></td>
</tr>
<tr>
<td>ADTED 501</td>
<td>Foundations of Medical Education</td>
<td></td>
</tr>
</tbody>
</table>

**Required Courses**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADTED 502</td>
<td>Program and Instructional Design in Medical Education</td>
<td></td>
</tr>
<tr>
<td>ADTED 506</td>
<td>Program Planning in Adult Education</td>
<td></td>
</tr>
<tr>
<td>ADTED 507</td>
<td>Research and Evaluation in Adult Education</td>
<td></td>
</tr>
<tr>
<td>ADTED 509</td>
<td>Language, Literacy, Identity, and Culture in a Global Context</td>
<td></td>
</tr>
<tr>
<td>ADTED 510</td>
<td>Historical and Social Issues in Adult Education</td>
<td></td>
</tr>
<tr>
<td>ADTED 531</td>
<td>Course Design and Development in Distance Education</td>
<td></td>
</tr>
<tr>
<td>ADTED 532</td>
<td>Research and Evaluation in Distance Education</td>
<td></td>
</tr>
<tr>
<td>ADTED 533</td>
<td>Global Online and Distance Education</td>
<td></td>
</tr>
<tr>
<td>ADTED 560</td>
<td>Teaching Reading to College Students and Adults</td>
<td></td>
</tr>
<tr>
<td>ADTED 575</td>
<td>Administration of Adult Education</td>
<td></td>
</tr>
<tr>
<td>ADTED 581</td>
<td>Social Theory and Lifelong Learning</td>
<td></td>
</tr>
</tbody>
</table>

**Culminating Experience**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADTED 588</td>
<td>Professional Seminar: Research and Adult Education</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits 30

¹ Other courses may be substituted for these electives with the adviser’s permission.

M.Ed. students are required to write a master’s paper as part of the required 30 credits of course work. Students complete the master’s paper while enrolled in ADTED 588 during their last semester.

M.Ed. students must select either the general M.Ed. degree or one of the three formal options:

1. Adult Basic Education and Literacy
2. Global and Online Distance Education
3. Medical and Health Professions

M.Ed. students who select a formal option must adhere to the requirements specified below.

**Adult Basic Education and Literacy Option**

The M.Ed. in Lifelong Learning and Adult Education – Adult Basic Education and Literacy Option consists of a required core of 12 credits in ADTED courses, 12 credits in ADTED courses required for this option, and 6 credits of ADTED or other electives.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADTED 460</td>
<td>Introduction to Lifelong Learning and Adult Education</td>
<td>3</td>
</tr>
<tr>
<td>ADTED 505</td>
<td>The Teaching of Adults</td>
<td>3</td>
</tr>
<tr>
<td>ADTED 542</td>
<td>Perspectives on Adult Learning Theory</td>
<td>3</td>
</tr>
</tbody>
</table>

**Required Option Courses**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADTED 480</td>
<td>Teaching Math and Numeracy to Adults</td>
<td>3</td>
</tr>
<tr>
<td>ADTED 507</td>
<td>Research and Evaluation in Adult Education</td>
<td>3</td>
</tr>
<tr>
<td>ADTED 509</td>
<td>Language, Literacy, Identity, and Culture in a Global Context</td>
<td></td>
</tr>
<tr>
<td>ADTED 560</td>
<td>Teaching Reading to College Students and Adults</td>
<td>3</td>
</tr>
</tbody>
</table>

**Electives**

Select an additional 6 credits (two courses) of the following ADTED courses in consultation with your adviser.¹

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADTED 456</td>
<td>Introduction to Family Literacy</td>
<td></td>
</tr>
</tbody>
</table>

¹ Other courses may be substituted for these electives with the adviser’s permission.
ADTED 457  Adult Literacy
ADTED 470  Introduction to Distance Education
ADTED 506  Program Planning in Adult Education
ADTED 510  Historical and Social Issues in Adult Education
ADTED 531  Course Design and Development in Distance Education
ADTED 533  Global Online and Distance Education
ADTED 575  Administration of Adult Education
ADTED 581  Social Theory and Lifelong Learning

**Culminating Experience**
ADTED 588  Professional Seminar: Research and Adult Education 3

**Total Credits** 30

1 Other courses may be substituted for these electives with the adviser's permission.

### Global Online and Distance Education Option

The M.Ed. in Lifelong Learning and Adult Education – Global Online and Distance Education Option consists of a required core of 12 credits in ADTED courses, 12 credits in ADTED courses required for this option, and 6 credits of ADTED or other electives.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Required Courses</strong></td>
<td></td>
</tr>
<tr>
<td>ADTED 460</td>
<td>Introduction to Lifelong Learning and Adult Education</td>
<td>3</td>
</tr>
<tr>
<td>ADTED 505</td>
<td>The Teaching of Adults</td>
<td>3</td>
</tr>
<tr>
<td>ADTED 542</td>
<td>Perspectives on Adult Learning Theory</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td><strong>Required Option Courses</strong></td>
<td></td>
</tr>
<tr>
<td>ADTED 470</td>
<td>Introduction to Distance Education</td>
<td>3</td>
</tr>
<tr>
<td>ADTED 531</td>
<td>Course Design and Development in Distance Education</td>
<td>3</td>
</tr>
<tr>
<td>ADTED 532</td>
<td>Research and Evaluation in Distance Education</td>
<td>3</td>
</tr>
<tr>
<td>ADTED 533</td>
<td>Global Online and Distance Education</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td><strong>Electives</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Select an additional 6 credits (two courses) from the following courses in consultation with your adviser.</td>
<td>6</td>
</tr>
<tr>
<td>ADTED 501</td>
<td>Program Planning in Adult Education</td>
<td></td>
</tr>
<tr>
<td>ADTED 502</td>
<td>Historical and Social Issues in Adult Education</td>
<td></td>
</tr>
<tr>
<td>ADTED 504</td>
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</tr>
<tr>
<td>ADTED 508</td>
<td>Administration of Adult Education</td>
<td></td>
</tr>
<tr>
<td>ADTED 509</td>
<td>Social Theory and Lifelong Learning</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Culminating Experience</strong></td>
<td></td>
</tr>
<tr>
<td>ADTED 588</td>
<td>Professional Seminar: Research and Adult Education</td>
<td>3</td>
</tr>
</tbody>
</table>

**Total Credits** 30

1 Other courses may be substituted for these electives with the adviser's permission.

### Medical and Health Professions Option

The M.Ed. in Lifelong Learning and Adult Education – Medical and Health Professions Option consists of a required core of 12 credits in ADTED courses, 9 credits in ADTED courses required for this option, and 9 credits of ADTED or other electives.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Required Courses</strong></td>
<td></td>
</tr>
<tr>
<td>ADTED 460</td>
<td>Introduction to Lifelong Learning and Adult Education</td>
<td>3</td>
</tr>
<tr>
<td>ADTED 505</td>
<td>The Teaching of Adults</td>
<td>3</td>
</tr>
<tr>
<td>ADTED 542</td>
<td>Perspectives on Adult Learning Theory</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td><strong>Required Option Courses</strong></td>
<td></td>
</tr>
<tr>
<td>ADTED 510</td>
<td>Foundations of Medical Education</td>
<td>3</td>
</tr>
<tr>
<td>ADTED 520</td>
<td>Program and Instructional Design in Medical Education</td>
<td>3</td>
</tr>
<tr>
<td>ADTED 531</td>
<td>Global Online and Distance Education</td>
<td>3</td>
</tr>
<tr>
<td>ADTED 551</td>
<td>Administration of Adult Education</td>
<td>3</td>
</tr>
<tr>
<td>ADTED 552</td>
<td>Social Theory and Lifelong Learning</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td><strong>Electives</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Select an additional 6 credits of electives in consultation with your adviser.</td>
<td>6</td>
</tr>
<tr>
<td>ADTED 470</td>
<td>Introduction to Distance Education</td>
<td></td>
</tr>
<tr>
<td>ADTED 501</td>
<td>Historical and Social Issues in Adult Education</td>
<td></td>
</tr>
<tr>
<td>ADTED 504</td>
<td>Course Design and Development in Distance Education</td>
<td></td>
</tr>
<tr>
<td>ADTED 505</td>
<td>Global Online and Distance Education</td>
<td></td>
</tr>
<tr>
<td>ADTED 508</td>
<td>Administration of Adult Education</td>
<td></td>
</tr>
<tr>
<td>ADTED 509</td>
<td>Social Theory and Lifelong Learning</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Culminating Experience</strong></td>
<td></td>
</tr>
<tr>
<td>ADTED 588</td>
<td>Professional Seminar: Research and Adult Education</td>
<td>3</td>
</tr>
</tbody>
</table>

**Total Credits** 30

1 Other courses may be substituted for these electives with the adviser's permission.

### Doctor of Education (D.Ed.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

A minimum of 60 credits beyond the master's degree is required for the D.Ed. degree. A minimum of 90 credits is required for the D.Ed. degree, of which at least 30 must be earned in residence at either University Park or Penn State Harrisburg. D.Ed. students who do not have previous experience in adult education are expected to acquire the equivalent of one year of experience in one or more fields of adult education practice prior to receiving their D.Ed. degree. All doctoral students must pass a qualifying examination, a comprehensive written and oral examination, and a final oral examination. To earn the D.Ed. degree, doctoral students must also write a dissertation that is accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

The qualifying examination is administered after when the student has earned a total of at least 30 credits toward the graduate degree, including the master’s program and graduate work done elsewhere. During the comprehensive examination, in addition to being examined in their area of specialization, all D.Ed. students are examined in the core adult education areas. A minimum of 21 credits in course work must be taken in Lifelong Learning and Adult Education, including:
Ph.D. students are required to take 12 core credits in Lifelong Learning and Adult Education, 18 credits in an emphasis area that is composed of Lifelong Learning and Adult Education and supporting courses outside Lifelong Learning and Adult Education, and 18 research credits, in addition to the residency requirement, qualifying, comprehensive, and final oral examinations, and continuous registration during the dissertation research. To earn the Ph.D. degree, doctoral students must also write a dissertation that is accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

Students in the Ph.D. program focus on research in Globalization and Lifelong Learning, selecting one emphasis area (Distance Education, Literacy for Culturally and Linguistically Diverse Populations, Comparative Lifelong Learning, or Learning in Work and Communities). Required research methods courses help students develop the background knowledge and tools to enable them to engage in original research.

## Dual-Titles

### Dual-Title M.Ed., D.Ed., and Ph.D. in Lifelong Learning and Adult Education and Comparative and International Education

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

### Admission Requirements

Students must apply and be admitted to the graduate program in Lifelong Learning and Adult Education and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Comparative and International Education dual-title program. Refer to the Admission Requirements section of the Comparative and International Education (http://bulletins.psu.edu/graduate/programs/majors/comparative-international-education) Bulletin page. Doctoral students must be admitted into the dual-title degree program in Comparative and International Education prior to taking the qualifying examination in their primary graduate program.

### Degree Requirements

To qualify for the dual-title degree, students must satisfy the degree requirements for the degree they are enrolled in Lifelong Learning and Adult Education, listed on the Degree Requirements tab. In addition, students must complete the degree requirements for the dual-title in Comparative and International Education, listed on the Comparative and International Education (http://bulletins.psu.edu/graduate/programs/majors/comparative-international-education) Bulletin page.

The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Lifelong Learning and Adult Education and must include at least one Graduate Faculty member from the Comparative and International Education program. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. There will be a single qualifying examination, containing elements of both Lifelong Learning and Adult Education and Comparative and International Education. Dual-title graduate students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

---

### Code | Title | Credits
--- | --- | ---
ADTED 460 | Introduction to Lifelong Learning and Adult Education | 3
or ADTED 521 | Doctoral Proseminar | 3
ADTED 510 | Historical and Social Issues in Adult Education | 3
ADTED 542 | Perspectives on Adult Learning Theory | 3

**Electives**

- 12 credits of ADTED electives
- A minimum of 15 credits must be taken outside Lifelong Learning and Adult Education as a minor or General Studies option.
- A minimum of 9 credits must be taken in research methods courses, including:
  - one graduate-level basic statistics course
  - ADTED 550 Qualitative Research in Adult Education
  - one course on quantitative design/methods

### Culminating Experience

- ADTED 600 Thesis Research
- or ADTED 610 Thesis Research Off Campus
- Total Credits 60

D.Ed. students conduct applied research with the goal of improving practice in the general adult education field.

### Doctor of Philosophy (Ph.D.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

A minimum of 48 credits beyond the master's degree is required for the Ph.D. degree. Ph.D. students are required to take:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADTED 521</td>
<td>Doctoral Proseminar</td>
<td>3</td>
</tr>
<tr>
<td>ADTED 508</td>
<td>Globalization and Lifelong Learning</td>
<td>3</td>
</tr>
<tr>
<td>ADTED 510</td>
<td>Historical and Social Issues in Adult Education</td>
<td>3</td>
</tr>
<tr>
<td>ADTED 542</td>
<td>Perspectives on Adult Learning Theory</td>
<td>3</td>
</tr>
</tbody>
</table>

### Emphasis Area

- 18 credits in an emphasis area, including at least 6 credits of ADTED electives and at least 9 credits chosen from one or more Supporting Area(s) outside of Lifelong Learning and Adult Education. A list of courses that will count towards the Supporting Areas requirement is maintained by the graduate program office.

### Research

- 18 research credits, including:
  - one graduate-level basic statistics course
  - ADTED 550 Qualitative Research in Adult Education
  - one course on quantitative design/methods

Total Credits 48

In addition, Ph.D. students must fulfill the residency requirement and English competence requirements, must pass qualifying, comprehensive, and final oral examinations, and maintain continuous registration during dissertation research.
In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of a Lifelong Learning and Adult Education and Comparative and International Education dual-title Ph.D. student must include at least one member of the Comparative and International Education Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in Comparative and International Education, the member of the committee representing Comparative and International Education must be appointed as co-chair. The Comparative and International Education representative on the student’s dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their dissertation committee and reflects their original research and education in Lifelong Learning and Adult Education and Comparative and International Education. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

**Joint Degrees**

**Joint M.D./M.Ed. with the college of Medicine**

Requirements listed here are in addition to requirements listed in GCAC-211 Joint Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/joint-degree-programs).

**Admission Requirements**

Those who wish to apply for admission to the joint M.D./M.Ed. degree program would have to meet the admission requirements for both the M.D./M.Ed. programs. Admissions requirements and applications for admission for Penn State College of Medicine are available at the M.D. Program (http://med.psu.edu/md) section of the Penn State College of Medicine website. Prospective students interested in simultaneously pursuing an M.D. and M.Ed. first must apply to the Penn State College of Medicine M.D. program using the national American Medical College Application Service (AMCAS) application system and indicate their intent to pursue the M.D. degree at Penn State. Applicants are encouraged to identify themselves as candidates for the joint degree program at this time. However, medical students who realize after accepting admission into Penn State's College of Medicine that they are interested in the joint M.D./M.Ed. can apply for admission to the joint degree during their first three years in the College of Medicine. Given that students will already be enrolled in the College of Medicine it will be possible for faculty to observe their academic record and counsel them on the advisability of the joint degree.

The general admission requirements for the M.Ed. degree are listed on the Admission Requirements tab. Joint M.D./M.Ed. candidates may substitute the MCAT for GRE or MAT scores. After the student has been accepted to the College of Medicine, s/he must apply and be admitted to the Graduate School (http://www.gradschool.psu.edu/prospective-students/how-to-apply) for admission to the graduate program.

**Degree Requirements**

Students must fulfill all requirements for each degree in order to be awarded that degree, subject to the double-counting of credits as outlined below. Degree requirements for the M.D. program are listed on the M.D. Program (http://med.psu.edu/md) section of the Penn State College of Medicine website. Degree requirements for the M.Ed. degree are listed on the Degree Requirements tab. In accordance with the Graduate Council policy on Joint Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/joint-degree-programs), any nine credits from the M.D. program will meet the substitution requirement into the M.Ed., and any nine credits from the M.Ed. will be accepted into the M.D. program, from among the courses that reflect the interdisciplinary common ground between the two programs. It is to be noted that the course requirements for the joint degree are the same for students admitted to the M.Ed. in Lifelong Learning and Adult Education in the Medical and Health Professions option. If students accepted into the joint degree program are unable to complete the M.D. degree, they are still eligible to receive the M.Ed. degree if all the M.Ed. degree requirements have been satisfied.

**Student Aid**

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

World Campus students in graduate degree programs may be eligible for financial aid. Refer to the Tuition and Financial Aid section (http://www.worldcampus.psu.edu/tuition-and-financial-aid) of the World Campus website for more information.

**Courses**

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**Learning Outcomes**

**Master of Education (M.Ed.)**

1. Produce a brief, coherent prospectus on a topic area related to lifelong learning and adult education, supported by a logical rationale and relevant bodies of literature that may be used to examine this topic.

2. Demonstrate and articulate in-depth knowledge of the foundational issues, major theories, and methods that transect the field of lifelong learning and adult education.

3. Execute a critical review of literature related to a research topic or issue in lifelong learning and adult education, articulate the key features of this review, provide a compelling rationale for pursuing this issue, and describe how to use it to examine the research topic or related issue.

4. Articulate well-reasoned arguments and ideas with clarity in oral presentations and written formats and use the conventions of the discipline.

5. Demonstrate knowledge of the professional and ethical standards for research and practice in the field of lifelong learning and adult education.
Doctor of Education (D.Ed.)
1. Produce a brief, coherent prospectus on a topic area related to lifelong learning and adult education, supported by a logical rationale and relevant bodies of literature that may be used to examine this topic.
2. Demonstrate and articulate in-depth knowledge of the foundational issues, major theories, and methods that transect the field of lifelong learning and adult education.
3. Demonstrate and articulate in-depth knowledge of an area of specialization within, or complementary to, the field of lifelong learning and adult education.
4. Select a methodology that is appropriate for investigating a particular research problem related to lifelong learning and adult education, articulate the key features of this methodology, provide a compelling rationale for its use, and describe how to use it to examine the research problem.
5. Design a rigorous research study that articulates a specific research problem, is situated in academic literature relevant to this problem, and employs a methodology appropriate for examining this problem.
6. Execute, in a rigorous, ethical fashion, an independent research project that significantly furthers knowledge and critically reflective practice in lifelong learning and adult education.
7. Articulate well-reasoned arguments and ideas with clarity in oral presentations and written formats and use the conventions of the discipline.
8. Demonstrate knowledge of the professional and ethical standards for research and practice in the field of lifelong learning and adult education.

Doctor of Philosophy (Ph.D.)
1. Produce a brief, coherent prospectus on a topic area related to lifelong learning and adult education, supported by a logical rationale and relevant bodies of literature that may be used to examine this topic.
2. Demonstrate and articulate in-depth knowledge of the foundational issues, major theories, and methods that transect the field of lifelong learning and adult education.
3. Demonstrate and articulate in-depth knowledge of an area of specialization within, or complementary to, the field of lifelong learning and adult education.
4. Select a methodology that is appropriate for investigating a particular research problem related to lifelong learning and adult education, articulate the key features of this methodology, provide a compelling rationale for its use, and describe how to use it to examine the research problem.
5. Design a rigorous research study that articulates a specific research problem, is situated in academic literature relevant to this problem, and employs a methodology appropriate for examining this problem.
6. Execute, in a rigorous, ethical fashion, an independent research project that significantly furthers knowledge and theory in lifelong learning and adult education.
7. Articulate well-reasoned arguments and ideas with clarity in oral presentations and written formats and use the conventions of the discipline.
8. Demonstrate knowledge of the professional and ethical standards for research and practice in the field of lifelong learning and adult education.

Contact
Graduate Program Head: Roy Clariana
Harrisburg Campus
Director of Graduate Studies/Professor-in-Charge: Elizabeth Tisdell
Primary Program Contact: Deborah Klugh
Email: dk33@psu.edu
Mailing Address: 777 W. Harrisburg Pike, Middletown, PA 17057
Telephone: (717) 948-6059
Program Website: Lifelong Learning and Adult Education at Harrisburg (https://harrisburg.psu.edu/behavioral-sciences-and-education/health-and-professional-studies/lifelong-learning-adult-education)

University Park Campus
Director of Graduate Studies/Professor-in-Charge: Susan Land
Primary Program Contact: Jennifer McLaughlin
Email: jem73@psu.edu
Mailing Address: 301 Keller Building, University Park, PA 16802
Telephone: (814) 863-2596
Program Website: Lifelong Learning and Adult Education at University Park (http://ed.psu.edu/lps/adult-education)

World Campus
Director of Graduate Studies/Professor-in-Charge: Susan Land
Primary Program Contact: Whitney Deshong
Email: wad5021@psu.edu
Mailing Address: 303 Keller Building, University Park, PA 16802
Telephone: (814) 863-2596
Program Website: Lifelong Learning and Adult Education at World Campus (http://www.worldcampus.psu.edu/degrees-and-certificates/adult-education-masters/overview)

Literacy Education
Graduate Program Head: Holly Angelique
Program Code: LEDUC
Campus(es): Harrisburg (M.Ed.)
Degrees Conferred: Master of Education (M.Ed.)
The Graduate Faculty
View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=LEDUC)

The Master of Education in Literacy Education at Penn State Harrisburg is designed to provide full-time and part-time graduate students with a focused program of study in the field of literacy education. This advanced degree provides students with a comprehensive approach to literacy research, instructional practice, assessment, and leadership to meet the
varied and diverse needs of K-12 learners. Grounded in sociocultural and critical literacy approaches, the program affords literacy professionals:

1. specialized, in-depth knowledge about the teaching of literacy;
2. diagnostic and clinical skills necessary to support and plan instruction for a diverse range of students;
3. the ability to interpret, evaluate, and use literacy research to inform practice;
4. opportunities to use both digital and traditional texts to teach literacy across the curriculum;
5. knowledge about the role of social context in supporting K-12 learners' acquisition of language and literacy; and
6. the literacy leadership skills necessary to support and inform professional practice in K-12 settings.

Students also participate in a final capstone course that provides the opportunity to work closely with K-12 learners in a faculty-supervised, clinical, or on-site setting. Throughout the program, students work closely with faculty and cultivate strong peer support networks.

The Literacy Education program is recognized by the Pennsylvania Department of Education (PDE) and the International Literacy Association (ILA). The M.Ed. in Literacy Education program is aligned with both state and national standards from the:

- Pennsylvania Department of Education (PDE),
- International Literacy Association (ILA),
- National Council of Teachers of English (NCTE), and
- Council for Accreditation of Educator Preparation (CAEP) (formerly known as NCATE).

Following successful completion of the program, students are eligible to take the Praxis examination for certification as a Pennsylvania Reading Specialist (K-12). A Literacy Leadership certificate and fellowship opportunities in the National Writing Project (NWP) are also available.

## Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Students must have achieved an overall junior/senior grade point average of 3.00 or higher on a 4.0 scale. For students applying for admission who have completed credits beyond the baccalaureate degree, we will evaluate the last (approximately) 60 credits completed.

- Two letters of recommendation
- A brief (200-300 words) personal statement describing your interest in pursuing a master's degree in Literacy Education
- A valid Pennsylvania Teaching Certificate
- Test scores from one of the following: GRE, Miller Analogies Test, or Praxis examinations completed for certification

Pennsylvania Teaching Certificate must include evidence of a course in the methods of teaching reading, such as EDUC 320 or EDUC 321 with a grade of C or better.

## Degree Requirements

### Master of Education (M.Ed.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

The Master of Education degree in Literacy Education consists of 33 credits that prepare students for the Pennsylvania Reading Specialist Certification (K-12). The degree requirements for the Master of Education in Literacy Education include 21 credits in foundational, pedagogical, and advanced theoretical work in reading, writing and educational research design, two courses that make up the capstone clinical practicum (6 credits), and 6 additional credits of electives for a total of 33 credits. At least 18 credits must be taken at the 500 or 800 level, with at least 6 credits at the 500 level. A minimum grade-point average of 3.00 for work completed at the University and acceptable professional dispositions are required for graduation.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDUC 452</td>
<td>Teaching Writing</td>
<td>3</td>
</tr>
<tr>
<td>EDUC 477</td>
<td>Teaching Struggling Readers and Writers</td>
<td>3</td>
</tr>
<tr>
<td>LLED 445</td>
<td>Teaching English in Bilingual/Dialectal Education (or an equivalent ELL course approved by the program coordinator)</td>
<td>3</td>
</tr>
<tr>
<td>EDUC 561</td>
<td>Psychology of Reading</td>
<td>3</td>
</tr>
<tr>
<td>EDUC 562</td>
<td>Diagnostic Evaluation of Reading Problems</td>
<td>3</td>
</tr>
<tr>
<td>EDUC 565</td>
<td>Literacy and Leadership</td>
<td>3</td>
</tr>
<tr>
<td>LLED 594</td>
<td>Research in Language and Literacy Education</td>
<td>3</td>
</tr>
</tbody>
</table>

### Electives

- Select 6 elective credits:
  - EDUC 422 Literature for Children and Adolescents
  - EDUC 432 Children's Literature in Teaching Writing
  - EDUC 472 Teaching Reading Through the Content Areas

### Culminating Experience

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDUC 563</td>
<td>Methods in Teaching Reading</td>
<td>3</td>
</tr>
<tr>
<td>EDUC 564</td>
<td>Reading Clinic (or an equivalent course approved by the program coordinator)</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits: 33

1 Students must enroll in EDUC 563 and EDUC 564 consecutively in the fall and spring during the same academic year. These courses serve as the culminating experience for the degree. In these courses, students complete a case study inquiry project designed to address the needs of a literacy-learner, engage in professional development and mentorship, and present their research findings to peers. In EDUC 563, students engage in observation and design of their case study inquiry project. In EDUC 564, under the supervision of faculty, students collect data, implement change, analyze results, and present their findings to colleagues. Students engage in ongoing professional development and mentorship in both courses.

### Transfer Credits

Credits earned at other institutions but not used to earn a degree and credits earned as a non-degree student prior to admission to the graduate program may be applied toward the requirements for a graduate degree, subject to restrictions outlined in GCAC-309 Transfer Credit (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-309/).
transfer-credit). Forms for transfer of credit can be obtained from the graduate program office.

**Retention**

Students must maintain a minimum 3.00 grade-point average, satisfactorily complete all required key assessments, and attain a grade of "C" or better in all required core courses. Students who do not make satisfactory progress will be notified in writing noting the specific deficiencies and requesting that they meet with the program coordinator to develop a remediation plan. Failure to meet or to satisfactorily complete the remediation plan will result in termination from the program.

All persons enrolled in Teacher Education Programs at Penn State Harrisburg are expected to demonstrate the professional dispositions that are aligned with the unit’s vision statement. The faculty shall evaluate the approved dispositions demonstrated by the students in class and during field experiences. Students may be rated as exemplary, acceptable, or unacceptable. Students are expected to attain acceptable or exemplary ratings in order to graduate.

**Accreditation and Licensure**

This program is accredited by the Council for Accreditation of Educator Preparation (CAEP), formerly known as the National Council for Accreditation of Teacher Education (NCATE), whose "performance-based system of accreditation fosters competent classroom teachers and other educators who work to improve the education of all K-12 students. CAEP believes every student deserves a caring, competent, and highly qualified teacher.”

**Student Aid**

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School's website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

**Courses**

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**Contact**

**Graduate Program Head:** Holly Angelique

**Director of Graduate Studies/Professor-in-Charge:** Mary Napoli

**Primary Program Contact:** Janet Althouse

**Email:** jla25@psu.edu

**Mailing Address:** 777 W. Harrisburg Pike, Olmsted Building W331, Middletown, PA 17057

**Telephone:** (717) 948-6213

**Program Website:** Literacy Education (https://harrisburg.psu.edu/behavioral-sciences-and-education/teacher-education/master-education-literacy-education)

**Management and Organizational Leadership**

**Graduate Program Head**

Brian H. Cameron

**Program Code**

MOL

**Campus(es)**

University Park (M.P.S.)

**Degrees Conferred**

Master of Professional Studies (M.P.S.)

**The Graduate Faculty**

View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=MOL)

The Master of Professional Studies in Management and Organizational Leadership prepares graduates to stand out in a competitive job market by studying at a highly-reputed business school with some of the world’s leading academic thinkers and industry experts. This program provides students with the business, leadership, and organizational skills needed for effective change management, strategic management, and high-performance team development. Students will acquire the business skills needed to succeed in today’s dynamic work environments, gain a firm understanding of business issues and problems, and be prepared to become successful leaders. The program is taught by the same world-class professors who teach our M.B.A. students. A solid foundation in strategy, decision analysis, management, accounting, marketing, operations, and finance will make graduates more attractive to hiring managers and enable them to advance more rapidly into management and leadership positions. These learning outcomes are achieved by a combination of lectures by faculty, invited guest lecturers, reading of key literature, individual and team projects, and practical involvement in a leadership immersion capstone experience.

**Admission Requirements**

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

**Educational Background**

The student cohort reflects today’s international business environment, with selective admittance. With this in mind, the following are the admission requirements:

- Undergraduate bachelor’s degree from a regionally accredited institution
- GMAT or GRE scores
- Submission of a completed Graduate School Application for Admission (http://www.gradschool.psu.edu/prospective-students/how-to-apply), including:
  - Statement of Purpose: a 600 word essay articulating career and educational goals that demonstrate strong written communication skills
  - Résumé
• Two letters of recommendation that attest to readiness for graduate study
• Official transcripts from all post-secondary institutions attended
• Work experience post-undergraduate graduation of 18 months or less
• Visa Application (International Candidates)

Candidates who have demonstrated a strong academic background may apply for a waiver of the GMAT/GRE requirement, which may be granted at the discretion of the program.

Language of Instruction
The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. See GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

Management and Organizational Leadership program applicants must have minimum TOEFL scores of:
- Internet-Based: 100
- Speaking Section: 20
- Paper-Based: 600

The minimum acceptable composite score for the IELTS for applicants to the Management and Organizational Leadership program is 7.0

Degree Requirements
Master of Professional Studies (M.P.S.)
Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

Total required credits for the Master of Professional Studies in Management and Organizational Leadership program is 30 credits.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BA 800</td>
<td>Marketing Management</td>
<td>2</td>
</tr>
<tr>
<td>BA 801</td>
<td>Management</td>
<td>2</td>
</tr>
<tr>
<td>BA 802</td>
<td>Team Process and Performance</td>
<td>1</td>
</tr>
<tr>
<td>BA 804</td>
<td>Ethical Leadership</td>
<td>2</td>
</tr>
<tr>
<td>BA 810</td>
<td>Supply Chain and Operations Management</td>
<td>2</td>
</tr>
<tr>
<td>BA 811</td>
<td>Financial Accounting</td>
<td>2</td>
</tr>
<tr>
<td>BA 512</td>
<td>Quantitative Analysis for Managerial Decision Making</td>
<td>2</td>
</tr>
<tr>
<td>BA 815</td>
<td>Business Statistics for Contemporary Decision Making</td>
<td>2</td>
</tr>
<tr>
<td>BA 817</td>
<td>Communication Skills for Management (1 per mod)</td>
<td>4</td>
</tr>
<tr>
<td>BA 821</td>
<td>Foundation in Managerial Accounting</td>
<td>2</td>
</tr>
<tr>
<td>BA 831</td>
<td>Foundations in Finance</td>
<td>2</td>
</tr>
<tr>
<td>BA 832</td>
<td>Global Business Environment</td>
<td>1</td>
</tr>
<tr>
<td>BA 533</td>
<td>Economics for Managers</td>
<td>2</td>
</tr>
<tr>
<td>BA 571</td>
<td>Strategic Management</td>
<td>2</td>
</tr>
</tbody>
</table>

Culminating Experience

BA 880 Leadership Immersion (Capstone Course) 2

Total Credits 30

Employers need future leaders. Our Leadership Immersion course provides practical and hands-on exposure to leadership training and exercises that can be applied in a diverse range of professional environments and business settings. Leadership Immersion programs take students out of their comfort zones to experience leadership and teamwork from a different perspective. The Capstone course provides an opportunity to apply and integrate the knowledge and skills that were gained throughout the Master of Professional Studies in Management and Organizational Leadership program with strategic management and leadership concepts. A capstone paper is one of the major deliverables in this course.

Student Aid
Refer to the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School’s website. Students in this program are not eligible for graduate assistantships.

Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact
Graduate Program Head: Brian Cameron
Primary Program Contact: Susan Winarchick
Email: skf10@psu.edu
Mailing Address: 220 Business Bldg, University Park, PA 16802
Telephone: (814) 863-0474
Program Website: Management and Organizational Leadership (https://mol.smeal.psu.edu)

Mass Communications
Graduate Program Head: James Ford Risley
Program Code: MASSC
Campus(es): University Park (Ph.D.)
Degrees Conferred: Doctor of Philosophy (Ph.D.)
The Graduate Faculty: View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=MASSC)

The Ph.D. Program in Mass Communications is administered by the Donald P. Bellisario College of Communications.

Admission Requirements
Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-
students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

All students seeking admission to the program are required to submit Graduate Record Examination scores, official transcripts from all post-secondary institutions attended (http://www.gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission), and three letters of recommendation from individuals qualified to comment on their ability to perform successfully at the doctoral level. In most cases, a completed master's degree is required for admission to the program. In addition, applicants are required to submit a formal statement indicating what they expect to achieve and how their educational background qualifies them for doctoral-level study in mass communications. Admission decisions are made by the college admissions committee.

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. See GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

Applicants to the Mass Communications Ph.D. program must have a minimum TOEFL score of 600 on the paper-based test to be considered for admission.

**Degree Requirements**

**Doctor of Philosophy (Ph.D.)**

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

Students admitted to the doctoral program must complete a qualifying examination. For students with a master's degree or equivalent, this examination ordinarily will occur before the student has completed 10 credits of doctoral-level work. For individuals admitted with only a baccalaureate degree and no graduate-level work, the qualifying examination will be administered after 30 credits and before 40 credits of graduate-level work have been completed. The committee designated to conduct the examination will determine whether the student's knowledge of mass communications is adequate for doctoral-level study, specify what deficiencies, if any, must be removed, and pass judgment on a proposed plan of study.

The program requirements include both semesters of the Mass Communications Proseminar (COMM 501), a foundation course and other courses selected by the student, with committee approval, that collectively constitute a coherent sequence appropriate to the advanced study of mass communications. Students are expected to take a minimum of 20 credits in communications-related courses. No more than 6 credits can be taken as independent study credits. Students also are required to take at least one course in research methods approved by the dissertation committee.

Upon completion of the course work approved for the plan of study, the candidate will take a comprehensive examination. Following the comprehensive examination, doctoral candidates schedule a dissertation proposal meeting at which the research plan for their dissertation is reviewed and approved by their committee. Upon completion of the dissertation, doctoral candidates present a final oral defense of their dissertations before their committees.

The communication and foreign language requirement for the Ph.D. degree may be satisfied by intermediate knowledge of one foreign language or by an equivalent research skill relevant to the student's field of study.

**Student Aid**

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School's website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

**Courses**

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**Contact**

**Graduate Program Head:** James Ford Risley

**Director of Graduate Studies/Professor-in-Charge:** Matthew McAllister

**Primary Program Contact:** Letitia Bullock (lqb4@psu.edu)

**Program Email:** commgpo@psu.edu

**Mailing Address:** 201 Carnegie Bldg., University Park, PA 16802

**Telephone:** (814) 865-3070

**Program Website:** Mass Communications (https://bellisario.psu.edu/graduate/ph.d.-in-mass-communications)

**Materials Science and Engineering**

**Graduate Program Head** Suzanne Mohney

**Program Code** MATSC

**Campus(es)** University Park (Ph.D., M.S.)

**Degrees Conferred** Doctor of Philosophy (Ph.D.) Master of Science (M.S.) Dual-Title Ph.D. in Materials Science and Engineering and Biogeochemistry

**The Graduate Faculty** View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=MATSC)

The Intercollege Graduate Degree Program in Materials Science and Engineering offers comprehensive graduate education in the fundamentals of materials science (synthesis-structure-property-performance relationships). Faculty have interests in many research areas including biomaterials, ceramics, composites and hybrids, computational materials science, electronic and photonic materials, materials chemistry and physics, metals, nanostructured and nanoscale materials, piezoelectrics and ferroelectrics, polymers and soft materials.
Students may choose to study across the major themes of materials today including materials in energy applications, nanotechnology, materials in medicine, materials in communications, materials for sensor applications, structural materials, etc., by using a combination of MATSE courses and a myriad of materials-related courses offered in the science and engineering departments at Penn State.

**Admission Requirements**

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Applicants with baccalaureate degrees in the physical sciences and engineering with a Junior/Senior grade point average of 3.2/4.0 or higher will be considered for admission.

Scores for the Graduate Record Examinations (GRE) are required for admission. Applicants with verbal and quantitative GRE scores 303 or higher will be considered.

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. See GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

**Degree Requirements**

**Master of Science (M.S.)**

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

A minimum of 30 credits is required for the completion of the M.S. degree. At least 18 credits must be at the 500 or 600 level, and the remaining credits may be at the 400 or 800 level. There are 12 credits required in the following core courses:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATSE 501</td>
<td>Thermodynamics of Materials</td>
<td>3</td>
</tr>
<tr>
<td>MATSE 512</td>
<td>Principles of Crystal Chemistry</td>
<td>3</td>
</tr>
<tr>
<td>MATSE 542</td>
<td>Polymers: Materials The Solid State</td>
<td>3</td>
</tr>
<tr>
<td>or MATSE 503</td>
<td>Kinetics of Materials Processes</td>
<td></td>
</tr>
<tr>
<td>MATSE 582</td>
<td>Materials Science and Engineering Professional Development</td>
<td>1</td>
</tr>
</tbody>
</table>

**Electives**

The remaining elective credits may be chosen from a list approved electives maintained by the program office.

**Culminating Experience**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATSE 600</td>
<td>Thesis Research</td>
<td>6</td>
</tr>
<tr>
<td>or MATSE 596</td>
<td>Individual Studies</td>
<td></td>
</tr>
</tbody>
</table>

As a culminating experience for the M.S. degree, students may choose to complete either a thesis or a scholarly paper. Students who choose to complete a thesis must take at least 6 credits of thesis research (MATSE 600). A thesis describing independent research performed by the student must be written and defended at an oral examination. Bound copies will be made available for the University Libraries and the thesis adviser. A thesis committee will administer the final oral examination of the thesis. The committee must consist of at least three Graduate Faculty members. The thesis must be accepted by the committee members, the head of the graduate program, and the Graduate School, and the student must pass the thesis defense.

The non-thesis track is designed to be completed in 3 semesters, or one calendar year (fall, spring, and summer). Students in this program will be required to begin in the fall semester and be registered continuously until the culminating research experience is completed at the end of the summer. A research adviser will be assigned to students in their first semester. Students in the non-thesis option must write a satisfactory scholarly paper while enrolled in MATSE 596. A total of 6 credits of MATSE 596 will be taken, 1 credit each in the fall and spring, and 4 credits in the summer. It is expected that the scholarly paper will be submitted and approved at the end of the summer semester. Students who need more time to complete the final paper will be allowed to complete the paper, and have it reviewed and approved after the third semester has ended. Students are not required to remain in residence while they complete the final paper. However, extensions granted to students in this program must comply with the Graduate Council policy on deferred grades (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-400/grading-system).

**Doctor of Philosophy (Ph.D.)**

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

A doctoral program consists of a combination of courses, seminars, and research that fulfills the minimum requirements of Graduate Council and is approved by the dissertation committee for each individual student. A master’s degree is not a prerequisite for the doctorate. However, the first year of graduate study leading to the Ph.D. may be the same as that provided for the M.S. degree. Acceptance into the Ph.D. program is based on the student’s performance on the Ph.D. qualifying exam, which is administered by a graduate qualifying exam committee of the department.

A minimum of 18 credits of 500-level courses is required for completing a Ph.D. degree in Materials Science and Engineering, including 9 credits in required core courses:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATSE 501</td>
<td>Thermodynamics of Materials</td>
<td>3</td>
</tr>
<tr>
<td>MATSE 503</td>
<td>Kinetics of Materials Processes</td>
<td>3</td>
</tr>
<tr>
<td>MATSE 512</td>
<td>Principles of Crystal Chemistry</td>
<td>3</td>
</tr>
</tbody>
</table>

Ph.D. students are also required to take 2 credits of MATSE 590 each year, and complete MATSE 582; credits for MATSE 582 and MATSE 590 will not count towards the minimum 18 credits required. Additional specific course requirements are determined by the student and the adviser in consultation with the student’s dissertation committee. A student with an M.S. degree from Penn State can use credits earned during his or her M.S. study to fulfill the Ph.D. course requirements. Upon approval by the dissertation committee and the graduate program...
coordinator, some or all of the course requirements may be waived for students holding an M.S. degree from another institution.

**Dual-Titles**

**Dual-title Ph.D. in Materials Science and Engineering and Biogeochemistry**

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

**Admission Requirements**

Students must apply and be admitted to the graduate program in Materials Science and Engineering and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Biogeochemistry dual-title program. Refer to the Admission Requirements section of the Biogeochemistry Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/biogeochemistry). Doctoral students must be admitted into the dual-title degree program in Biogeochemistry prior to taking the qualifying examination in their primary graduate program.

**Degree Requirements**

To qualify for the dual-title degree, students must satisfy the degree requirements for the degree they are enrolled in Materials Science and Engineering. In addition, students must complete the degree requirements for the dual-title in Biogeochemistry, listed on the Biogeochemistry Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/biogeochemistry). Doctoral students must be admitted into the dual-title degree program in Biogeochemistry prior to taking the qualifying examination in their primary graduate program.

The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Materials Science and Engineering and must include at least one Graduate Faculty member from the Biogeochemistry program. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. There will be a single qualifying examination, containing elements of both Materials Science and Engineering and Biogeochemistry. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of a Materials Science and Engineering and Biogeochemistry dual-title Ph.D. student must include at least one member of the Biogeochemistry Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in Biogeochemistry, the member of the committee representing Biogeochemistry must be appointed as co-chair. The Biogeochemistry representative on the student’s dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their dissertation committee and reflects their original research and education in Materials Science and Engineering and Biogeochemistry. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

**Student Aid**

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

Graduate assistantships are not available to students in the accelerated MATSC M.S. track.

**Courses**

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**Learning outcomes**

**Master of Science (m.S.)**

1. **KNOW:** Demonstrate appropriate breadth and depth of fundamental knowledge in materials science and engineering.
2. **THINK:** Review and critically analyze the ideas of other scientists and engineers, especially those addressing problems closely related to their own research.
3. **APPLY/CREATE:** Apply the scientific method using laboratory, computational and/or theoretical techniques to create new knowledge in material science and engineering or to design new materials.
4. **COMMUNICATE:** Effectively communicate unanswered questions about materials in writing and oral presentations; express the scientific and societal impact of their work; and disseminate new knowledge through archived publications, such as articles and theses.
5. **PROFESSIONAL PRACTICE:** Employ the highest ethical and professional standards, and the best practices in laboratory safety, in all research and academic endeavors.

**Doctor of Philosophy (Ph.D.)**

1. **KNOW:** Demonstrate appropriate breadth and depth of fundamental knowledge in materials science and engineering.
2. **THINK:** Review and critically analyze the ideas of other scientists and engineers, especially those addressing problems closely related to their own research.
3. **APPLY/CREATE:** Apply the scientific method using laboratory, computational and/or theoretical techniques to create new knowledge in material science and engineering or to design new materials.
4. **COMMUNICATE:** Effectively communicate unanswered questions about materials in writing and oral presentations; express the scientific and societal impact of their work; and disseminate new knowledge through archived publications, such as articles and theses.
5. **PROFESSIONAL PRACTICE:** Employ the highest ethical and professional standards, and the best practices in laboratory safety, in all research and academic endeavors.

**Contact**

**Graduate Program Head:** Suzanne Mohney

**Primary Program Contact:** Hayley Colyer

**Email:** hjc24@psu.edu

**Mailing Address:** 225D Steidle Building, University Park, PA 16802

**Telephone:** (814) 865-0498

**Program Website:** Materials Science and Engineering (http://www.igdpmatse.psu.edu)

**Mathematics**

<table>
<thead>
<tr>
<th>Graduate Program Head</th>
<th>Carina Curto</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Campus(es)</strong></td>
<td>University Park (Ph.D., D.Ed., M.A., M.Ed.)</td>
</tr>
<tr>
<td></td>
<td>Great Valley (M.Ed.)</td>
</tr>
</tbody>
</table>

**Degrees Conferred**

- Doctor of Philosophy (Ph.D.)
- Doctor of Education (D.Ed.)
- Master of Arts (M.A.)
- Master of Education (M.Ed.)
- Dual-Title Ph.D. and M.A. in Mathematics and Operations Research

**The Graduate Faculty**

View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=MATH)

Graduate courses in all the principal branches of mathematics are offered regularly each year. The department is prepared to direct research in a variety of fields, including various branches of analysis, algebra, topology, number theory, applied analysis, and mathematical logic and foundations.

**Admission Requirements**

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Scores from the Graduate Record Examinations Aptitude Test (GRE), or from a comparable substitute examination accepted by the Mathematics graduate program, are required for admission. At the discretion of a graduate program, a student may be admitted provisionally (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/provisional-admission) for graduate study in a program without these scores.

To be admitted to the Ph.D., D.Ed., or M.A. program without undergraduate deficiency, an applicant should have completed at least 18 credits in mathematics at the advanced undergraduate level (400 series or their equivalents). The undergraduate student is urged to take at least 6 credits in foundations of analysis (MATH 401), 6 in modern algebra (MATH 435 and MATH 436), and 3 in topology (MATH 429) or their equivalents. These courses are essential preparation for the graduate program, and if they are taken after admission, a maximum of 6 credits may be counted toward an advanced degree.

Students with a 3.00 junior/senior average and with appropriate course backgrounds will be considered for admission. The best-qualified applicants will be accepted up to the number of spaces that are available for new students.

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. See GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

**Degree Requirements**

**Master of Education (M.Ed.)**

Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

To be admitted to the M.Ed. program without undergraduate deficiency, an applicant should have completed at least 15 credits in mathematics at the intermediate level beyond calculus. The M.Ed. program does not require any 500-series courses, but the student is encouraged to select some at this level. Special courses have been instituted for the training of teachers. Among these are MATH 470 and MATH 471. These are acceptable to satisfy credit requirements only for the M.Ed. degree.

**Master of Arts (M.A.)**

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

For the M.A. degree the department offers two options:

1. the thesis option requires 12 credits of approved 500-series course in mathematics, 6 to 9 credits of thesis, sufficient credits in approved 400- or 500-series courses to make a total of 30 credits, and a final oral examination based on the thesis and general course material; and

2. the nonthesis option requires 18 credits of 500-series courses in mathematics, sufficient credits in approved 400- or 500-series courses to make a total of 30 credits, and a term paper on an approved topic in mathematics. No final examination is given in this option. Under this option a student may also elect to take a minor in applied mathematics (9 credits with at least 6 at the 500 level) and may use these credits toward the necessary 30 credits. For both options, a grade of A or B is required in all courses.

**Doctor of Education (D.Ed.)**

Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

All doctoral students are required to take three qualifying examinations. Two of these examinations must be completed prior to the beginning of the student’s second year of graduate study, and the third prior to the beginning of the third year. The qualifying examinations are in the areas of analysis, algebra, and topology/geometry.
The qualifying examinations are given twice a year—after the end of the spring semester and before the beginning of the fall semester. Basic, one-year sequences are offered in each subject annually to help students prepare for the examinations.

After passing all three qualifying exams, students are expected to select a dissertation adviser and form a dissertation committee. The committee administers the comprehensive exam (no later than the end of the seventh semester of study) and offers counsel of the student as his or her research progresses.

**Doctor of Philosophy (Ph.D.)**

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

All doctoral students are required to take three qualifying examinations. Two of these examinations must be completed prior to the beginning of the student's second year of graduate study, and the third prior to the beginning of the third year. The qualifying examinations are in the areas of analysis, algebra, and topology/geometry.

The qualifying examinations are given twice a year—after the end of the spring semester and before the beginning of the fall semester. Basic, one-year sequences are offered in each subject annually to help students prepare for the examinations. Typically, an entering Ph.D. student takes two of the basic sequences in the first year and the third basic sequence in the second year of study, and takes the qualifying examinations in the spring after completing the corresponding courses. If an examination is failed, the student must take it again. Students who fail a qualifying examination in a given subject twice may not continue in the Ph.D. program.

Entering Ph.D. students may take one or more of the qualifying examinations on arrival in August without penalty. If they fail a pre-entrance exam, they still have two more opportunities to pass it. Entering Ph.D. students are advised to take at least two basic sequences (in the subjects they did not pass qualifying exams in on arrival) and the subsequent qualifying exams in the first year of graduate study.

After passing all three qualifying exams, students are expected to select a dissertation adviser and form a dissertation committee. The committee administers the comprehensive exam (no later than the end of the seventh semester of study) and offers counsel of the student as his or her research progresses.

**Dual-Titles**

**Dual-Title M.A. and Ph.D. in Mathematics and Operations Research**

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

**Admission Requirements**

Students must apply and be admitted to the graduate program in Mathematics and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Operations Research dual-title program. Refer to the Admission Requirements section of the Operations Research Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/operations-research). Doctoral students must be admitted into the dual-title degree program in Operations Research prior to taking the qualifying examination in their primary graduate program.

**Degree Requirements**

To qualify for the dual-title degree, students must satisfy the degree requirements for the degree they are enrolled in Mathematics. In addition, students must complete the degree requirements for the dual-title in Operations Research, listed on the Operations Research Bulletin page.

The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Mathematics and Operations Research. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for dissertation committees, the dissertation committee of a Mathematics and Operations Research dual-title Ph.D. student must include at least one member of the Operations Research Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. There will be a single qualifying examination, containing elements of both Mathematics and Operations Research. Graduates must complete the degree requirements for the dual-title in Operations Research, listed on the Operations Research Bulletin page.

In the dual-title program, students are required to write and orally defend a dissertation on a topic that is approved in advance by their dissertation committee and reflects their original research and education in Mathematics and Operations Research. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

**Student Aid**

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding section of The Graduate School's website. Students on graduate assistantships must adhere to the course load limits set by The Graduate School.

**Courses**

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up...
deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact
Graduate Program Head: Carina Curto
Director of Graduate Studies/Professor-in-Charge: Alexei Novikov
Primary Program Contact: Allyson Borger (awr5036@psu.edu)
Program Email: gradstudies@math.psu.edu
Mailing Address: 104G McAllister Building, University Park, PA 16802
Telephone: (814) 865-7529
Program Website: Mathematics (http://www.math.psu.edu/graduate)

Mechanical Engineering (Capital)
Graduate Program Head: Rafic Bachnak
Program Code: MCENG
Campus(es): Harrisburg (M.S.)
Degrees Conferred: Master of Science (M.S.)
The Graduate Faculty: View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=MCENG)

Penn State Harrisburg (PSH) is located within a short commute from York, Lancaster, Carlisle, Reading, and Harrisburg industrial centers concentrated on manufacturing, engineering consulting, product design, and development. The Master of Science in Mechanical Engineering degree program is designed to provide support for industrial research needs, as well as offer an avenue for Penn State Harrisburg B.S. ME graduates to continue their education in the south central Pennsylvania region. The program is accessible to engineering professionals who wish to pursue advanced studies without giving up their current employment. The program may be completed on a full-time or part-time basis. Classes are scheduled weekly in three-hour evening sessions, offering a convenient format for career professionals seeking to enroll part time. Whenever possible, the program will take advantage of the specialized equipment and research facilities available in the local industries to enhance the training of M.S. ME students.

Admission Requirements
Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies)

Admission into the Master of Science (M.S.) Mechanical Engineering program will be granted only to candidates who demonstrate high potential for success in graduate studies. Applicants should have undergraduate degrees in engineering or technology fields from an accredited university and must meet the admission requirements as set by Penn State's Graduate School.

An undergraduate cumulative grade-point average of 3.0 or better on a 4.0 scale, and scores from the GRE are required for admission.

Applicants should submit the following:
- a completed Graduate School online application (http://gradschool.psu.edu/prospective-students/how-to-apply) with the nonrefundable application fee;
- official transcripts from all post-secondary institutions attended (http://gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission);
- three (3) letters of professional recommendations from individuals who can evaluate the applicant's potential;
- a personal statement of professional interest, goals, and experience;
- test scores from the Graduate Record Examination (GRE);
- statement of interest in graduate assistantship, if desired.

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. See GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

Degree Requirements
Master of Science (M.S.)
Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

A minimum of 31 credits at the 400, 500, 600, or 800 level is required, including 24 course credits with at least 15 credits at the 500 level, 1 credit of ME 590, and 6 credits of thesis research (ME 600 or ME 610).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMCH 524A</td>
<td>Mathematical Methods in Engineering</td>
<td>3</td>
</tr>
<tr>
<td>ME 590</td>
<td>Colloquium</td>
<td>1</td>
</tr>
</tbody>
</table>

Students take 9 credits in one of the following concentrations. A list of courses that will count towards these concentrations is maintained by the program office.

- Thermo-Fluids Science
- Mechanical Science
- Materials Science

Electives
Students take 12 credits of electives from a list of approved electives maintained by the program office. To incorporate breadth into the program, students are required to take at least one elective course in a Concentration Area other than the one they complete.

<table>
<thead>
<tr>
<th>Culminating Experience</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME 600 Thesis Research</td>
<td>6</td>
</tr>
<tr>
<td>or ME 610 Thesis Research Off Campus</td>
<td></td>
</tr>
</tbody>
</table>

Total Credits 31

A maximum of 3 400-level courses (9 credits) can be counted towards the degree requirements for the M.S. A minimum of 12 credits must be earned in 400- and 500-level courses in Mechanical Engineering.

Students who have deficiencies in the use of spoken or written English may be required to take courses in these areas in addition to the specified degree requirements. Credits earned to remediate deficiencies cannot be applied towards requirements for the M.S. degree.
Degree requirements must be completed within six years of admission to degree status.

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/credit-loads-graduate-assistants) set by The Graduate School.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact

Graduate Program Head: Rafic Bachnak
Director of Graduate Studies/Professor-in-Charge: Richard Ciocci
Primary Program Contact: Stephanie Rehm
Email: szr514@psu.edu
Mailing Address: W 215 Olmsted- Penn State Harrisburg, 777 W Harrisburg Pike, Middletown, PA 17057
Program Website: Mechanical Engineering at Harrisburg (https://harrisburg.psu.edu/science-engineering-technology/me-met/bachelor-science-mechanical-engineering)

Mechanical Engineering (Engineering)

Graduate Program Head Karen A. Thole
Program Code ME
Campus(es) University Park (Ph.D., M.S.) World Campus (M.S.)
Degrees Conferred Doctor of Philosophy (Ph.D.) Master of Science (M.S.) Integrated B.S. in Mechanical Engineering and M.S. in Mechanical Engineering
The Graduate Faculty View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=ME)

Graduate programs and research facilities are available in combustion, heat transfer, fluid mechanics, energy storage, dynamic system analysis, robotics, mechanical design, energy systems, biomedical applications, and micro-nano applications. Air pollution control, automotive safety, tribology, designing for noise control and for reliability also provide many research and design opportunities.

Admission Requirements

Applications for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

To maintain a high quality program, it is important that our students are also of a caliber to succeed. As such, the admission requirements for the students enrolling in the online program will not differ from those of our resident students. Online students will only be accepted into the program with approval from the Department’s Admissions Committee. Within the Department, the ME Admissions Committee (made up of ME Graduate Faculty) will provide recommendations to the Professor-in-Charge of Graduate Studies on accepting students to the MSME degree program. It is expected that students have a Bachelor of Science degree in a suitable engineering field from a U.S. regionally accredited institution or from an officially recognized degree-granting international institution. Admission decisions will also be based upon relevant work experience and recommendation letters.

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. See GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

Degree Requirements

Master of science (M.S.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

The M.S. degree program is designed for students to gain advanced knowledge for research, analysis, and design in mechanical engineering. Resident students pursuing an M.S. degree may choose one of two options: completion of 24 course credits and the submission of a thesis (6 credits) to the Graduate School, or 30 course credits and the submission of a scholarly paper to the department. The M.S. degree program is also offered on-line in which only the 30 course credits and the submission of a scholarly paper is permitted. The requirements for the M.S. M.E. degree program are:

1. Minimum of 30 course credits at the 400 level or higher, of which 20 course credits must be earned at Penn State. Note that 2 additional credits are required by enrolling in the ME 590 Colloquium but these 2 additional credits do not count toward the 30 course credits. The required course credits must be completed with a grade point average of 3.00 or higher.
2. All students must successfully complete two credits of ME 590 Colloquium preferably in their first two semesters in the program. These two colloquium credits do not count toward the 30 course credits in Requirement 1 above.
3. At least 18 credits in 500- and 600-level courses.
4. A minimum of 12 credits in 400- and 500-level courses in Mechanical Engineering, excluding ME 410, ME 440, ME 441, ME 442, ME 443, ME 450, and any other required undergraduate courses. ME 596 cannot be used to fulfill this requirement.
5. The MSME requires three credits of mathematics. These credits must be taken from the following group of courses:
Courses with specific focus on numerical analysis will not count toward the mathematics requirement.

6. A thesis or paper must be presented to meet the specific requirement of the culminating experience type selected; the paper may take the form of a doctoral research proposal if agreed upon in advance by the student and the graduate adviser. Online students seeking an MSME degree will only be permitted to write a paper.

7. Preparatory course(s) required for teaching assistants (such as ENGR 888), remedial courses, and any courses required in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**CULMINATING EXPERIENCE OPTION A - M.S. THESIS**
Candidate registers for a minimum of six credits of ME 600 or ME 610 and submits a thesis following the procedures specified by the Graduate School. This program will consist of at least 24 course credits of which 18 credits must be at the 500 level (not including ME 596), and six thesis credits. At least 12 credits must be 400- or 500-level Mechanical Engineering courses.

**CULMINATING EXPERIENCE OPTION B - M.S. PAPER**
Candidate registers for 30 course credits of which 18 credits must be at the 500 level. A maximum of three credits of ME 596 can be counted in the total of 30 credits. At least 12 credits must be 400- or 500-level Mechanical Engineering courses. Candidates write a paper on a topic mutually agreed upon by the adviser suitable for publication in a professional journal or presentation at a national or international conference.

**Doctor of Philosophy (Ph.D.)**
Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

The Ph.D. program emphasizes scholarly research and helps students prepare for research and related careers in industry, government, and academe. Students must pass written and oral qualifying examinations. The Ph.D. program is quite flexible, with minimal formal requirements.

Courses with specific focus on numerical analysis will not count toward the mathematics requirement.

6. A thesis or paper must be presented to meet the specific requirement of the culminating experience type selected; the paper may take the form of a doctoral research proposal if agreed upon in advance by the student and the graduate adviser. Online students seeking an MSME degree will only be permitted to write a paper.

7. Preparatory course(s) required for teaching assistants (such as ENGR 888), remedial courses, and any courses required in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**CULMINATING EXPERIENCE OPTION A - M.S. THESIS**
Candidate registers for a minimum of six credits of ME 600 or ME 610 and submits a thesis following the procedures specified by the Graduate School. This program will consist of at least 24 course credits of which 18 credits must be at the 500 level (not including ME 596), and six thesis credits. At least 12 credits must be 400- or 500-level Mechanical Engineering courses.

**CULMINATING EXPERIENCE OPTION B - M.S. PAPER**
Candidate registers for 30 course credits of which 18 credits must be at the 500 level. A maximum of three credits of ME 596 can be counted in the total of 30 credits. At least 12 credits must be 400- or 500-level Mechanical Engineering courses. Candidates write a paper on a topic mutually agreed upon by the adviser suitable for publication in a professional journal or presentation at a national or international conference.

**Doctor of Philosophy (Ph.D.)**
Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

The Ph.D. program emphasizes scholarly research and helps students prepare for research and related careers in industry, government, and academe. Students must pass written and oral qualifying examinations. The Ph.D. program is quite flexible, with minimal formal requirements.

Courses with specific focus on numerical analysis will not count toward the mathematics requirement.

6. A thesis or paper must be presented to meet the specific requirement of the culminating experience type selected; the paper may take the form of a doctoral research proposal if agreed upon in advance by the student and the graduate adviser. Online students seeking an MSME degree will only be permitted to write a paper.

7. Preparatory course(s) required for teaching assistants (such as ENGR 888), remedial courses, and any courses required in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**CULMINATING EXPERIENCE OPTION A - M.S. THESIS**
Candidate registers for a minimum of six credits of ME 600 or ME 610 and submits a thesis following the procedures specified by the Graduate School. This program will consist of at least 24 course credits of which 18 credits must be at the 500 level (not including ME 596), and six thesis credits. At least 12 credits must be 400- or 500-level Mechanical Engineering courses.

**CULMINATING EXPERIENCE OPTION B - M.S. PAPER**
Candidate registers for 30 course credits of which 18 credits must be at the 500 level. A maximum of three credits of ME 596 can be counted in the total of 30 credits. At least 12 credits must be 400- or 500-level Mechanical Engineering courses. Candidates write a paper on a topic mutually agreed upon by the adviser suitable for publication in a professional journal or presentation at a national or international conference.

**Doctor of Philosophy (Ph.D.)**
Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

The Ph.D. program emphasizes scholarly research and helps students prepare for research and related careers in industry, government, and academe. Students must pass written and oral qualifying examinations. The Ph.D. program is quite flexible, with minimal formal requirements.

Courses with specific focus on numerical analysis will not count toward the mathematics requirement.

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**CULMINATING EXPERIENCE OPTION A - M.S. THESIS**
Candidate registers for a minimum of six credits of ME 600 or ME 610 and submits a thesis following the procedures specified by the Graduate School. This program will consist of at least 24 course credits of which 18 credits must be at the 500 level (not including ME 596), and six thesis credits. At least 12 credits must be 400- or 500-level Mechanical Engineering courses.

**CULMINATING EXPERIENCE OPTION B - M.S. PAPER**
Candidate registers for 30 course credits of which 18 credits must be at the 500 level. A maximum of three credits of ME 596 can be counted in the total of 30 credits. At least 12 credits must be 400- or 500-level Mechanical Engineering courses. Candidates write a paper on a topic mutually agreed upon by the adviser suitable for publication in a professional journal or presentation at a national or international conference.

**Doctor of Philosophy (Ph.D.)**
Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

The Ph.D. program emphasizes scholarly research and helps students prepare for research and related careers in industry, government, and academe. Students must pass written and oral qualifying examinations. The Ph.D. program is quite flexible, with minimal formal requirements.

Courses with specific focus on numerical analysis will not count toward the mathematics requirement.

6. A thesis or paper must be presented to meet the specific requirement of the culminating experience type selected; the paper may take the form of a doctoral research proposal if agreed upon in advance by the student and the graduate adviser. Online students seeking an MSME degree will only be permitted to write a paper.

7. Preparatory course(s) required for teaching assistants (such as ENGR 888), remedial courses, and any courses required in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**CULMINATING EXPERIENCE OPTION A - M.S. THESIS**
Candidate registers for a minimum of six credits of ME 600 or ME 610 and submits a thesis following the procedures specified by the Graduate School. This program will consist of at least 24 course credits of which 18 credits must be at the 500 level (not including ME 596), and six thesis credits. At least 12 credits must be 400- or 500-level Mechanical Engineering courses.

**CULMINATING EXPERIENCE OPTION B - M.S. PAPER**
Candidate registers for 30 course credits of which 18 credits must be at the 500 level. A maximum of three credits of ME 596 can be counted in the total of 30 credits. At least 12 credits must be 400- or 500-level Mechanical Engineering courses. Candidates write a paper on a topic mutually agreed upon by the adviser suitable for publication in a professional journal or presentation at a national or international conference.

**Doctor of Philosophy (Ph.D.)**
Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

The Ph.D. program emphasizes scholarly research and helps students prepare for research and related careers in industry, government, and academe. Students must pass written and oral qualifying examinations. The Ph.D. program is quite flexible, with minimal formal requirements.
Contact
Graduate Program Head: Karen Thole
Director of Graduate Studies/Professor-in-Charge: Mary Frecker
Primary Program Contact: Jason Nachman
Email: jpn127@psu.edu
Mailing Address: 127 Reber Building, University Park, PA 16802
Telephone: (814) 865-1345
Program Website:
Mechanical Engineering at University Park (http://www.mme.psu.edu)
Mechanical Engineering at World Campus (http://www.worldcampus.psu.edu/degrees-and-certificates/mechanical-engineering-masters/overviewhttp://www.mme.psu.edu)

Media Studies
Graduate Program Head: Ford Risley
Program Code: MEDIA
Campus(es): University Park (M.A.)
Degrees Conferred: Master of Arts (M.A.)
Integrated B.A./M.A. in Media Studies
Joint J.D./M.A. with Penn State Law
The Graduate Faculty:
Graduate Council policies listed under GCAC-300 General Admissions Standards
Joint J.D./M.A. with Penn State Law

The master's degree in Media Studies is an academic program that involves students in the systematic study of media. The objective of the course of study is to enable students to achieve a comprehensive understanding of the systems, networks, cultures, and information associated with media. The program prepares students for doctoral study in communications and for professional positions in business and government requiring a comprehensive understanding of the historical, social, and political implications of the media. This program helps prepare students to organize research projects, critically evaluate research reports, and directly influence media practices by the application of research findings.

Admission Requirements
Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Scores from the Graduate Record Examinations (GRE) are required for admission. Students with a 3.00 junior/senior grade-point average are eligible for admission. Three letters of recommendation are required. Applicants must also submit an autobiographical statement of about 1,000 words indicating the nature of the applicant's interest in Media Studies, reasons for wanting to do graduate work, and future aspirations relating to the field of mass communications. Experience shows that most applicants hold a bachelor's degree in a field of the liberal arts or the social and behavioral sciences, including journalism and mass communications. However, this does not preclude applicants with other backgrounds, abilities, and interests such as those whose undergraduate training may have been in a scientific or technical field. In every case, the applicant should explain in the autobiographical statement how his or her undergraduate education relates to the decision to seek admission to graduate study in mass communications.

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. See GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

Applicants to the Media Studies program must have a score of 24 or higher on the speaking section of the TOEFL Internet-based test.

Degree Requirements
Master of Arts (M.A.)
Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

The M.A. program seeks to integrate two areas of inquiry and analysis. The "Critical Studies" area centers on the expressive, creative, and linguistic dimensions of media as cultural processes. The "Political Studies" area focuses primarily on the political and economic dimensions of national and international communications systems and processes. The student is encouraged to combine courses from these and possibly other areas into a coherent package of course work culminating in either a thesis or a master's paper.

Degree Requirements
A minimum of 36 credits is required for the completion of the M.A. degree. Students in the thesis track must complete at least 18 credits at the 500 or 600 level, and the remaining credits may be at the 400 or 800 level. Students in the non-thesis track must complete 18 credits at the 500 level, and the remaining credits may be at the 400 or 800 level. There are 7 credits required in the following core courses:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMM 506</td>
<td>Research Methods in Communications</td>
<td>3</td>
</tr>
<tr>
<td>or COMM 511</td>
<td>Mass Communications Research Methods II</td>
<td></td>
</tr>
<tr>
<td>COMM 515</td>
<td>MA Proseminar in Mass Communications</td>
<td>3</td>
</tr>
<tr>
<td>COMM 590</td>
<td>Colloquium</td>
<td>1</td>
</tr>
</tbody>
</table>

Electives
Additional courses that will count as electives towards this degree can be chosen from a list of approved elective courses maintained by the graduate program office. Course work offered by departments outside the College of Communications may be scheduled as part of the student's program with prior approval of the student's academic committee.

Culminating Experience
Students choose to complete a thesis or a master's paper.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMM 600</td>
<td>Thesis Research</td>
<td></td>
</tr>
<tr>
<td>or COMM 610</td>
<td>Thesis Research Off Campus</td>
<td></td>
</tr>
<tr>
<td>COMM 596</td>
<td>Individual Studies (Master's Paper)</td>
<td></td>
</tr>
</tbody>
</table>
If the student chooses to write a thesis, at least 6 credits in thesis research (COMM 600 or COMM 610) must be taken. Students in the non-thesis track must write a satisfactory master’s paper, while enrolled in COMM 596. In some cases, students may be required to take additional credits in order to make up deficiencies in undergraduate course work.

Students are required to schedule three separate, formal meetings with their advisers and the academic committees for (1) discussion and approval of the general program plan, (2) the thesis or master's paper proposal, and (3) the defense of the thesis or paper. In most cases, satisfactory completion of course work and thesis requires two years. A thesis must be accepted by the advisers and/or committee members, the head of the graduate program, and the Graduate School, and the student must pass a thesis defense. A master’s paper must be accepted by the advisers, committee members and the graduate programs chair, and the students must pass a master's paper defense.

### Integrated Undergrad-Grad Programs

#### Integrated B.A/M.A. in Media Studies

Requirements listed here are in addition to requirements listed in GCAC-210 Integrated Undergraduate-Graduate (IUG) Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/integrated-undergraduate-graduate-degree-programs).

The Donald P. Bellisario College of Communications offers academically qualified students enrolled in a Bachelor of Arts program in the College of Communications the opportunity to earn both the B.A and the M.A. upon completion of five years of study. The Integrated Undergraduate-Graduate Program in Media Studies facilitates the advanced study of communications research and thesis development through a carefully organized selection of undergraduate courses, graduate seminars and directed research projects. The program accelerates and enhances undergraduate students' appreciation for graduate level scholarship by involving them in the seminars, research activities, and the scholarly discourse of the college's community of master's- and doctoral-level scholars.

The Integrated B.A./M.A. degree in Media Studies is an academic program that involves students in the systematic study of media. The objective of the course of study is to enable students to achieve a comprehensive understanding of the systems, networks, cultures, and information associated with media. The program prepares students for doctoral study in communications and for professional positions in business and government requiring a comprehensive understanding of the historical, social, and political implications of the media, and research methods for studying the media. This program helps prepare students to organize research projects, critically evaluate research reports, and directly influence media practices by the application of research findings. The program is specifically not intended for advanced professional education.

#### Admission Requirements

Students must apply to the program via the Graduate School application for admission (http://www.gradschool.psu.edu/prospective-students/how-to-apply), and must meet all the admission requirements of the Graduate School and the Media Studies graduate program for the Master of Arts degree.

Applicants must have a minimum GPA of 3.5 in order to be admitted; 3 credits from COMM's General Education courses (COMM 100, COMM 150N, COMM 180, COMM 320, or COMM 370); and 3 credits from the COMM 200 level and above. Admission to the program is based on the evaluation of the student’s transcript, examples of completed writing and research projects, a narrative statement of objectives, and two letters of support from faculty with whom they have worked. One faculty member must be from the College of Communications. Students shall be admitted to an IUG program no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester proceeding the semester of expected conferral of the undergraduate degree. Applicants are expected to present records of outstanding scholarly achievement to qualify.

#### Applicants to the Integrated Program

1. Must be enrolled in a B.A program in the College of Communications.
2. Must apply no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester proceeding the semester of expected conferral of the undergraduate degree.
3. Must provide a narrative statement of objectives and two letters of endorsement from faculty with whom they have worked. One faculty member must be from the College of Communications.
4. In consultation with an adviser, students must prepare a plan of study appropriate to this integrated program. Students must present their plan of study in person to the head of the graduate program or the appropriate committee overseeing the integrated program prior to being admitted to the program. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser as the student advances through the program.

#### Degree Requirements

Students must fulfill all requirements for each degree in order to be awarded that degree, subject to the double-counting of credits as outlined below. Degree requirements for the B.A. in Media Studies are listed in the Undergraduate Bulletin (http://bulletins.psu.edu/undergraduate). Degree requirements for the M.A. degree are listed on the Degree Requirements tab. Up to 12 credits may be double-counted towards the degree requirements for both the graduate and undergraduate degrees; a minimum of 50% of the double-counted courses must be at the 500 or 800 level. Credits associated with the culminating experience for the graduate degree cannot be double-counted. Students must sequence their courses so all undergraduate degree requirements are fulfilled before taking courses to count towards the graduate degree.

#### Courses Eligible to Double Count for Both Degrees

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>COMM 504</td>
<td>Seminar in the History of Mass Communication</td>
<td>3</td>
</tr>
<tr>
<td>COMM 506</td>
<td>Research Methods in Communications</td>
<td>3</td>
</tr>
<tr>
<td>COMM 507</td>
<td>News Media and Public Opinion</td>
<td>3</td>
</tr>
<tr>
<td>COMM 510</td>
<td>Comparative Theories of Press Systems</td>
<td>3</td>
</tr>
<tr>
<td>COMM 511</td>
<td>Mass Communications Research Methods II</td>
<td>3</td>
</tr>
<tr>
<td>COMM 512</td>
<td>Government and Mass Communications</td>
<td>3</td>
</tr>
<tr>
<td>COMM 513</td>
<td>Constitutional Problems of the News Media</td>
<td>3</td>
</tr>
<tr>
<td>COMM 514</td>
<td>Political Economy of Communications</td>
<td>3</td>
</tr>
<tr>
<td>COMM 515</td>
<td>MA Proseminar in Mass Communications</td>
<td>3</td>
</tr>
<tr>
<td>COMM 516</td>
<td>Introduction to Data Analysis in Communications</td>
<td>3</td>
</tr>
<tr>
<td>COMM 517</td>
<td>Psychological Aspects of Communication Technology</td>
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<tr>
<td>Code</td>
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<tr>
<td>COMM 518</td>
<td>Media Effects</td>
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<td>COMM 520</td>
<td>Seminar in Advertising Problems</td>
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<td>COMM 521</td>
<td>Advertising Perspectives</td>
<td>3</td>
</tr>
<tr>
<td>COMM 522</td>
<td>Social and Cultural Aspects of Advertising</td>
<td>3</td>
</tr>
<tr>
<td>COMM 550</td>
<td>Film Theory and Criticism</td>
<td>3</td>
</tr>
<tr>
<td>COMM 553</td>
<td>Special Problems in Film and TV</td>
<td>1-3</td>
</tr>
<tr>
<td>COMM 556</td>
<td>Reading Film</td>
<td>3</td>
</tr>
<tr>
<td>COMM 580</td>
<td>Seminar in Telecommunications</td>
<td>3</td>
</tr>
<tr>
<td>COMM 582</td>
<td>Ethics and Emerging Communications Technology</td>
<td>3</td>
</tr>
<tr>
<td>COMM 584</td>
<td>International Telecommunications and Trade Policy</td>
<td>3</td>
</tr>
<tr>
<td>COMM 585</td>
<td>Media &amp; Telecommunications Industries</td>
<td>3</td>
</tr>
<tr>
<td>COMM 594</td>
<td>Research Topics</td>
<td>1-15</td>
</tr>
<tr>
<td>COMM 595</td>
<td>Internship</td>
<td>1-18</td>
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<tr>
<td>COMM 596</td>
<td>Individual Studies</td>
<td>1-9</td>
</tr>
<tr>
<td>COMM 597</td>
<td>Special Topics</td>
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Undergraduate Credits

Advertising

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<tbody>
<tr>
<td>COMM 410</td>
<td>International Mass Communications</td>
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<tr>
<td>COMM 411</td>
<td>Cultural Aspects of the Mass Media</td>
<td>3</td>
</tr>
<tr>
<td>COMM 417</td>
<td>Ethics and Regulation in Advertising and Public Relations</td>
<td>3</td>
</tr>
<tr>
<td>COMM 420</td>
<td>Research Methods in Advertising and Public Relations</td>
<td>3</td>
</tr>
<tr>
<td>COMM 421W</td>
<td>Advertising Creative Strategies</td>
<td>3</td>
</tr>
<tr>
<td>COMM 424</td>
<td>Advertising Campaigns</td>
<td>3</td>
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Journalism

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<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>COMM 403</td>
<td>Law of Mass Communications</td>
<td>3</td>
</tr>
<tr>
<td>COMM 405</td>
<td>Political Economy of Communications</td>
<td>3</td>
</tr>
<tr>
<td>COMM 409</td>
<td>News Media Ethics</td>
<td>3</td>
</tr>
<tr>
<td>COMM 410</td>
<td>International Mass Communications</td>
<td>3</td>
</tr>
<tr>
<td>COMM 411</td>
<td>Cultural Aspects of the Mass Media</td>
<td>3</td>
</tr>
<tr>
<td>COMM 438</td>
<td>Advanced Narrative Production</td>
<td>3</td>
</tr>
<tr>
<td>COMM 440</td>
<td>Advanced Cinematography and Lighting Techniques</td>
<td>3</td>
</tr>
<tr>
<td>COMM 451</td>
<td>Topics in American Film</td>
<td>3</td>
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<tr>
<td>COMM 452</td>
<td>Topics in International Cinema</td>
<td>3</td>
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Film Video

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<tr>
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<th>Credits</th>
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<tbody>
<tr>
<td>COMM 411</td>
<td>Cultural Aspects of the Mass Media</td>
<td>3</td>
</tr>
<tr>
<td>COMM 438</td>
<td>Advanced Narrative Production</td>
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<tr>
<td>COMM 440</td>
<td>Advanced Cinematography and Lighting Techniques</td>
<td>3</td>
</tr>
<tr>
<td>COMM 451</td>
<td>Topics in American Film</td>
<td>3</td>
</tr>
<tr>
<td>COMM 452</td>
<td>Topics in International Cinema</td>
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Media Studies

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<tr>
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<tbody>
<tr>
<td>COMM 405</td>
<td>Political Economy of Communications</td>
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<tr>
<td>COMM 411</td>
<td>Cultural Aspects of the Mass Media</td>
<td>3</td>
</tr>
<tr>
<td>COMM 413W</td>
<td>The Mass Media and the Public</td>
<td>3</td>
</tr>
<tr>
<td>COMM 418</td>
<td>Media Effects: Theory and Research</td>
<td>3</td>
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Public Relations

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<tr>
<th>Code</th>
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<tbody>
<tr>
<td>COMM 403</td>
<td>Law of Mass Communications</td>
<td>3</td>
</tr>
<tr>
<td>COMM 409</td>
<td>News Media Ethics</td>
<td>3</td>
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<tr>
<td>COMM 417</td>
<td>Ethics and Regulation in Advertising and Public Relations</td>
<td>3</td>
</tr>
<tr>
<td>COMM 420</td>
<td>Research Methods in Advertising and Public Relations</td>
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Telecommunications

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<tr>
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<tbody>
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<td>3</td>
</tr>
<tr>
<td>COMM 410</td>
<td>International Mass Communications</td>
<td>3</td>
</tr>
<tr>
<td>COMM 484</td>
<td>Emerging Telecommunications Technologies</td>
<td>3</td>
</tr>
<tr>
<td>COMM 486</td>
<td>Telecommunications Ethics</td>
<td>3</td>
</tr>
<tr>
<td>COMM 487</td>
<td>Advanced Telecommunications Management and Leadership</td>
<td>3</td>
</tr>
</tbody>
</table>

If students accepted into the IUG program are unable to complete the M.A. degree, they are still eligible to receive their undergraduate degree if all the undergraduate degree requirements have been satisfied.

Joint Degrees

**Joint J.D./M.A. with Penn State Law**

Requirements listed here are in addition to requirements listed in GCAC-211 Joint Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/joint-degree-programs).

**Admission Requirements**

Students applying to the joint degree program must be admitted separately into both PSL and COMM. Admissions requirements and applications for admission for Penn State Law are listed in the J.D. Admissions section of the Penn State Law website. The admission requirements for the Media Studies graduate program are listed on the Admission Requirements tab. Students must first be admitted to the law school and must complete the required first-year curriculum in the J.D. program before commencing the Media Studies M.A. component. Application to the M.A. program must take place through the Graduate School Application. Formal admission to the M.A. program would normally take place during the student’s first year of law, but COMM may extend admission to the M.A. program at the time an applicant applies to PSL particularly where an applicant’s law school choice depends upon admission to the J.D./M.A. joint degree program. At the student’s request, the LSAT may replace the GRE for joint degree admission purposes.

Residency: A typical J.D./M.A. joint degree student will be in residence at PSL for six semesters and at COMM for two semesters.

**Inter-Program Transfer of Credits**

Students must fulfill all requirements for each degree in order to be awarded that degree, subject to the double-counting of credits as outlined below. Degree requirements for the J.D. program are listed on the Penn State Law website. Degree requirements for the M.A. degree are listed on the Degree Requirements tab.

Penn State Law: A maximum of twelve (12) 500-level credits for Media Studies M.A. course work may be transferred for credit toward the J.D. degree at PSL. Students must obtain a grade satisfactory to PSL for the course work to be credited toward the J.D. degree. The following COMM courses may qualify for credit toward the PSL J.D.:

<table>
<thead>
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</thead>
<tbody>
<tr>
<td>COMM 504</td>
<td>Seminar in the History of Mass Communication</td>
<td>3</td>
</tr>
<tr>
<td>COMM 505</td>
<td>International Communication Problems</td>
<td>3</td>
</tr>
</tbody>
</table>
COMM 506  Research Methods in Communications  3
COMM 511  Mass Communications Research Methods II  3
COMM 513  Constitutional Problems of the News Media  3
COMM 516  Introduction to Data Analysis in Communications  3
COMM 517  Psychological Aspects of Communication Technology  3
COMM 518  Media Effects  3
COMM 580  Seminar in Telecommunications  3
COMM 582  Ethics and Emerging Communications Technology  3
COMM 585  Media & Telecommunications Industries  3
COMM 587  Internet Law and Policy  3

Donald P. Bellisario College of Communication: A maximum of twelve (12) credits of PSL course work will be counted for credit for the minimum requirements for a master's degree. These courses must be approved by the student's advisory committee and Joint Degree Program Faculty Adviser in COMM, normally during the Program Proposal Meeting.

The J.D. seminar requirement and the Media Studies thesis requirement must be fulfilled separately, using unique research topics.

Course Sequencing: The sequence of courses will be determined by the student and their adviser(s). However, students must successfully complete the first-year curriculum with PSL before beginning the M.A. Media Studies program. In compliance with ABA Standards and Rules law students may not enroll for more than 17 credits per semester at Penn State as a law student; the maximum credit load for graduate students is 15 credits per semester. It is expected that most joint degree students will complete the first two semesters of the M.A. consecutively in either the first or second year after completion of the first-year curriculum with the Law School.

Recommended Program of Study and Advising
All students in the program will have two advisers, one from PSL and one from COMM; the adviser from COMM may be any member of the Graduate Faculty in the College. Periodic interaction between the two advisers is encouraged. A program of study is developed for each student, taking into account the fact that some courses at both locations are offered on a rotating or intermittent basis. Many courses are offered every year but some are offered every two or three years. Advisers will have available a list of projected relevant courses or educational experiences in order to work with the student on an individualized program of study. The standard committee structure will apply to the COMM M.A. program.

Tuition
Students will be charged the applicable PSL tuition to cover the J.D. program and the applicable graduate tuition to cover the M.A. degree program. PSL tuition will be paid for the semesters in which the student is registered for PSL courses, and graduate tuition will be paid for the semesters in which the student is registered for graduate courses in the M.A. program. A student may take up to one course (3 credit hours) per semester in the program where the student is not primarily registered without any change in tuition, but must pay additional tuition to the program that the student is not primarily registered if he or she wishes to take additional course work pursuant to that program during the semester.

Financial Aid and Assistantships
Decisions on financial aid and assistantships will be made by each school according to that school's procedures. Students on graduate assistantships must adhere to the course load policy listed in the Bulletin.

Fulfillment of Degree Requirements and Graduation
A student in the program may complete the requirements for one of the degrees and be awarded that degree prior to completing all the requirements for the other degree; provided, however, that the student shall have successfully completed at least two semesters of work towards the other degree. All courses in one program that will count towards meeting the requirements of the other must be completed before the awarding of either degree. Students will be required to fulfill all requirements for each degree in order to be awarded that degree, subject to the inter-program transfer of credits. If students accepted into the joint degree program are unable to complete the J.D. degree, they are still eligible to receive the M.A. degree if all M.A. degree requirements have been satisfied.

Important Note: If the joint degree student is using law (900-level) credits toward the graduate degree during their last semester of enrollment, they should be prepared to extend their graduate degree graduation to a subsequent semester (the following semester at a minimum). This is due to the graduate degree approval deadline falling before the law (900-level) course grading processes are complete. If students accepted into the joint degree program are unable to complete the J.D. degree, they are still eligible to receive the M.A. degree if all M.A. degree requirements have been satisfied.

Student Aid
Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School's website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact
Graduate Program Head: Ford Risley
Director of Graduate Studies/Professor-in-Charge: Matthew McAllister
Primary Program Contact: Melissa Wandrisco (myw5290@psu.edu)
Program Email: commgpo@psu.edu
Mailing Address: 201 Carnegie Bldg., University Park, PA 16802
Telephone: (814) 863-6250
Program Website: Media Studies (https://bellisario.psu.edu/graduate/m.a.-in-media-studies)
Meteorology and Atmospheric Science

Graduate Program Head
David J. Stensrud

Program Code
METEO

Campus(es)
University Park (Ph.D., M.S.)

Degrees Conferred
Doctor of Philosophy (Ph.D.)
Master of Science (M.S.)
Dual-Title Ph.D. in Meteorology and Atmospheric Science and Astrobiology
Dual-Title Ph.D. in Meteorology and Atmospheric Science and Climate Science
Integrated B.S. in Meteorology and Atmospheric Science and M.S. in Meteorology and Atmospheric Science

The Graduate Faculty
View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=METEO)

The Graduate Faculty

The graduate program embraces topics that span atmospheric processes from those of the planetary boundary layer to those of the upper atmosphere, that encompass phenomena from weather to climate with molecular to planetary dimensions, and that range from practical to theoretical significance. The program develops and integrates approaches based on observational, computational and analytical techniques, and seeks to advance both fundamental understanding and predictive skill.

The major interests of the faculty and graduate students include (1) mesoscale- and synoptic-scale weather systems; (2) climate and earth system dynamics; (3) atmospheric physics including radiative transfer and cloud physics; (4) atmospheric chemistry, air quality and the earth’s biogeochemical cycles; (5) atmospheric turbulence, boundary layers, land-atmosphere interactions, ocean-atmosphere interactions, and ocean-ice-atmosphere interactions; (6) geophysical fluid dynamics, (7) physical oceanography, and (8) climate and weather risk. Methodological approaches include numerical modeling, data assimilation, atmospheric remote sensing, field observations, atmospheric data analysis, and laboratory studies.

Admission Requirements

Applicants apply for admission to the Graduate School via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

The Meteorology and Atmospheric Science program is open to all students with a baccalaureate degree and a strong interest in the atmospheric sciences. A degree in science (including, but not limited to, meteorology or atmospheric science), mathematics, or engineering provides a particularly good background, although the department has had some students with arts and humanities degrees who have done well. The minimum course requirements for admission are mathematics at least through differential equations and at least one year of calculus-based physics. Scores from the Graduate Record Examinations (GRE) are required for the evaluation of all applicants.

For admission to the program, the departmental admission committee considers courses taken, grade-point average, three letters of recommendation, GRE scores, professional experience, and English proficiency. Rather than setting rigid standards in each category, the committee examines the overall record as a whole. The best-qualified applicants are accepted up to the number of spaces that are available for new students.

Generally, additional mathematics and physics beyond the minimum requirements listed above, as well as courses in statistics, chemistry, and computer programming, will strengthen the student’s application. Courses in meteorology and atmospheric science are not required for admission. Most students admitted to the graduate program have undergraduate grade-point averages of 3.50 or higher. Three recommendations are solicited from persons familiar with the student’s academic competence, and the student is required to write a letter summarizing interests and goals. A verbal and quantitative combined GRE score of 315 or greater is typical for the department’s students.

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. See GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information. Note: All international students required to take the English proficiency test must take the American English Oral Communicative Proficiency Test (AEOCPT) (http://apling.la.psu.edu/programs/about-the-aecpt/about-the-american-english-oral-communicative-test-aecpt) upon first enrollment. If the student does not meet the minimum score requirements on the AEOCPT, the student must complete additional course work in English in order to be eligible to receive a teaching assistantship.

Degree Requirements

The program differentiates between instruction and research topics appropriate for M.S. students seeking positions of advanced responsibility in government or industry, those appropriate for M.S. students anticipating further study, and those appropriate for Ph.D. candidates who will work in advanced research laboratories or academic institutions.

Master of Science (M.S.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

The M.S. degree is offered with thesis or research paper options, both requiring 35 credits.

A minimum of 35 credits at the 400, 500, 600, or 800 level is required, with at least 29 credits at the 500, 600 and 800 level combined. The required core curriculum consists of 23 credits, including 12 credits in four distinct courses, two each from two prescribed lists for dynamic meteorology and physical meteorology:

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<thead>
<tr>
<th>Code</th>
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<tr>
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<td>Required Courses</td>
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<td></td>
<td>Dynamic Meteorology Courses</td>
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</table>

The Graduate Faculty

View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=METEO)
The 12 credits of core curriculum courses, METEO 880, and METEO 591 must be taken prior to the department's competency exam in written and spoken technical English.

One credit of METEO 590 is required each semester until the comprehensive exam is passed. A student must pass the comprehensive exam before scheduling the comprehensive exam. To earn the Ph.D. degree, doctoral candidates must write a dissertation that is accepted by the dissertation committee, the head of the graduate program, and the Graduate School. For the Ph.D. program, a minimum of 21 credits is required, including a core curriculum of 12 credits in four distinct courses, two each from two prescribed lists for dynamic meteorology and physical meteorology. The student will be tested for mastery of the selected core in the qualifying exam.

The exam must be taken within three semesters (excluding summer sessions) of entry into the doctoral program. If a student does not pass the exam on their first attempt, then a second attempt may be allowed at the discretion of the Graduate Faculty members of the department.

In addition, Ph.D. degree requirements include successful completion of the following: approved graduate course work, English competence requirements, a comprehensive examination, and a final oral examination (the dissertation defense). The student must pass the English competency exam before scheduling the comprehensive exam. To earn the Ph.D. degree, doctoral candidates must write a dissertation that is accepted by the dissertation committee, the head of the graduate program, and the Graduate School. For the Ph.D. program, a minimum of 21 credits is required, including a core curriculum of 12 credits in four distinct courses, two each from two prescribed lists for dynamic meteorology and physical meteorology. The student will be tested for mastery of the selected core in the qualifying exam.

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The exam must be taken within three semesters (excluding summer sessions) of entry into the doctoral program. If a student does not pass the exam on their first attempt, then a second attempt may be allowed at the discretion of the Graduate Faculty members of the department.

In addition, Ph.D. degree requirements include successful completion of the following: approved graduate course work, English competence requirements, a comprehensive examination, and a final oral examination (the dissertation defense). The student must pass the English competency exam before scheduling the comprehensive exam. To earn the Ph.D. degree, doctoral candidates must write a dissertation that is accepted by the dissertation committee, the head of the graduate program, and the Graduate School. For the Ph.D. program, a minimum of 21 credits is required, including a core curriculum of 12 credits in four distinct courses, two each from two prescribed lists for dynamic meteorology and physical meteorology. The student will be tested for mastery of the selected core in the qualifying exam.

The exam must be taken within three semesters (excluding summer sessions) of entry into the doctoral program. If a student does not pass the exam on their first attempt, then a second attempt may be allowed at the discretion of the Graduate Faculty members of the department.

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the department’s competency exam in written and spoken technical English before being admitted to the comprehensive exam. There are no minimum quality-graded credit (research credits whose grades count toward the grade-point average) requirements for METEO 600; students may earn up to a maximum of 12 quality-graded METEO 600 credits.

Minor

Master’s Minor
Requirements listed here are in addition to requirements for minors in Graduate Council policies listed under GCAC-600 Research Degree Requirements (http://gradschool.psu.edu/graduate-education-policies) and GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

For a master’s minor in Meteorology and Atmospheric Science, a student must select 6 credits of Meteorology and Atmospheric Science courses, 3 of which have to be at the 500-level, in a course plan approved by the Meteorology and Atmospheric Science graduate program.

Doctoral Minor
Requirements listed here are in addition to requirements for minors in Graduate Council policies listed under GCAC-600 Research Degree Requirements (http://gradschool.psu.edu/graduate-education-policies) and GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

For a minor in Meteorology and Atmospheric Science, doctoral students should select 15 credits of Meteorology and Atmospheric Science courses, 9 credits of which have to be 500-level, in a course plan approved by the department.

Dual-Titles

Dual-Title Ph.D. in Meteorology and Atmospheric Science and Astrobiology
Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

Students interested in the emerging field of Astrobiology may wish to obtain a dual-title Ph.D. in Meteorology and Atmospheric Science and Astrobiology. The pursuit of this dual-title entails additional course work beyond the degree requirements set forth here (see the Astrobiology Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/astrobiology) for further details concerning these course and other program requirements), as well as the participation of at least one Astrobiology program faculty member on the dissertation committee. The Astrobiology representative, who assists with the selection of courses, may be the adviser and have an appointment in Meteorology and Atmospheric Science. The Ph.D. qualifying exam for dual-title students will be administered by Meteorology and Atmospheric Science but with a component of it from the Astrobiology representative, or others related to this dual-title graduate degree, that assesses the student’s potential in the field of Astrobiology. The field of Astrobiology will also be integrated into the comprehensive examination. A Ph.D. dissertation that contributes fundamentally to the field of Astrobiology is required. A public oral presentation of the dissertation is required.

Admission Requirements
Students must apply and be admitted to the graduate program in Meteorology and Atmospheric Science and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Astrobiology dual-title program. Refer to the Admission Requirements section of the Astrobiology Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/astrobiology). Doctoral students must be admitted into the dual-title degree program in Astrobiology prior to taking the qualifying examination in their primary graduate program.

Degree Requirements
To qualify for the dual-title degree, students must satisfy the degree requirements for the Ph.D. in Meteorology and Atmospheric Science. In addition, students must complete the degree requirements for the dual-title in Astrobiology, listed on the Astrobiology Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/astrobiology).

The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Meteorology and Atmospheric Science and must include at least one Graduate Faculty member from the Astrobiology program. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. There will be a single qualifying examination, containing elements of both Meteorology and Atmospheric Science and Astrobiology. Dual-title graduate students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of a Meteorology and Atmospheric Science and Astrobiology dual-title Ph.D. student must include at least one member of the Astrobiology Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in Astrobiology, the member of the committee representing Astrobiology must be appointed as co-chair. The Astrobiology representative on the student’s dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their dissertation committee and reflects their original research and education in Meteorology and Atmospheric Science and Astrobiology. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

Dual-Title Ph.D. in Meteorology and Atmospheric Science and Climate Science
Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

Students interested in the field of Climate Science may wish to obtain a dual-title Ph.D. in Climate Science and Meteorology and Atmospheric Science. The pursuit of this dual-title entails additional course work beyond the degree requirements set forth here (see the Climate Science Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/
climate-science) for further details concerning these course and other program requirements), as well as the participation of at least one Climate Science program faculty member on the dissertation committee. The Climate Science representative, who assists with the selection of courses, may be the adviser and have an appointment in Meteorology and Atmospheric Science. The Ph.D. qualifying exam for dual-title students will be administered by Meteorology and Atmospheric Science but with a component of it from the Climate Science representative, that assesses the student’s potential in the field of Climate Science. The field of Climate Science will also be integrated into the comprehensive examination. A Ph.D. dissertation that contributes fundamentally to the field of Climate Science is required. A public oral presentation of the dissertation is required.

**Admission Requirements**

Students must apply and be admitted to the graduate program in Meteorology and Atmospheric Science and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Climate Science dual-title program. Refer to the Admission Requirements section of the Climate Science Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/climate-science). Doctoral students must be admitted into the dual-title degree program in Climate Science prior to taking the qualifying examination in their primary graduate program.

**Degree Requirements**

To qualify for the dual-title degree, students must satisfy the degree requirements for the Ph.D. in Meteorology and Atmospheric Science. In addition, students must complete the degree requirements for the dual-title in Climate Science, listed on the Climate Science Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/climate-science).

The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Meteorology and Atmospheric Science and must include at least one Graduate Faculty member from the Climate Science program. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. There will be a single qualifying examination, containing elements of both Meteorology and Atmospheric Science and Climate Science. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of a Meteorology and Atmospheric Science and Climate Science dual-title Ph.D. student must include at least one member of the Climate Science Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in Climate Science, the member of the committee representing Climate Science must be appointed as co-chair. The Climate Science representative on the student’s dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their dissertation committee and reflects their original research and education in Meteorology and Atmospheric Science and Climate Science. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

**Integrated Undergrad-Grad Programs**

**Integrated B.S. in Meteorology and Atmospheric Science and M.S. in Meteorology and Atmospheric Science**

Requirements listed here are in addition to requirements listed in GCAC-210 Integrated Undergraduate-Graduate (IUG) Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/integrated-undergraduate-graduate-degree-programs).

The Department of Meteorology and Atmospheric Science offers an integrated B.S./M.S. program, also called the Integrated Undergraduate-Graduate (IUG) program, that is designed to allow academically superior students to obtain both the B.S. and the M.S. degree in Meteorology and Atmospheric Science in five years of study. In order to complete the program in five years, students interested in the IUG program in Meteorology and Atmospheric Science must apply for admission to the Graduate School and the IUG program no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree.

During the first three years, the student will follow the course scheduling of one of the options in the B.S. degree, normally the Atmospheric Sciences or the General Option (see the Undergraduate Bulletin (http://bulletins.psu.edu/undergraduate)). Students who intend to enter the IUG program are encouraged to take upper level classes during their first three years whenever appropriate. However, students must sequence their courses so all undergraduate degree requirements are fulfilled before taking courses to count solely towards the graduate degree. By the end of the junior year, students normally apply for admission to both the IUG Program and to the Graduate School. Acceptance decisions will be made prior to the beginning of the senior year and M.S. advising committees appointed for successful applicants. During the senior year, IUG students follow the scheduling of the selected B.S. Meteorology and Atmospheric Science Option, with an emphasis on completing 500-level course work as appropriate. During the senior year, IUG students will start work on their theses or papers that are designed to meet the requirements of the M.S. degree in Meteorology and Atmospheric Science. During the fifth year, IUG students take courses fulfilling the departmental M.S. degree requirements and complete their M.S. theses or papers. Typical scheduling plans for students pursuing the General or Atmospheric Sciences Options are given on the Meteorology and Atmospheric Science Undergraduate Bulletin page (http://undergraduate.bulletins.psu.edu/undergraduate/colleges/earth-mineral-sciences/meteorology-atmospheric-science-bs). If a plan similar to one of these plans is followed, then the student will have completed all requirements for the B.S. in Meteorology and Atmospheric Science by the end of the fourth year. If a student cannot continue in the integrated program, then the student will be able to receive the undergraduate degree upon completion of all of the B.S. requirements.

**Admission Requirements**

Students must apply to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply), and must meet all the admission requirements of the Graduate School and the Meteorology and Atmospheric Science graduate program for the Master of Science degree. In consultation with an adviser, students must prepare a plan of study appropriate to this integrated
program, and must present their plan of study in person to the head of the graduate program or the appropriate committee overseeing the integrated program prior to being admitted to the program. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser as the student advances through the program.

Students who wish to complete the IUG program in Meteorology and Atmospheric Science must be admitted to the program no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree. Admission to the program will be at the discretion of the Associate Head of the Department of Meteorology and Atmospheric Science graduate program, who will determine the necessary criteria for all applicants. These criteria include the setting of the minimum required scores on the GRE and minimum cumulative GPA for consideration, the receipt of recommendation letters from three faculty and a letter of support from the department head, and the identification of an adviser who is willing to oversee the student’s research project. Evidence of significant research potential must be provided in the application.

Degree Requirements
Students must fulfill all degree requirements for each degree in order to be awarded that degree, subject to the double-counting of credits as outlined below. Degree requirements for the Bachelor of Science in Information Systems are listed in the Undergraduate Bulletin (http://bulletins.psu.edu/undergraduate). Degree requirements for the Master of Science in Meteorology and Atmospheric Science degree are listed on the Degree Requirements tab. All IUG students must defend their theses or papers, as do all M.S. students, in a public presentation toward the end of their graduate program.

Up to 12 credits may be double-counted towards the degree requirements for both the graduate and undergraduate degrees; a minimum of 50% of the double-counted courses must be at the 500 or 800 level. Credits associated with the culminating experience for the graduate degree cannot be double-counted.

<table>
<thead>
<tr>
<th>Code</th>
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<th>Credits</th>
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<tbody>
<tr>
<td>METEO 520</td>
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</tr>
<tr>
<td>METEO 521</td>
<td>Dynamic Meteorology</td>
<td>3</td>
</tr>
<tr>
<td>METEO 532</td>
<td>Chemistry of the Atmosphere</td>
<td>3</td>
</tr>
<tr>
<td>METEO 533</td>
<td>Cloud Physics</td>
<td>3</td>
</tr>
<tr>
<td>METEO 535</td>
<td>Radiative Transfer</td>
<td>3</td>
</tr>
<tr>
<td>METEO 554</td>
<td>Atmospheric Turbulence</td>
<td>3</td>
</tr>
<tr>
<td>METEO 551</td>
<td>Physical Oceanography</td>
<td>3</td>
</tr>
<tr>
<td>METEO 556</td>
<td>The Atmospheric Boundary Layer</td>
<td>3</td>
</tr>
<tr>
<td>METEO 570</td>
<td>Climate System Dynamics</td>
<td>3</td>
</tr>
</tbody>
</table>

Most graduate students are supported with teaching or research assistantships.

Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Learning Outcomes
MAster of Science (M.S.)
1. Know: Graduates will acquire and demonstrate mastery of knowledge within a core disciplinary area of the atmospheric sciences while demonstrating familiarity with other topics within the atmospheric sciences outside of the core area.
2. Investigate: Graduates will develop analytical and methodological skills necessary to apply knowledge of the atmospheric sciences to the solution of an unanswered problem within the discipline.
3. Communicate: Graduates will disseminate results of investigation via a logically, clearly written master’s thesis, and via articulate, effective presentations.
4. Professional practice: Graduates will demonstrate the ability to collaborate in a collegial and ethical manner with other professionals within their field or with diverse scientific backgrounds.

Doctor of Philosophy (Ph.D.)
1. Know: Graduates will demonstrate in-depth knowledge within a core disciplinary area of atmospheric science while extending their depth of knowledge on other topical areas within the atmospheric sciences.
2. Investigate: Graduates will master analytical and methodological skills necessary to pursue solutions to unanswered problems within the atmospheric sciences independently.
3. Communicate: Graduates will disseminate research results of investigations through a logically, clearly written doctoral thesis, and through articulate, effective presentations.
4. Professional practice: Graduates will demonstrate the ability to collaborate in a collegial and ethical manner with other professionals in their field or with diverse scientific backgrounds.

Contact
Graduate Program Head: David Stensrud
Director of Graduate Studies/Professor-in-Charge: Paul Markowski
Primary Program Contact: Karen Corl (kqc8@psu.edu)
Program Email: grad-admissions@meteo.psu.edu
Mailing Address: 501A Walker Building, University Park, PA 16802
Telephone: (814) 863-9500
Program Website: Meteorology (http://ploneprod.met.psu.edu/academics/browse-by-audience/future-students/future-graduate-students-ms-and-phd)

Student Aid
Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.
Molecular, Cellular and Integrative Biosciences

Graduate Program Head
Melissa Rolls

Program Code
MCIBS

Campus(es)
Hershey (Ph.D., M.S.)
University Park (Ph.D., M.S.)

Degrees Conferred
Doctor of Philosophy (Ph.D.)
Master of Science (M.S.)
Joint M.D./Ph.D. with the College of Medicine

The Graduate Faculty
View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=MCIBS)

The Intercollege Graduate Degree Program (IGDP) in Molecular, Cellular, and Integrative Biosciences (MCIBS) is designed to prepare researchers across an array of specializations in the biological sciences that share an emphasis on trans-disciplinary training, an approach that considers the whole organism and spans the continuum of understanding from fundamental mechanisms of action at the molecular/cellular level of discovery, to the function of the organism in its environment, with applications that enhance health and well-being. To achieve this goal, the IGDP in MCIBS serves as an umbrella portal for the entry and subsequent training of the next generation of researchers for academic, industrial, non-profit foundation, government, and other research entities in the biomedical sciences. Researchers will be trained across a wide range of specializations in the biological sciences that share the goal to elucidate mechanisms of action at the molecular, cellular, and organismal level, including disease.

The program currently offers educational and research emphasis areas in Cell and Developmental Biology; Immunology and Infectious Disease; Molecular and Evolutionary Genetics; Molecular Medicine; and Molecular Toxicology and Neurobiology, but is structured to remain contemporary with evolving or emerging fields within the biological/health sciences. Incoming students enroll in core courses of instruction covering basic biochemistry and molecular biology of cellular processes; ethics; and current research topics related to the diverse pathological mechanisms that underlie disease etiologies in humans and animals. In addition, students take specialized courses associated with one of the above programmatic emphasis areas or the option, as well as elective courses that complement and support their research interests and foci.

Calling upon the expertise of an extensive list of life science research faculty members representing an array of different departments across multiple colleges, the IGDP in MCIBS offers a unique opportunity to learn about and work in multiple bioscience disciplines. The MCIBS graduate program is supported by modern telecommunications facilities and equipment, and students not only explore new conceptual connections at the frontiers of research, but also engage in active group learning experiences and explore a variety of potential career opportunities before graduation.

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Review of completed applications begins December 1 of each year. Applicants to the Ph.D. program are considered for admission; the program does not admit applicants for the terminal master's degree. Required application materials include:

1. Completed official Penn State Graduate School application (http://gradschool.psu.edu/prospective-students/how-to-apply).
2. Paid, nonrefundable application fee (see Requirements for Graduate Admission (http://gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission) for current fee).
3. Official transcripts from all post-secondary institutions attended (http://www.gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission).
4. Application for a U.S. visa (international applicants only).
5. Graduate Record Examination (GRE) General Test; successful applicants generally have scores above the 75th percentile for each of the verbal, quantitative, and analytical writing sections.
6. Names and contact information, including business email addresses, for three references.
7. Statement of goals that pertain to the life sciences including motivation for pursuing a research doctorate; research experience and interests; and professional goals. The statement should include biological problems that are of interest to the applicant and how the applicant’s past experiences have prepared him or her to pursue this research.
8. Successful applicants generally will have completed coursework in biochemistry, molecular and/or cell biology, physics, chemistry (organic and inorganic), and calculus and have a minimum 3.5/4.0 Jr./Sr. undergraduate grade point average.

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. See GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-305/admission-requirements-international-students) for more information.

Applicants to the MCIBS graduate program must have a minimum TOEFL score of 575 for the paper-based test, or a total score of 90 with a 21 on the speaking section for the Internet-based test (iBT). Successful applicants generally have a minimum score of 100 (with a 23 on the speaking section) on the Internet-based test.

Degree Requirements

Master of Science (M.S.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

Master’s students must take a minimum of 30 credits, described below. At least 18 credits in 500- and 600-level courses combined must be included in the program. A minimum of 24 credits in course work (400, 500, and 800 series), as contrasted with research, must be completed in the major program.

<table>
<thead>
<tr>
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<th>Credits</th>
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<tbody>
<tr>
<td>MCIBS 590</td>
<td>Colloquium</td>
<td>2</td>
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- Required Courses
MCIBS 591 Ethics in the Life Sciences 1
BIOL 593 2
MCIBS 596 Individual Studies (for Research Rotations) 1
MCIBS/BIOL/ BMMB/VBSC 503 Critical Elements of Genetics and Molecular and Cellular Biology 4
MCIBS 592 Current Research Seminar 2

Emphasis Areas
MCIBS offers curricular/research specializations in the following Emphasis Areas: Cell and Developmental Biology; Immunology and Infectious Disease; Molecular and Evolutionary Genetics; Molecular Medicine; Molecular Toxicology; Neurobiology. To complete an emphasis in any of these areas, students take a minimum of 9 credits of specialized course work and conduct original research associated with the respective Emphasis Area. The list of specialized courses that will count towards each Emphasis Area is maintained by the program office.

Additional Course Requirements
Quantitative Foundation Course: A minimum of 3 credits in 400- or 500-level courses in a quantitative area such as statistics, genetics, bioinformatics, etc. (e.g., STAT 501 Regression Methods; STAT 502 Analysis of Variance and Design of Experiments; STAT 503 Design of Experiments; Population Genetics; etc.). The list of courses that will count towards the Quantitative Foundation requirement is maintained by the program office.

Culminating Experience
MCIBS 600 Thesis Research 6

Total Credits 30

In addition, all graduate students in MCIBS are required to have one semester of teaching experience by serving as a teaching assistant (TA) in an undergraduate course (400-level or lower) in a bioscience-related field. Teaching assistant opportunities are arranged in consultation with the adviser and program chair.

Master's students must complete at least 6 credits of MCIBS 600, and up to 6 of the MCIBS 600 credits may be assigned a quality grade (A-F). In consultation with the adviser, the student must select a thesis committee of at least three members (including the adviser), write a thesis, and defend the thesis. The thesis must be accepted by the advisers and/or committee members, the head of the graduate program, and the Graduate School, and the student must pass the thesis defense. If all course credits and requirements are met, a student does not have to be registered for classes while writing and/or defending the thesis. Students must present their thesis in accordance with Graduate Council and Graduate School guidelines as described in the Thesis and Dissertation Guide: Requirements and Guidelines for the Preparation of Master's Theses and Doctoral Dissertations (http://www.gradsch.psu.edu/index.cfm/current-students/thesis-and-dissertation-information/thesisdissertationguidedpf).

Additional Requirements
All MCIBS graduate students must maintain a cumulative grade-point average of > 3.0 to remain in good academic standing. One or more failing grades (F) or a cumulative grade-point average below 3.0 will be considered evidence of unsatisfactory scholarship and may be grounds for dismissal from the program.

Doctor of Philosophy (Ph.D.)
Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)
Ph.D. students must take a minimum of 24 credits, as described below. At least 18 credits in 500- and 600-level courses combined must be included in the program. A minimum of 24 credits in course work (400, 500, and 800 series), as contrasted with MCIBS 600, must be completed in the major program. A student's dissertation committee can require additional course work depending on the student's background and research plans.

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<td>Individual Studies (for Research Rotations)</td>
<td>1</td>
</tr>
<tr>
<td>MCIBS/BIOL/ BMMB/VBSC 503 Critical Elements of Genetics and Molecular and Cellular Biology</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>MCIBS 592</td>
<td>Current Research Seminar</td>
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Emphasis Areas
MCIBS offers curricular/research specializations in the following Emphasis Areas: Cell and Developmental Biology; Immunology and Infectious Disease; Molecular and Evolutionary Genetics; Molecular Medicine; Molecular Toxicology; Neurobiology. To complete an emphasis in any of these areas, students take a minimum of 9 credits of specialized course work and conduct original research associated with the respective Emphasis Area. The list of specialized courses that will count towards each Emphasis Area is maintained by the program office.

Additional Course Requirements
Quantitative Foundation Course: A minimum of 3 credits in 400- or 500-level courses in a quantitative area such as statistics, genetics, bioinformatics, etc. (e.g., STAT 501 Regression Methods; STAT 502 Analysis of Variance and Design of Experiments; STAT 503 Design of Experiments; Population Genetics; etc.). The list of courses that will count towards the Quantitative Foundation requirement is maintained by the program office.

Teaching Experience
In addition, all graduate students in MCIBS are required to have one semester of teaching experience by serving as a teaching assistant (TA) in an undergraduate course (400-level or lower) in a bioscience-related field. Teaching assistant opportunities are arranged in consultation with the adviser and program chair.

English Competence
Doctoral degree students are required to demonstrate high-level competence in the use of the English language, including reading, writing, and speaking, as part of the language and communication requirements for the doctorate. This will be assessed for both domestic and international students as part of the qualifying exam, which includes a reading and original writing component. Should deficiencies be identified at the qualifying examination, students will be directed into appropriate remedial activities, including additional English and communication courses. Competence must be formally attested by the program before the doctoral student's comprehensive examination is scheduled. (Note: Passage of the minimal TOEFL or IELTS requirement...

Graduate School, and the student must pass a final oral examination (the dissertation committee, the head of the graduate program, and the time of the final oral examination. The dissertation must be accepted by scholarly attainments of the candidate. The portion of the examination in because a major purpose of the examination is also to assess the general quality. The research paper selected from the literature.

Dissertation Committee

Upon successful completion of the qualifying examination, the student in consultation with his/her adviser will, as soon as possible, select a dissertation committee. The committee must meet Graduate Council guidelines for the composition of dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation). This committee is responsible for supervising the academic program and monitoring the progress of the student towards his/her degree. It is the charge of this committee to assure that the student carries out a substantial piece of independent research and presents it as a dissertation.

Comprehensive Examination

The Comprehensive Examination is administered and evaluated by the entire dissertation committee when the student has completed substantially all required course work, and is intended to determine the feasibility of the student's proposed research and the preparedness of the student to embark on his/her dissertation research. Students must be registered for classes (typically MCIBS 600) the semester they take this exam. The examination will consist of a written research proposal using an NRSA or NSF format, based upon the student's proposed dissertation research, and an oral presentation of the proposed research. The proposal must include a timeline for the completion of the work that will be considered in the feasibility of the work.

Dissertation

All Ph.D. candidates must conduct original research and prepare a dissertation that makes a significant contribution of new knowledge, is presented in a scholarly manner, and demonstrates an ability on the part of the candidate to do independent research of high quality. The contents and conclusions of the dissertation must be defended at the time of the final oral examination. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School, and the student must pass a final oral examination (the dissertation defense).

Additional admission requirements for the joint degree are listed below:

• Research Experience - We are especially interested in students with a strong and sustained background in research. Students who have spent 1-2 years after graduation conducting research are strongly encouraged to apply. Alternatively, in-depth research experience as an undergraduate can suffice.
• Recommendations - We are especially interested in receiving letters of recommendation from faculty with whom you conducted research and who can comment on your passion and potential for research.
• Goals - Applicants must be able to clearly articulate the reasons for pursuing the joint degree.
• International Students - All qualified students are eligible to apply regardless of citizenship.

Degree Requirements

Students must fulfill all requirements for each degree in order to be awarded that degree, subject to the double-counting of credits as outlined below. Degree requirements for the M.D. program are listed on the M.D.
The MCIBS program (http://med.psu.edu/md) section of the Penn State College of Medicine website. Degree requirements for the Ph.D. degree are listed on the Degree Requirements tab.

During the first two years of medical school, the student conducts at least three research rotations. After successful completion of the first two years of medical school the candidate joins their dissertation lab in the MCIBS Graduate Program.

During the summer after the second year of medical school M.D./Ph.D. students take Step 1 of the United States Medical Licensing Examination (USMLE), which serves in lieu of the knowledge-based part of the qualifying examination for the MCIBS program. Successful completion of BMS 506A and BMS 506B, which is taken in the second year of medical school, with a grade of B or higher, meets the critical thinking and paper analysis requirement of the qualifying exam.

The dissertation committee of an M.D./Ph.D. student in the MCIBS program is formed upon entry into the dissertation laboratory. In addition to the general Graduate Council requirements for dissertation committees, the committee must include at least two members of the MCIBS program Graduate Faculty and one M.D./Ph.D. steering committee member.

The MCIBS program will accept passing grades in the medical school courses SPM 711 (15 cr.) in lieu of 11 required credits for the MCIBS Core Required and Elective courses. The 11 required credits include:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MCIBS 503</td>
<td>Critical Elements of Genetics and Molecular and Cellular Biology</td>
<td>4</td>
</tr>
<tr>
<td>MCIBS 596</td>
<td>Individual Studies</td>
<td>1</td>
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Electives

<table>
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<td>BMMB 541</td>
<td>Molecular Biology of Animal Development</td>
<td>3</td>
</tr>
<tr>
<td>BMMB 542</td>
<td>Eukaryotic Cell Biology</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits 11

Because students in the M.D./Ph.D. program are being trained to combine research and medicine, most likely in medical schools, the MCIBS requirement for exposure to undergraduate teaching is waived. M.D./Ph.D. candidates are not required to take BIOL 593 (2 credits) or to be teaching assistants. The Emphasis Area requirement and the Quantitative Foundation Course requirement are also waived.

In addition to taking the required courses MCIBS 590 (2 cr.), MCIBS 591 (1 cr.), and MCIBS 592 (2 cr.), elective courses are selected in consultation with the student’s dissertation adviser and dissertation committee, with guidance from the MCIBS emphasis area course lists and program chair. 6 credits of elective courses will be selected.

The M.D./Ph.D. candidate prepares a written comprehensive examination in the format of a grant application and gives an oral presentation of this proposal to their dissertation committee.

A dissertation must be prepared and defended by each M.D./Ph.D. candidate, as described on the Degree Requirements tab. In addition, M.D./Ph.D. students must have submitted a first-author manuscript before defending their dissertation. Before returning to medical school, the doctoral dissertation must be accepted by the Graduate School.

The M.D./Ph.D. program requires that students have one first author peer-reviewed paper published based on their research accepted prior to completing medical school, and preferably accepted for publication prior to returning to the third year of medical school. At the discretion of the College of Medicine Vice Dean for Research and Graduate Studies, in consultation with the MCIBS Program Chair, the requirement for a first author publication prior to completing medical school may be waived. Examples of conditions that might warrant exemptions include:

- prolonged illness,
- mentor’s relocation,
- mentor’s reluctance to submit the student’s work for publication,
- the student’s project is published by another research group, or delays or challenges in the publication review process beyond the control of the student or dissertation adviser.

If a student decides not to return to medical school, or for some other reason is not able to complete the last two years of medical school, but they have successfully completed their Ph.D. dissertation and final oral examination and met all other degree requirements for the Ph.D. in MCIBS, they will eligible to receive the Ph.D. The latter will be conferred after the student notifies the program that she/he wishes to withdraw from the M.D. program and completes all requirements for conferral of the Ph.D. degree.

**Student Aid**

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits set by The Graduate School.

**Courses**

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**Learning Outcomes**

1. **Know:** demonstrate knowledge of core principles and primary literature in their specialty area including comprehension of methods, results, and data analysis in the specialty area.
2. **Apply/Create:** demonstrate ability to design and carry out a major research project in the field, including synthesis of previous work in the field, and assembling new findings into a written work that advances understanding in the field.
3. **Think:** demonstrate ability to critically analyze work by others in their specialty area.
4. **Communicate:** demonstrate ability to convey scientific ideas and results in clear, concise and original writing as well as in formal oral presentations.
5. **Professional Practice:** demonstrate comprehension of and commitment to ethical standards in the discipline. Demonstrate the ability to teach key concepts.
6. **Teach:** demonstrate the ability to teach key concepts of the discipline to students.

**Contact**

**Graduate Program Head:** Melissa Rolls

**Primary Program Contact:** Terrie Young (tly2@psu.edu)

**Program Email:** gradinfo@huck.psu.edu

**Mailing Address:** 101 Life Sciences Building, University Park, PA 16802

**Telephone:** (814) 863-3273

**Program Website:** Molecular, Cellular, and Integrative Biosciences (http://www.huck.psu.edu/education/molecular-cellular-and-integrative-biosciences)

**Music**

**Graduate Program Head:** David Frego

**Program Code**

MUCND, MUCOM, MUPER, MUSMA, MUSPP

**Campus(es)**

University Park

**Degrees Conferring**

Master of Arts (M.A.)

Master of Music (M.Mus.) Integrated B.A. in Music and M.A. in Music

Integrated B.M. in Performance and M.A. in Music

**The Graduate Faculty**

Music (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=MUSMA)

Music, Composition and Theory (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=MUCOM)

Music, Conducting (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=MUCND)

Music, Pedagogy and Performance (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=MUSPP)

Music, Performance (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=MUPER)

The School of Music requires the completion of a recognized baccalaureate degree in music or music education, with a junior/senior grade-point average of 2.80 or higher (on a 4.00 scale).

Admission to the M.Mus. program requires an audition, or the submission of compositions, or a list of works studied in preparation for conducting (depending on the specific degree).

Admission to the M.A. program requires scores from the Graduate Record Examinations (GRE General Test), and evidence of scholarly writing on a musical topic.

Additional requirements include an interview in person or by interactive video to assess language skills.

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. See GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

**Degree Requirements**

**Master of Music (M.Mus.)**

Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

In the Master of Music degree program, at least 18 credits must be at the 500 or 800 level, with at least 6 credits at the 500 level, and a comprehensive examination is required. The Master of Music degree (36 credits) offers four majors:

- Performance
- Composition/Theory
- Conducting
- Pedagogy and Performance (piano and voice tracks)

The M.Mus. in Performance offers three separate curricula with areas of emphasis in: Voice, Keyboard, or Orchestral Instruments. Depending on the area of emphasis, a recital, a composition project, or a conducting project is required. For the M.Mus. in Performance with emphasis in voice or keyboard, a master's recital is required, in addition to either a master's paper or lecture-recital. For the M.Mus. in Performance (orchestral instruments), a master's recital is required.

For the M.Mus. in Composition/Theory, a composition project and a master's paper are required.

The M.Mus. in Conducting offers three areas of emphasis: Orchestral, Choral, or Band/Wind Ensemble. A performance project and a master's paper are required.

For the M.Mus. in Pedagogy and Performance, a master's recital is required, in addition to either a master's paper or lecture-recital.

The School of Music sponsors many musical ensembles, and candidates for performance degrees are required to participate in positions of responsibility. All candidates for degrees are expected to be in residence for a minimum of two semesters.

The School of Music is an accredited institutional member of the National Association of Schools of Music.

**Admission Requirements**

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).
Master of Arts (M.A.)
Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

In the Master of Arts degree program, at least 18 credits must be at the 500 level or higher, and a comprehensive examination is required. The Master of Arts in Music offers three tracks, in:

- Music Theory (32 credits),
- Musicology (32 credits), and
- Music Theory and History (34 credits).

All three tracks provide an interdisciplinary approach to the field of music scholarship, a hallmark of our program, and all tracks require a thesis. The track in Music Theory offers preparation in current modes of research and analysis from a music theoretical perspective. The track in Musicology emphasizes the development of a broad knowledge of music of all periods and, at the same time, cultivates one or more areas of specialization. The track in Music Theory and History provides greater breadth by integrating theoretical, analytical, and historical approaches to musical styles and works. A reading knowledge of German or another appropriate language must be demonstrated before thesis credits may be scheduled.

Integrated Undergrad-Grad Programs
Integrated B.A. in Music and M.A. in Music
Requirements listed here are in addition to requirements listed in GCAC-210 Integrated Undergraduate-Graduate (IUG) Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/integrated-undergraduate-graduate-degree-programs).

The IUG program enables a select number of students to further their research interests at the undergraduate and graduate levels. By the end of the five-year program students receive two degrees, a B.A. in Music and an M.A. in Music.

Candidates for these Integrated Undergraduate-Graduate degrees must demonstrate a high level of aptitude and achievement in academic core courses and be highly motivated to pursue research projects with faculty. The IUG program enables gifted music students to double count credits in two degree programs. As a result they will have developed a research focus during their fourth and fifth years, which will help them prepare for entry into doctoral programs at other institutions.

Student Aid
Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact
Program Home Page (http://www.music.psu.edu)
David Frego, Director, School of Music
232 Music Building
814-863-4421

Music Education
Graduate Program Head
David Frego

Program Code
MUED

Campus(es)
University Park (Ph.D., M.M.E.)

Degrees Conferring
Doctor of Philosophy (Ph.D.)
Master of Music Education (M.M.E.)

The Graduate Faculty
View (https://secure.gradsch.psu.edu/gmps/index.cfm?searchType=fac&prog=MUED)

The School of Music is an accredited institutional member of the National Association of Schools of Music.

Admission Requirements
Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

The School of Music requires the completion of a recognized baccalaureate degree in music or music education, with a junior/senior grade-point average of 2.80 or higher (on a 4.00 scale). Admission to the M.M.E. program requires the completion of 12-15 credits in music education methods at the undergraduate level and successful teaching or student teaching experience. Admission to the Ph.D. requires an interview, submission of videotapes of teaching or conducting, scores from the Miller Analogies Test, and a portfolio of requested documents.
Additional requirements include an interview in person or by interactive video to assess language skills.

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. See GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

### Degree Requirements

#### Master of Music Education (M.M.E.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

The Master of Music Education degree provides the opportunity for advanced study in music, music learning and teaching, and teaching as reflective practice. The program requires one full-year of residency at the University Park campus, and is designed to be completed in one academic year plus two summer semesters. Fulfillment of degree requirements includes successful completion of 30 credits of course work that includes a final action research project and resultant substantial article-length paper, followed by an oral presentation focusing on the student’s projects and course work. This presentation, including questions posed by the faculty committee, serves as the final comprehensive examination. Twenty credits must be earned at the University Park campus and 18 credits must be at the 500 or 800 level, with at least 6 credits at the 500 level.

#### Doctor of Philosophy (Ph.D.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

The Ph.D. in Music Education is designed to provide opportunities for the highest level of scholarly study in the processes of teaching and learning music. Students are expected to develop and test new knowledge in the field of music education while preparing themselves for positions in higher education or other leadership roles within the profession. A qualifying exam, a doctoral dissertation, and comprehensive written and oral examinations are required.

### Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding section of The Graduate School's website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

### Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

### Contact

**Graduate Program Head:** David Frego  
**Director of Graduate Studies/Professor-in-Charge:** Ann Clements  
**Primary Program Contact:** Irene Kohute  
**Email:** iel1@psu.edu

**Mailing Address:** School of Music, 233 Music Building I, University Park, PA 16802

**Telephone:** (814) 863-0418

**Program Website:** Music Education (https://music.psu.edu/area/music-education)

### Neuroscience

**Graduate Program Head**  
Alistair Barber

**Program Code**  
NEURS

**Campus(es)**  
Hershey (Ph.D., M.S.)  
University Park (Ph.D., M.S.)

**Degrees Conferred**  
Doctor of Philosophy (Ph.D.)  
Master of Science (M.S.)  
Dual-Title Ph.D. in Neuroscience and Clinical and Translational Sciences M.D./Ph.D.

**The Graduate Faculty**  
View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=NEURS)

The Neuroscience (NEURS) Graduate Program provides students curricular training with a broad focus on neuroscience, and the opportunity for concentrated research in a variety of disciplinary approaches to neuroscience such as biochemistry, cell biology, embryology, genetics, immunology, neuroscience, pharmacology, physiology, structural biology, and virology. Students receive rigorous training that provides the skills necessary to be leaders in biomedical research and other endeavors that benefit from a rigorous scientific background, including education, law, journalism, and public policy.

The Neuroscience Graduate Program is an interdepartmental program that engages faculty from multiple basic science and clinical science departments. This broad-reaching Program provides students a wide ranging understanding of multiple disciplines with specific expertise in a chosen area, and encourages interdisciplinary research that is the hallmark of biomedical sciences in the 21st century.

### Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Prospective applicants should have a bachelor's degree in a biological, physical, or behavioral science and are expected to have taken undergraduate courses in biology, chemistry, physics, and mathematics. Applicants are expected to have a 3.0 (B) grade-point average or better. Neuroscience courses are desirable but not essential and research
experience is an advantage. The General Test of the Graduate Record Examinations (GRE), or a comparable substitute examination accepted by the Neuroscience graduate program, is required for all applicants.

A complete application includes:

- completed online Graduate School application (http://gradschool.psu.edu/prospective-students/how-to-apply) with personal statement of purpose;
- GRE scores;
- official transcripts from all post-secondary institutions attended (http://www.gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission);
- three letters of recommendation; and
- TOEFL scores (if applicable).

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. See GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

The application deadline is December 15 for admission in the following fall.

Qualified applicants generally will be requested to visit the College of Medicine in Hershey, PA for an interview. Admission is based on evaluation of the undergraduate transcript, GRE scores, personal statement of purpose, letters of recommendation, and performance at the interview.

**Degree Requirements**

**Master of Science (M.S.)**

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

A minimum of 30 credits at the 400, 500, 600, or 800 level is required for the M.S., with least 18 credits at the 500 and 600 level, combined. A thesis is required, and a minimum of six (6) thesis research credits (NEURO 600 or NEURO 610) must be taken in Neuroscience. The thesis must be accepted by the advisers and/or committee members, the head of the graduate program, and the Graduate School, and the student must pass a thesis defense.

<table>
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<tr>
<th>Code</th>
<th>Title</th>
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<tr>
<td>NEURO 511</td>
<td>Neurobiology II</td>
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<tr>
<td>NEURO 520</td>
<td>Cellular and Molecular Neuroscience</td>
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<td>NEURO 521</td>
<td>Systems Neuroscience</td>
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</tr>
<tr>
<td>NEURO 523</td>
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**Doctor of Philosophy (Ph.D.)**

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

A minimum of 32 credits is required for the Ph.D. degree:

**Required Courses**

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<tr>
<th>Code</th>
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<tr>
<td>BMS 502</td>
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<tr>
<td>BMS 503</td>
<td>Flow of Cellular Information</td>
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<tr>
<td>NEURO 511</td>
<td>Neurobiology II</td>
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<td>Cellular and Molecular Neuroscience</td>
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<td>NEURO 521</td>
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**Program Requirements**

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<td>PHS 520</td>
<td>Principles of Biostatistics</td>
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<tr>
<td>NEURO 522</td>
<td>Seminars in Neuroscience I</td>
<td>2</td>
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<tr>
<td>NEURO 523</td>
<td>Seminars in Neuroscience II</td>
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<td>NEURO 530</td>
<td>Professional Development and Responsible Conduct in Science</td>
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<td>NEURO 590</td>
<td>Colloquium</td>
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<tr>
<td>BMS 591</td>
<td>Biomedical Research Ethics</td>
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**Additional Required Course**

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<tbody>
<tr>
<td>NEURO 602</td>
<td>Supervised Experience in College Teaching</td>
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</tr>
</tbody>
</table>

**Electives**

A minimum of 6 elective credits is required.

Total Credits 32

In addition, Ph.D. students are required to complete 1 credit of NEURO 602; however, this 1 credit cannot be counted towards the minimum 32 credits required.

A student’s dissertation committee can require additional course work depending on the student’s background and research plans.

Ph.D. degree requirements include successful completion of the following:

- approved graduate course work,
- English Competence requirements,
- a qualifying examination, which entails an oral presentation and a written examination on anatomical course work,
- a comprehensive examination, and
- a final oral examination (the dissertation defense).
To earn the Ph.D. degree, doctoral candidates must write a dissertation that is accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

**Dual-Titles**

**Dual-Title Ph.D. in Neuroscience and Clinical and Translational Sciences**

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

**Admission Requirements**

Potential dual-title students can express an interest in the CTS dual-title as early as during the recruitment process for the Neuroscience Graduate Program. Students must apply and be admitted to the graduate program in Neuroscience and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admission requirements of the CTS dual-title program. Refer to the Admission Requirements section of the CTS Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/clinical-translational-sciences). Doctoral students must be admitted into the dual-title degree program in CTS prior to taking the qualifying exam in Neuroscience.

Students interested in the dual-title Ph.D. will be considered for admission to the Clinical and Translational Sciences Program by a committee consisting of the Clinical and Translational Sciences Program co-directors and faculty affiliated with the Clinical and Translational Sciences Dual-Title Program. To apply, the student must submit the following documentation to the Clinical and Translational Sciences Dual-title Program:

1. A statement of interest, including the applicant’s reasons for pursuing a career that includes clinical/translational science.
2. A letter from the applicant’s research adviser which endorses the applicant’s participation in the Clinical and Translational Sciences dual-title program.
3. A letter of support from the head of Neuroscience. If the applicant has not yet selected a research adviser, the program head’s letter should describe the program’s support of the applicant’s desire to incorporate clinical/translational research in the applicant’s training plans.
4. A description of the applicant’s academic performance to date.

**Degree Requirements**

To qualify for the dual-title degree, students must satisfy the degree requirements for the degree they are enrolled in Neuroscience. In addition, students must complete the degree requirements for the dual-title in CTS, listed on the CTS Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/clinical-translational-sciences). Up to 7 credits of course work may be used to satisfy both Neuroscience and CTS degree requirements. In addition, a student may request to double count additional credits up to a maximum of 12. An increase in double-counted credits will be determined by the CTS Program on a case-by-case basis.

Neuroscience graduate students accepted to the Clinical and Translational Sciences Dual-Title Program will take the qualifying exam by the end of the fourth semester of the graduate program:

1. to allow exposure to the Clinical and Translational Sciences curriculum in the Spring semester of the first year and Fall semester of the second year, which will prepare the students for the integrated content of the dual-title qualifying exam, and
2. to allow sufficient time to identify and assure commitment of an appropriate dissertation adviser who embraces the dual-title program of the student.

During the qualifying examination, the student will also be assessed for the dual-title program, and at least one member of the qualifying exam committee must come from the dual-title program. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role.

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of a Neuroscience and Clinical and Translational Sciences dual-title doctoral degree candidate must include at least one member of the Clinical and Translational Sciences Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in CTS, the member of the committee representing CTS must be appointed as co-chair. The CTS representative on the student’s dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students enrolled in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their dissertation committee and reflects their original research and expertise in both Neuroscience and Clinical and Translational Sciences. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

**Joint Degrees**

**Joint M.D./Ph.D. with the college of Medicine**

Requirements listed here are in addition to requirements listed in GCAC-211 Joint Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/joint-degree-programs).

**Admission Requirements**

Applicants to the joint M.D./Ph.D. degree program must apply and be admitted to both the Neuroscience graduate program and the College of Medicine.

Students interested in simultaneously pursuing an M.D. and Ph.D. degree must apply to the College of Medicine M.D. program using the national American Medical College Application Service (AMCAS) application system and indicate their intent to pursue the joint degree program. Admission requirements and applications for admission for Penn State College of Medicine are available at the M.D. Program (http://med.psu.edu/md) section of the Penn State College of Medicine website. The College of Medicine M.D./Ph.D. Admissions Committee reviews applications and evaluates applicants for acceptance into both the M.D. and Ph.D. program. Students not accepted into the joint degree program can be referred to either the M.D. or Ph.D. program, depending on their qualifications and interests.

After the review committee has accepted an applicant to the joint degree program, s/he must apply and be admitted to the Graduate School (http://www.gradschool.psu.edu/prospective-students/how-to-apply) for
admission to the graduate program. Requirements for the joint degree, additional to the general admission requirements for the Ph.D. degree, are:

- **Academic Achievement.** Applicants to our program generally have very strong grades and MCAT scores. In recent years, successful applicants have an average GPA of 3.75 and total MCAT scores of >85 percentile. Applicants are not required to take the GREs.

- **Research Experience.** We are especially interested in receiving letters of recommendation from faculty with whom you conducted research and who can comment on your passion and potential for research.

- **Goals.** Applicants must be able to clearly articulate the reasons for pursuing the joint degree.

- **International Students.** All qualified students are eligible to apply regardless of citizenship.

### Degree Requirements

Students must fulfill all requirements for each degree in order to be awarded that degree, subject to the double-counting of credits as outlined below. Degree requirements for the M.D. program are listed on the M.D. Program (http://med.psu.edu/md) section of the Penn State College of Medicine website.

During the first two years of medical school, the student conducts at least three research rotations. In addition, students are required to take BMS 506A and BMS 506B during the M1 (Spring) and M2 (Fall), as well as either a 1 credit course in genetics or immunology. After successful completion of the first two years of medical school, the student joins their dissertation lab in the Neuroscience graduate program.

During the summer after the second year of medical school M.D./Ph.D. students take Step 1 of the United States Medical Licensing Examination (USMLE), which serves in lieu of the knowledge-based portion of the qualifying examination for the Neuroscience program.

The dissertation committee of an M.D./Ph.D. student in the Neuroscience program is formed upon entry into the dissertation laboratory. In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gsad/gcac-gcac-600/phd-dissertation-committee-formation), the committee must include at least two members of the Neuroscience program Graduate Faculty and one M.D./Ph.D. steering committee member.

In addition to taking the required courses NEURO 590, BMS 591, and PHS 520, students are required to take the core neuroscience courses: NEURO 521, NEURO 522, NEURO 523, and NEURO 530. A minimum of 4 elective credits is required. Other elective courses are selected in consultation with the student’s dissertation adviser and dissertation committee.

### Electives

A minimum of 4 elective credits is required. Other elective courses are selected in consultation with the student’s dissertation adviser and doctoral committee.

### Total Credits

The Neuroscience program will accept passing grades in the medical school courses SPM 711 (11 cr.) and NBS 723 (3 cr.) in lieu of following 12 required credits for the Neuroscience Ph.D.:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMS 501</td>
<td>Regulation of Cellular &amp; Systemic Energy Metabolism</td>
<td>3</td>
</tr>
<tr>
<td>BMS 502</td>
<td>Cell and Systems Biology</td>
<td>3</td>
</tr>
<tr>
<td>NEURO 520</td>
<td>Cellular and Molecular Neuroscience</td>
<td>3</td>
</tr>
<tr>
<td>NEURO 511</td>
<td>Neurobiology II</td>
<td>3</td>
</tr>
</tbody>
</table>

M.D./Ph.D. students are not required to take NEURO 602 (1 cr.).

The M.D./Ph.D. student prepares a written comprehensive examination in the format of a grant application and gives an oral presentation of this proposal to their dissertation committee.

M.D./Ph.D. candidates are required to have at least one paper accepted for publication in a major peer-reviewed scientific journal prior to the final oral examination, and this must be accepted before they return to the third year of medical school. A student may petition to waive this requirement due to extenuating circumstances (e.g., adviser relocation, abnormal issues with publication process). All waivers must be approved by the Vice Dean for Research and Graduate Studies of the College of Medicine.

A dissertation must be prepared and defended by each M.D./Ph.D. candidate prior to returning to the M3 year of medical school. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School, and the student must pass the final oral examination (the dissertation defense).

If a student decides not to return to medical school, or for some other reason is not able to complete the last two years of medical school, but they have successfully completed their Ph.D. dissertation and final oral examination and met all other degree requirements of the Neuroscience program, they will be able to complete the Ph.D. The latter will be conferred after the student notifies the program that she/he wishes to withdraw from the M.D. program and completes all requirements for conferral of the graduate degree.

### Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

All support is continuous for the first year from the Neuroscience program. Support in years two and above, when the student is conducting dissertation research, must be acquired from either the basic science
department in which the candidate elects to pursue his/her minor or from funds available from the dissertation adviser. These funds must be secured by the student in conjunction with his/her adviser.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Learning Outcomes

1. Describe the structural-functional organization of the nervous system at the cellular and systems levels
2. Describe the basic principles of neurotransmission
3. Explain the techniques used to analyze the structure and function of the nervous system
4. Develop testable hypotheses aimed at elucidating the structure or function of the nervous system
5. Develop an experimental plan that tests a specific set of hypotheses about nervous system structure or function following accepted professional standards for ensuring reproducibility
6. Conduct neuroscience research in which data are collected using ethical and professional standards
7. Present the results of a research project in a lucid and logical manner in both oral and written formats

Contact

Graduate Program Head: Alistair Barber

Hershey Campus

Director of Graduate Studies/Professor-in-Charge: Alistair Barber

Primary Program Contact: Kristin Smith (kec17@psu.edu)

Program Email: Neuro-grad-hmc@psu.edu

Mailing Address: H170, College of Medicine, Hershey, PA 17033

Telephone: (717) 531-1045

Program Website: Neuroscience at Hershey (http://med.psu.edu/neuroscience-phd)

University Park Campus

Director of Graduate Studies/Professor-in-Charge: Kevin Alloway

Primary Program Contact: Jean Pierce (jep32@psu.edu)

Program Email: gradinfo@huck.psu.edu

Mailing Address: 101 Huck Life Sciences Bldg [H133 BIOMEDICAL], University Park, PA 16802

Telephone: (814) 867-0371

Program Website: Neuroscience at University Park (http://www.huck.psu.edu/content/graduate-programs/neuroscience)

Nuclear Engineering

Graduate Program Head: Arthur T. Motta

Program Code: NUCE

Campus(es): University Park (Ph.D., M.S., M.Eng.) World Campus (M.Eng.)

Degrees Conferred: Doctor of Philosophy (Ph.D.) Master of Science (M.S.) Master of Engineering (M.Eng.)

The Graduate Faculty

Graduate programs and research facilities are available in:

- thermal-hydraulics,
- neutronics,
- computational methods,
- advanced controls with applications of artificial intelligence,
- materials,
- radiation monitoring and effects,
- fuel management, and
- radioactive waste management.

Application areas include:

- advanced reactor design,
- safety analysis,
- radiation instrumentation development,
- neutron imaging, and
- plant life extension.

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Scores from the Graduate Record Examinations (GRE), or from a comparable substitute examination accepted by the Nuclear Engineering graduate program, are required for admission. At the discretion of a graduate program, a student may be admitted provisionally for graduate study in a program without these scores.

Students with a 3.00 junior/senior grade-point average and with appropriate course backgrounds will be considered for admission. General aptitude GRE test results are required. The best-qualified applicants will be accepted up to the number of spaces that are available for new students. Exceptions to the minimum 3.00 grade-point average may be made for students with special backgrounds, abilities, and interests.

Letters of recommendation and a statement of purpose written by the applicant are also required to complete the application package.

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. See GCAC-305 Admission Requirements for International Students
Degree Requirements

Master of Engineering (M.Eng.)
Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

The M.Eng. degree is a nonthesis professional master's degree. In the M.Eng. degree program, 30 course credits are required. Twelve of those credits must be in Nuclear Engineering with at least 18 credits at the 500 level. No thesis is required for the M.Eng. degree. Instead, the student must take 3 credits of NUCE 597C, which represents formal recognition of the student's effort spent on writing a paper about an engineering subject. It must be approved by the adviser, a faculty reader, and the program chair.

Master of Science (M.S.)
Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

The M.S. degree program is designed for students to gain advanced knowledge for research, analysis, and design in nuclear engineering. Student pursuing an M.S. degree must complete 24 course credits and submit an acceptable thesis (6 research credits) to the Graduate School.

Doctor of Philosophy (Ph.D.)
Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

Continuous registration is required of all Ph.D. students until the dissertation is approved.

The Ph.D. program emphasizes scholarly research and helps students prepare for research and related careers in industry, government, and academia. Students must pass written and oral qualifying examinations. The Ph.D. program is quite flexible, with minimal formal requirements. The Ph.D. degree is awarded upon completion of a program of advanced study that includes a minimum period of residence, a satisfactory dissertation, and the passing of comprehensive and final oral examinations as determined by the student's dissertation committee.

Generally, a Ph.D. student must have 30 credits above a master's degree before taking the comprehensive examination.

Student Aid
Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

In addition to the fellowships, traineeships, graduate assistantships, and other forms of financial aid described in the link above, the following awards typically have been available to graduate students in this program:

National Academy for Nuclear Training Fellowships
Available to graduate students in nuclear engineering; stipend plus tuition.

U.S. Department of Energy-Nuclear Science and Engineering Fellowships
Available to graduate students interested in engineering and engineering support related to nuclear technology; stipend plus tuition.

Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact
Graduate Program Head: Arthur Motta
Director of Graduate Studies/Professor-in-Charge: Mary Frecker
Primary Program Contact: Jason Nachman
Email: jpn127@psu.edu
Mailing Address: 127 Reber Building, University Park, PA 16802
Telephone: (814) 865-1345
Program Website: Nuclear Engineering (http://www.mne.psu.edu)

Nursing
Graduate Program Head
Judith E. Hupcey
Program Code
NURS
Campus(es)
University Park (Ph.D., M.S., M.S.N.)
World Campus (D.N.P., M.S.N.)
Degrees Conferred
Doctor of Philosophy (Ph.D.)
Doctor of Nursing Practice (D.N.P)
Master of Science (M.S.)
Master of Science in Nursing (M.S.N.)
Dual-Title Ph.D. in Nursing and Bioethics
Dual-Title Ph.D. in Nursing and Clinical and Translational Science

The Graduate Faculty
View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=NURS)

The graduate programs emphasize productive scholarship and research in the development of nursing knowledge and the translation of knowledge into practice. Advanced study is in human health and development throughout the life span, and in nursing’s role in providing health services to individuals, families, and communities.

The Ph.D. program, the dual-title Ph.D. program in nursing and bioethics, and the dual-title Ph.D. program in nursing and clinical and translational
sciences prepare nurse scientists to provide leadership in nursing education, practice and research. Individualized curricula prepare nursing graduates to assume positions as faculty, researchers and leaders in educational, community, governmental, or institutional settings.

The D.N.P. degree program prepares nurse administrators and advanced practice nurses to assume leadership roles in practice settings in the community, governmental agencies, or healthcare institutions.

The M.S. degree program with a major in nursing prepares nurse scientists and clinical scholars who plan to complete a Ph.D. in nursing or dual-title Ph.D. in nursing and bioethics or a dual-title Ph.D. in nursing and clinical and translational sciences.

The M.S.N. degree in Nursing consists of a base program and five options. The options include:

- Family Nurse Practitioner
- Adult Gerontology Primary Care Nurse Practitioner
- Adult Gerontology Acute Care Nurse Practitioner
- Nurse Administrator
- Nurse Educator

The M.S., M.S.N., and D.N.P. degree programs in Nursing are accredited by the Commission on Collegiate Nursing Education.

The Nurse Practitioner options are designed to help prepare the professional nurse to function in an expanded nursing role providing direct care to specific groups of clients in a variety of health care settings. Since that practice is inherently interdisciplinary in nature, advanced knowledge and research from nursing is combined with knowledge from science, medicine, and related disciplines. The Nurse Practitioner may also function in supervisory, consultative, education, and research roles.

The Nurse Administrator option enables the student to acquire advanced knowledge of organizational leadership, health policy, and evidence-based health care delivery. The program is designed to prepare students for leadership and administrative roles in a variety of health care settings.

The Nurse Educator option enables the student to acquire advanced knowledge of evidence-based teaching and learning principles, curriculum development, and evaluative techniques. The program is designed to prepare students for educator roles in a variety of academic and health care settings.

**Admission Requirements**

Applicants apply for admission to the program via the Graduate School application (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

For admission to the Nursing program, an applicant must hold either:

- a bachelor’s degree in Nursing from a U.S. regionally accredited institution or
- a postsecondary degree in Nursing that is equivalent to a U.S. baccalaureate degree earned from an officially recognized degree-granting international institution. Students entering the doctoral program via the traditional post-master’s route must have earned a master’s degree with a major in nursing from a program accredited by a national accrediting agency for nursing. Well-qualified Ph.D. applicants with a baccalaureate degree in nursing and master’s degree in a related discipline (e.g., public health) will be evaluated individually to assess the need for prerequisite master’s-level course work in nursing for doctoral program admission.

Applicants must submit official transcripts from all post-secondary institutions attended (http://www.gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission). For M.S.N. applicants, a cumulative grade-point average of 3.3 (on a 4.0 scale) for the baccalaureate degree is expected with a B or better in all science and nursing courses. For M.S. applicants, a cumulative grade-point average of 3.5 (on a 4.0 scale) for the baccalaureate degree is expected with a B or better in all science and nursing courses. College chemistry and statistics are also required (chemistry is not required for the nurse administrator option). B.S.N. to D.N.P. applicants are expected to have a cumulative undergraduate grade-point average of 3.5 (on a 4.0 scale). For master’s to Ph.D. or D.N.P. applicants, a cumulative grade-point average 3.5 (on a 4.0 scale) for master’s and subsequent course work is expected.

Two letters of reference are required for the M.S.N. degree program and three letters of reference are required for the M.S., D.N.P., and Ph.D. degree programs. The letters should be solicited from professional supervisors and faculty who can attest to the applicant’s ability.

All applicants must submit a statement of purpose. In addition, M.S., D.N.P., and Ph.D. degree applicants must also submit a published or unpublished scientific paper, thesis, or other scholarly writing sample and a complete curriculum vitae.

GRE scores are required for admission to the M.S. and Ph.D. programs. GRE scores are not required for the M.S.N. or D.N.P. applicants, but if the scores are submitted to Penn State they will be reviewed as part of the application.

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. See GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

Applicants to the Nursing program must have a minimum TOEFL total score of 80 with a 25 on the speaking section for the internet-based test (IBT). For the paper-based test, taken prior to July 2017, a minimum of 580 is required. The minimum composite score for the IELTS for applicants to the Nursing program is 7.

Applicants to the M.S.N. options and D.N.P. degree offered online via the World Campus must hold a current license to practice professional nursing in at least one U.S. state or in a foreign country. All other applicants to the M.S. and M.S.N. degree programs must hold a current Pennsylvania license to practice professional nursing. Applicants to the Ph.D. degree program must be licensed to practice professional nursing in at least one state or in a foreign country.

Applicants to the Adult Gerontology Acute Care Nurse Practitioner Option are required to have two years of acute care hospital experience.

Applicants to the M.S.N. degree program are encouraged to discuss program options with the faculty; however, an interview is not required. Doctoral (B.S.N. - Ph.D., B.S.N. - D.N.P., D.N.P., and Ph.D.) applicants will be contacted by the College of Nursing to schedule a required interview (either in person or via internet-based video conferencing).
Degree Requirements

Master of Science in Nursing (M.S.N.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

The Master of Science in Nursing (M.S.N.) requires a minimum of 30 credits, with at least 6 credits at the 500 level, including:

- 12 credits of M.S.N. Program Core courses,
- 15 credits of electives, and
- at least 3 credits in a capstone course.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>NURS 501</td>
<td>Issues in Nursing and Health Care</td>
<td>3</td>
</tr>
<tr>
<td>NURS 510</td>
<td>Theoretical and Scientific Foundations of Advanced Nursing Practice</td>
<td>3</td>
</tr>
<tr>
<td>NURS 513</td>
<td>Evidence-Based Practice in Professional Nursing</td>
<td>3</td>
</tr>
<tr>
<td>NURS 830</td>
<td>Evidence-Based Practice I: Theory and Research Methods</td>
<td>3</td>
</tr>
</tbody>
</table>

Electives

Additional courses that will count as electives towards this degree can be chosen from a list of approved elective courses maintained by the graduate program office.

Culminating Experience

Students in the M.S.N. degree program are required to complete a capstone project, which demonstrates the application of theory and research to a clinical problem based on review of the literature and research utilization for that problem. For M.S.N. students who do not choose to complete an option, the capstone project is completed while enrolled in NURS 596 (3 credits).

Total Credits

30

The five advanced role options offered in the M.S.N. degree program include nurse educator, nurse administrator, family nurse practitioner, adult gerontology primary care nurse practitioner, and adult gerontology acute care nurse practitioner. Students in these options complete the 12 credits of M.S.N. Program Courses as described above. The option-specific course requirements described below replace the requirement for 15 credits of electives.

Family Nurse Practitioner Option

Students must earn a minimum of 45 credits for the M.S.N. with the Family Nurse Practitioner option. The option-specific course requirements total 23 credits and a 6 credit capstone course, including:

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Family Nurse Practitioner Option Required Courses

<table>
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<tr>
<th>Code</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td>NURS 802</td>
<td>Advanced Health Assessment of Adult Populations</td>
<td>3</td>
</tr>
<tr>
<td>NURS 802A</td>
<td>Advanced Health Assessment of Pediatric Populations</td>
<td>1</td>
</tr>
<tr>
<td>NURS 803</td>
<td>Pathophysiology</td>
<td>3</td>
</tr>
<tr>
<td>NURS 804</td>
<td>Pharmacologic Therapy</td>
<td>3</td>
</tr>
<tr>
<td>NURS 870</td>
<td>Nurse Practitioner Role with Healthy Individuals and Families</td>
<td>3</td>
</tr>
<tr>
<td>NURS 871</td>
<td>Nurse Practitioner Role with Individuals and Families with Complex and/or Chronic Health Problems</td>
<td>3</td>
</tr>
<tr>
<td>NURS 872</td>
<td>Family Nurse Practitioner Practicum I</td>
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<tr>
<td>NURS 873</td>
<td>Family Nurse Practitioner Practicum II</td>
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</tr>
<tr>
<td>NURS 875</td>
<td>Nurse Practitioner Role with Children and Families</td>
<td>2</td>
</tr>
<tr>
<td>NURS 876</td>
<td>Family Nurse Practitioner Practicum with Pediatric Populations</td>
<td>2</td>
</tr>
</tbody>
</table>

Culminating Experience

NURS 874 Family Nurse Practitioner Integrative Practicum (Capstone Course) 6

Total Credits 45

Adult Gerontology Primary Care Nurse Practitioner Option

Students must earn a minimum of 41 credits for the M.S.N. with the Adult Gerontology Primary Care Nurse Practitioner option. The option-specific course requirements total 23 credits and a 6 credit capstone course:

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Adult Gerontology Primary Care Nurse Practitioner Option Required Courses

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<td>3</td>
</tr>
<tr>
<td>NURS 803</td>
<td>Pathophysiology</td>
<td>3</td>
</tr>
<tr>
<td>NURS 804</td>
<td>Pharmacologic Therapy</td>
<td>3</td>
</tr>
<tr>
<td>NURS 870</td>
<td>Nurse Practitioner Role with Healthy Individuals and Families</td>
<td>3</td>
</tr>
<tr>
<td>NURS 871</td>
<td>Nurse Practitioner Role with Individuals and Families with Complex and/or Chronic Health Problems</td>
<td>3</td>
</tr>
<tr>
<td>NURS 872A</td>
<td>Adult Gerontology Primary Care Nurse Practitioner Practicum I</td>
<td>4</td>
</tr>
<tr>
<td>NURS 873A</td>
<td>Adult Gerontology Primary Care Nurse Practitioner Practicum II</td>
<td>4</td>
</tr>
</tbody>
</table>

Culminating Experience

NURS 874A Adult Gerontology Primary Care Nurse Practitioner Integrative Practicum (Capstone Course) 6

Total Credits 41
### Penn State University

#### Adult Gerontology Acute Care Nurse Practitioner Option

Students must earn a minimum of 43 credits for the M.S.N. with the Adult Gerontology Acute Care Nurse Practitioner option. The option-specific course requirements total 25 credits and a 6 credit capstone course:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>NURS 501</td>
<td>Issues in Nursing and Health Care</td>
<td>3</td>
</tr>
<tr>
<td>NURS 510</td>
<td>Theoretical and Scientific Foundations of Advanced Nursing Practice</td>
<td>3</td>
</tr>
<tr>
<td>NURS 830</td>
<td>Evidence-Based Practice I: Theory and Research Methods</td>
<td>3</td>
</tr>
<tr>
<td>NURS 513</td>
<td>Evidence-Based Practice in Professional Nursing</td>
<td>3</td>
</tr>
</tbody>
</table>

**Adult Gerontology Acute Care Nurse Practitioner Option Required Courses**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>NURS 802</td>
<td>Advanced Health Assessment of Adult Populations</td>
<td>3</td>
</tr>
<tr>
<td>NURS 803</td>
<td>Pathophysiology</td>
<td>3</td>
</tr>
<tr>
<td>NURS 804</td>
<td>Pharmacologic Therapy</td>
<td>3</td>
</tr>
<tr>
<td>NURS 860</td>
<td>Adult Gerontology Acute Care Nurse Practitioner Role I</td>
<td>3</td>
</tr>
<tr>
<td>NURS 861</td>
<td>Adult Gerontology Acute Care Nurse Practitioner Role II</td>
<td>3</td>
</tr>
<tr>
<td>NURS 862</td>
<td>Adult Gerontology Acute Care Nurse Practitioner Practicum I</td>
<td>4</td>
</tr>
<tr>
<td>NURS 863</td>
<td>Adult Gerontology Acute Care Nurse Practitioner Practicum II</td>
<td>4</td>
</tr>
<tr>
<td>NURS 865</td>
<td>Pharmacology for Acute Care Practitioners</td>
<td>1</td>
</tr>
<tr>
<td>NURS 866</td>
<td>Health Assessment of the Adult Gerontology Population in Acute Care</td>
<td>1</td>
</tr>
</tbody>
</table>

**Capstone Course**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>NURS 864</td>
<td>Adult Gerontology Acute Care Nurse Practitioner Integrative Practicum (Capstone Course)</td>
<td>6</td>
</tr>
</tbody>
</table>

Total Credits 43

#### Nurse Administrator Option

Students must earn a minimum of 37 credits for the M.S.N. with the Nurse Administrator option. The option-specific course requirements total 12 credits, 9 additional elective credits, and a 4 credit capstone course:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>NURS 501</td>
<td>Issues in Nursing and Health Care</td>
<td>3</td>
</tr>
<tr>
<td>NURS 510</td>
<td>Theoretical and Scientific Foundations of Advanced Nursing Practice</td>
<td>3</td>
</tr>
<tr>
<td>NURS 830</td>
<td>Evidence-Based Practice I: Theory and Research Methods</td>
<td>3</td>
</tr>
<tr>
<td>NURS 513</td>
<td>Evidence-Based Practice in Professional Nursing</td>
<td>3</td>
</tr>
</tbody>
</table>

**Nurse Administrator Option Required Courses**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>NURS 802B</td>
<td>Physical Assessment Through The Lifespan</td>
<td>3</td>
</tr>
<tr>
<td>NURS 803</td>
<td>Pathophysiology</td>
<td>3</td>
</tr>
<tr>
<td>NURS 804</td>
<td>Pharmacologic Therapy</td>
<td>3</td>
</tr>
<tr>
<td>NURS 840</td>
<td>Nursing Education Theories and Strategies</td>
<td>3</td>
</tr>
<tr>
<td>NURS 841</td>
<td>Assessment and Evaluation in Nursing Education</td>
<td>3</td>
</tr>
<tr>
<td>NURS 842</td>
<td>Curriculum and Program Development in Nursing Education</td>
<td>3</td>
</tr>
</tbody>
</table>

**Electives**

Students in this option are required to take 9 additional elective credits chosen from a list of approved elective courses maintained by the graduate program office. Total Credits 37

#### Nurse Educator Option

Students must earn a minimum of 37 credits for the M.S.N. with the Nurse Educator option. The option-specific course requirements total 18 credits, 3 additional elective credits, and a 4 credit capstone course:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>NURS 501</td>
<td>Issues in Nursing and Health Care</td>
<td>3</td>
</tr>
<tr>
<td>NURS 510</td>
<td>Theoretical and Scientific Foundations of Advanced Nursing Practice</td>
<td>3</td>
</tr>
<tr>
<td>NURS 830</td>
<td>Evidence-Based Practice I: Theory and Research Methods</td>
<td>3</td>
</tr>
<tr>
<td>NURS 513</td>
<td>Evidence-Based Practice in Professional Nursing</td>
<td>3</td>
</tr>
</tbody>
</table>

**Nurse Educator Option Required Courses**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>NURS 802B</td>
<td>Physical Assessment Through The Lifespan</td>
<td>3</td>
</tr>
<tr>
<td>NURS 803</td>
<td>Pathophysiology</td>
<td>3</td>
</tr>
<tr>
<td>NURS 804</td>
<td>Pharmacologic Therapy</td>
<td>3</td>
</tr>
<tr>
<td>NURS 840</td>
<td>Nursing Education Theories and Strategies</td>
<td>3</td>
</tr>
<tr>
<td>NURS 841</td>
<td>Assessment and Evaluation in Nursing Education</td>
<td>3</td>
</tr>
<tr>
<td>NURS 842</td>
<td>Curriculum and Program Development in Nursing Education</td>
<td>3</td>
</tr>
</tbody>
</table>

**Electives**

Students in this option are required to take 3 additional elective credits chosen from a list of approved elective courses maintained by the graduate program office. Total Credits 37

#### Culminating Experience

**NURS 843** Synthesis and Application of the Nurse Educator Role (Capstone Course) 4

#### Master of Science (M.S.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

Students in the Master of Science (M.S.) degree program in nursing (B.S.N. - Ph.D.) are required to complete a minimum of 30 credits, with at least 18 credits in the 500 and 600 series combined, to be awarded an M.S. degree. A minimum of 12 credits in course work (400, 500, and 800 series), as contrasted with research, must be completed in the major program. There are 9 credits required in M.S. core course work, including:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>NURS 836</td>
<td>Healthcare Informatics</td>
<td>3</td>
</tr>
<tr>
<td>NURS 846</td>
<td>Leadership Concepts and Theories for Nurse Administrators</td>
<td>3</td>
</tr>
</tbody>
</table>

**Electives**

Students in this option are required to take 9 additional elective credits chosen from a list of approved elective courses maintained by the graduate program office. Total Credits 9

**Culminating Experience**

**NURS 843** Synthesis and Application of the Nurse Educator Role (Capstone Course) 4

Total Credits 37
Additional Required Courses

9-12 credits are required in research and statistics courses approved 9-12 in advance by the student’s adviser.

Electives

Additional courses that will count as electives towards this degree can be chosen from a list of approved elective courses maintained by the graduate program office.

Culminating Experience

Students choose to complete either a thesis or a scholarly paper.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>NURS 596</td>
<td>Individual Studies (Scholarly Paper)</td>
<td>3-6</td>
</tr>
</tbody>
</table>

Total Credits 30

If the M.S. student chooses to complete a thesis, at least 6 credits in thesis research (NURS 600 or NURS 610) must be taken in conjunction with the thesis. The thesis must be accepted by the advisers and/or committee members, the head of the graduate program, and the Graduate School, and the student must pass a thesis defense. If the student chooses the non-thesis track, the students must submit a satisfactory scholarly paper while enrolled in NURS 596 (3 credits). If no thesis is required, at least 18 credits of course work must be in 500-level courses.

Doctor of Nursing Practice (D.N.P.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

Students may enter the program directly with a B.S.N. degree or following completion of a Master’s degree in nursing.

For the B.S.N. to the D.N.P., a core of master’s courses is required. A minimum of 61 credits, 1000 hours of practicum time, and a DNP project is required. The 61 credits include:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>NURS 501</td>
<td>Issues in Nursing and Health Care</td>
<td>3</td>
</tr>
<tr>
<td>NURS 510</td>
<td>Theoretical and Scientific Foundations of Advanced Nursing Practice</td>
<td>3</td>
</tr>
<tr>
<td>NURS 512</td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>

Nurse Administrator Option Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>NURS 846</td>
<td>Leadership Concepts and Theories for Nurse Administrators</td>
<td>3</td>
</tr>
<tr>
<td>NURS 848A</td>
<td>Synthesis and Application of the Nurse Administrator Role</td>
<td>4</td>
</tr>
</tbody>
</table>

D.N.P. Core Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>NURS 830</td>
<td>Evidence-Based Practice I: Theory and Research Methods</td>
<td>3</td>
</tr>
<tr>
<td>NURS 831</td>
<td>Evidence-Based Practice II: Translation of Research</td>
<td>3</td>
</tr>
<tr>
<td>NURS 832</td>
<td>Doctor of Nursing Practice: Leadership I</td>
<td>3</td>
</tr>
<tr>
<td>NURS 833</td>
<td>Doctor of Nursing Practice: Leadership II</td>
<td>3</td>
</tr>
</tbody>
</table>

Electives

8 credits of electives chosen from a list of approved elective courses maintained by the graduate program office

Culminating Experience

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>NURS 835</td>
<td>Doctor of Nursing Practice Project</td>
<td>6</td>
</tr>
</tbody>
</table>

Total Credits 61

The Master of Science in Nursing (M.S.N.) to D.N.P. program requires a minimum of 30 post-master’s degree credits completed at Penn State. The curriculum is individualized based on previous course work and number of practicum hours completed during the master’s program. A maximum of 550 practicum hours from the previous master’s program will be accepted to fulfill to 1000 hours of required practicum hours. The curriculum is composed of 5 components, for a minimum of 38 credits:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>NURS 510</td>
<td>Theoretical and Scientific Foundations of Advanced Nursing Practice</td>
<td>3</td>
</tr>
<tr>
<td>NURS 590</td>
<td>Colloquium</td>
<td>1</td>
</tr>
<tr>
<td>NURS 587</td>
<td>Ethics in Nursing Research</td>
<td>1</td>
</tr>
<tr>
<td>NURS 545</td>
<td>Healthcare Economics and Policy for Nurse Administrators</td>
<td>3</td>
</tr>
<tr>
<td>NURS 808</td>
<td>Population Health Perspectives</td>
<td>3</td>
</tr>
<tr>
<td>NURS 836</td>
<td>Healthcare Informatics</td>
<td>3</td>
</tr>
</tbody>
</table>

Electives

6 credits of electives chosen from a list of approved elective courses maintained by the graduate program office

Culminating Experience

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>NURS 835</td>
<td>Doctor of Nursing Practice Project</td>
<td>6</td>
</tr>
</tbody>
</table>

Total Credits 38

In addition to the minimum 38 credits, up to 8 credits of NURS 834 may be required for M.S.N. to D.N.P. students, depending on the number of practicum hours completed in the student’s M.S.N. program.

For both entry options, students are required to participate in 3 intensives offered at the University Park or Hershey Medical Center campus. For full-time students, the first intensive is August of semester I for M.S.N. to D.N.P. and Semester III for B.S.N. to D.N.P. students. Intensive 2 is the beginning of the subsequent semester, Intensive 3 is at the end...
of semester II for M.S.N. to D.N.P. and semester IV for B.S.N. to D.N.P. students.

In addition to course work, all students are required to complete a series of three benchmarks, Qualifying Examination, Comprehensive Examination, and a Final Oral Presentation.

**D.N.P. Doctoral Committee Composition**
The doctoral committee will consist of the student’s academic adviser, the DNP project course (NURS 835) instructor, and a third member of the Graduate Faculty, all from the graduate program in Nursing. The academic adviser will be the chair of the committee.

**Qualifying Examination**
All students must satisfactorily complete the qualifying examination, which is designed to evaluate the student’s past performance and potential for successfully completing the program. The qualifying examination typically occurs prior to the 2nd intensive, which follows completion of one semester of full-time study for the M.S.N. to D.N.P. student, and after three semesters of full-time study for the B.S.N. to D.N.P. student. Students who fail the examination on the first attempt may repeat it once. Students who fail the examination the second time are terminated from the program.

**Comprehensive Examination**
The comprehensive examination marks the student’s progression into their D.N.P. project. This occurs during the 3rd intensive, when students present their D.N.P. project proposal. The comprehensive examination needs to be successfully completed prior to the submission of the proposal for human subjects’ review or carrying out the project (if it does not require a review). Students who fail the examination on the first attempt may repeat it once. Students who fail the examination the second time are terminated from the program.

**Final Oral Presentation**
Upon completion of the project, the Final Oral Presentation is scheduled. Students are required to present the project for approval by their dissertation committee. The Associate Dean for Graduate Education & Research will sign off on the final paper, following completion of the paper during NURS 835 and the student’s passing of the oral presentation. Students who fail the presentation on the first attempt may repeat it once. The student’s final paper will be made publicly available through ScholarSphere (https://scholarsphere.psu.edu).

**Doctor of Philosophy (Ph.D.)**
Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

Students may enter the program directly with a B.S.N. degree (and may receive an M.S. degree en route to the Ph.D.) or a concurrent M.S.N. (nurse practitioner option) or following completion of a B.S.N. and a Master’s degree (either in Nursing or non-Nursing).

Students entering with an M.S.N. will complete a minimum of 43 credits. The curriculum is composed of 3 components:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>NURS 580</td>
<td>Epistemology of Nursing Science</td>
<td>3</td>
</tr>
<tr>
<td>NURS 582</td>
<td>Review and Analysis of the Literature for Nursing Science</td>
<td>4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>NURS 583</td>
<td>Advanced Seminar in Nursing Science</td>
<td>3</td>
</tr>
<tr>
<td>NURS 587</td>
<td>Ethics in Nursing Research</td>
<td>1</td>
</tr>
<tr>
<td>NURS 588</td>
<td>Healthcare Policy for Nurse and Healthcare Scholars</td>
<td>3</td>
</tr>
<tr>
<td>NURS 590</td>
<td>Colloquium</td>
<td>2</td>
</tr>
<tr>
<td>NURS 596</td>
<td>Individual Studies</td>
<td>3</td>
</tr>
</tbody>
</table>

1 Required of students who are not research assistants on an active faculty research study.

In addition to course work, all students are required to complete a series of examinations: the Qualifying Examination, the Comprehensive Examination (written and oral components), the Dissertation Proposal Defense, and Final Oral Examination. Students are required to pass the Final Oral Examination, have the dissertation approved and submitted, and graduate within five years of passing the qualifying examination.

**Qualifying Examination**
All students must satisfactorily complete the qualifying examination, which is designed to confirm the student's mastery of basic nursing theory and research methods. For students entering the doctoral program with a master’s degree, the qualifying examination must be taken at the end of the first year of full-time study or the equivalent. Students who fail the examination on the first attempt may repeat it once. Students who fail the examination the second time are terminated from the program.

**Comprehensive Examination**
The comprehensive examination is designed to test the student’s mastery of and ability to synthesize and integrate the theoretical basis for nursing science, advanced research methods, and the chosen specialty area. This examination is taken when a student has substantially completed all course work. Students who fail the examination on the first attempt may repeat it once. Students who fail the examination the second time are terminated from the program.

**Dissertation and Final Oral Examination (the Dissertation Defense)**
Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. Each student is required to conduct an original and independent research project which adds to nursing’s body of knowledge, and to communicate the research report in a written dissertation. A written dissertation proposal is required and must be approved at a proposal hearing by a majority vote of the student's dissertation committee. A majority vote is also required for approval of the completed written dissertation at the Final Oral Examination (the dissertation defense). The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

**Dual-Titles**

**Dual-Title Ph.D. in Nursing and Bioethics**
Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://
Nursing Ph.D. students may pursue additional training in bioethics through the dual-title Ph.D. program in Bioethics. Students must apply and be admitted to the graduate program in Nursing and the Graduate School before they can apply for admission to the dual-title degree program. Admission to the dual-title is determined upon review of all application materials (forwarded from the College of Nursing) by the admissions committee in Bioethics. Students must apply and be admitted to the dual-title degree program in Bioethics prior to taking the qualifying exam.

To qualify for the dual-title degree, students must satisfy the requirements of the Nursing Ph.D. program. In addition, they must satisfy the requirements described below, as established by the Bioethics program committee. Within this framework, final course selection is determined by the student, their Nursing adviser, and their Bioethics program adviser.

The dual-title Ph.D. in Nursing and Bioethics requires a minimum of 1 credit of course work beyond the requirements for the Ph.D. in Nursing (17 credits of the 18 Bioethics credits are part of the current degree requirements in Nursing), as follows:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOET 501</td>
<td>Perspectives and Methods in Bioethics</td>
<td>3</td>
</tr>
<tr>
<td>BIOET 502</td>
<td>Perspectives in Macro-Bioethics</td>
<td>3</td>
</tr>
<tr>
<td>BIOET 590</td>
<td>Bioethics Colloquium</td>
<td>1</td>
</tr>
<tr>
<td>At least 3 additional BIOET credits at the 500 level.</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

Electives
8 additional credits from a list of approved electives at the 400 or 500 level, at least two of these courses must be at the 500 level.

Total Credits 18

1 These credits can be applied to the Courses for Individual Specialty requirement for the Nursing Ph.D.

2 Many of the available electives that students may wish to take are 3-credit courses, so 9 additional credits may be a more typical number for most students. The list of elective courses will be maintained by the Director of the Bioethics Graduate Program in consultation with the Bioethics Program Committee. The Nursing Science core constitutes 7 of these elective credits.

Qualifying Examination
Students must meet the Ph.D. qualifying examination requirements specified by Nursing; a single qualifying examination will be administered that includes assessment of both Nursing and Bioethics. At least one member of the qualifying examination committee must have a Graduate Faculty appointment in Bioethics. Because students must first be admitted to a graduate major program of study before they may apply to and be considered for admission into a dual-title graduate degree program, dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

Comprehensive Examination
In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of a Nursing and Bioethics dual-title Ph.D. student must include at least one member of the Bioethics Graduate Faculty. Graduate faculty members who hold appointments in both programs may serve in a combined role. If the chair of the committee representing Nursing is not also a member of the Graduate Faculty in Bioethics, the member of the committee representing Bioethics must be appointed as co-chair. The faculty member (or members) affiliated with the Bioethics Program will be responsible for administering a portion of the comprehensive exam that will require the student to demonstrate an understanding of various theoretical and methodological approaches to bioethics, and an ability to apply them to issues and problems (including, where appropriate, practical problems) in their nursing.

**Dissertation and Final Oral Examination (the Dissertation Defense)**
Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. Students enrolled in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their dissertation committee and reflects their original research and expertise in Nursing and Bioethics. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

**Dual-Title Ph.D. in Nursing and Clinical and Translational Sciences**
Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

Nursing Ph.D. students may pursue additional training in CTS through the dual-title Ph.D. program in CTS. Students must apply and be admitted to the graduate program in Nursing and the Graduate School before they can apply for admission to the dual-title degree program. Admission to the dual-title is determined upon review of all application materials (forwarded from the College of Nursing) by the admissions committee in CTS. Students must apply and be admitted to the dual-title degree program in CTS prior to taking the qualifying exam.

To qualify for the dual-title degree, students must satisfy the requirements of the Nursing Ph.D. program. In addition, they must satisfy the requirements described below, as established by the CTS program committee. Within this framework, final course selection is determined by the student, their Nursing adviser, and their CTS program adviser.

The CTS dual-title requires 26 credits:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CTS 590</td>
<td>Colloquium</td>
<td>2</td>
</tr>
<tr>
<td>Select 6 credits from the following:</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>CTS 595A</td>
<td>Clinical Science Internship</td>
<td></td>
</tr>
<tr>
<td>CTS 595B</td>
<td>Translational Science Internship</td>
<td></td>
</tr>
<tr>
<td>BMS 571</td>
<td>Graduate Clinical Rotation</td>
<td></td>
</tr>
</tbody>
</table>

Electives
18 credits from a list of approved electives in each of the following areas (at least half of which must be at the 500 or 800 level):

- Statistics 3
- Epidemiology 3
- Bioinformatics 3
forms of student aid are described in the Tuition & Funding Graduate assistantships available to students in this program and other Student Aid and expertise in Nursing and CTS. The dissertation must be accepted by their dissertation committee and reflects their dissertation research and orally defend a dissertation on a topic that is approved in advance degree. Students enrolled in the dual-title program are required to write a final oral examination (the dissertation defense) to earn the Ph.D. Dissertation and Final Oral Examination (the Dissertation Defense) nursing.

Qualifying Examination

Students must meet the Ph.D. qualifying examination requirements specified by Nursing; a single qualifying examination will be administered that includes assessment of both Nursing and CTS. At least one member of the qualifying examination committee must have a Graduate Faculty appointment in CTS. Because students must first be admitted to a graduate major program of study before they may apply to and be considered for admission into a dual-title graduate degree program, dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

Comprehensive Examination

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of a Nursing and CTS dual-title Ph.D. student must include at least one member of the CTS Graduate Faculty. Graduate Faculty members who hold appointments in both programs may serve in a combined role. If the chair of the committee representing Nursing is not also a member of the Graduate Faculty in CTS, the member of the committee representing CTS must be appointed as co-chair. The faculty member (or members) affiliated with the CTS Program will be responsible for administering a portion of the comprehensive exam that will require the student to demonstrate an understanding of various theoretical and methodological approaches to CTS, and an ability to apply them to issues and problems (including, where appropriate, practical problems) in their nursing.

Dissertation and Final Oral Examination (the Dissertation Defense)

Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. Students enrolled in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their dissertation committee and reflects their dissertation research and expertise in Nursing and CTS. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School's website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

The following awards typically have been available to graduate students in this program:

U.S. Public Health Service Traineeships in Nursing

Open to selected registered nurse, full-time students in nursing; stipend may be available plus tuition. Apply to Associate Dean for Graduate Education & Research, College of Nursing.

World Campus students in graduate degree programs may be eligible for financial aid. Refer to the Tuition and Financial Aid section (http://www.worldcampus.psu.edu/tuition-and-financial-aid) of the World Campus website for more information.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact

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University Park Campus

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M.S.N. Director of Graduate Studies/Professor-in-Charge: Madeline Mattern

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Program Website: Nursing at University Park (http://www.nursing.psu.edu/graduate)

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Director of Graduate Studies/Professor-in-Charge: Kristen Altdoerffer

Primary Program Contact: Xiaohong Sheng

Email: xus1@psu.edu

Mailing Address: 203 Nursing Sciences Building, University Park, PA 16802

Telephone: (814) 863-2211

Program Website: Nursing at World Campus (http://www.nursing.psu.edu/graduate)
Nutritional Sciences

Graduate Program Head
Catharine Ross

Program Code
NUTR

Campus(es)
University Park (Ph.D., M.S.)
World Campus (M.P.S.)

Degrees Conferred
Doctor of Philosophy (Ph.D.)
Master of Science (M.S.)
Master of Professional Studies (M.P.S.)
Dual-Title Ph.D. in Nutritional Sciences and Clinical and Translational Science

The Graduate Faculty
View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=NUTR)

Graduates of the M.S. and Ph.D. programs are prepared for careers in basic and applied research in nutrition and in college teaching. The course of study is planned to meet the professional objectives of the individual student. Students may emphasize molecular and cellular nutritional sciences, nutritional biochemistry, applied human nutrition, applied animal nutrition, nutrition education, and nutrition in public health. Supporting courses are available in biochemistry, physiology, genetics, microbiology, biophysics, food science, health policy and administration, human development and family studies, anthropology, sociology, psychology, public health sciences, and statistics.

Current research emphasizes minerals, vitamin A, lipid metabolism, metabolic disorders, nutrition and behavior, nutrition education strategies, evaluation of dietary intake and nutritional status, nutrition policy and health promotion and disease prevention across the life cycle.

Facilities include well-equipped nutrition science laboratories with animal facilities supervised by a University laboratory animal resource staff. The Diet Assessment Center and the metabolic kitchens serve as laboratories for students in community nutrition, nutrition education, and metabolic nutrition.

The online professional master’s degree (M.P.S.) is designed for those seeking to become registered dietitians, for those already registered and interested in enhancing their careers, and for those interested in pursuing a career with a focus in Nutritional Sciences. Graduates of the program may expect to become leaders on the health care team and other practice teams, and share their knowledge and expertise with other health care professionals and colleagues. Graduates will be positioned for career success and will be innovators in today’s dynamic health and wellness sector.

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Master of Professional Studies (M.P.S.)
Scores from the Graduate Record Examinations (GRE), or from the Medical College Admission Test (MCAT), are required for admission. At the discretion of the graduate program, the GRE or other test scores may be waived for an individual on a case-by-case basis.

College graduates with an undergraduate degree in nutrition, dietetics, public health or related health sciences will be considered for admission. Applicants should have a minimum grade-point average of 3.00 (on a 4.00 scale), an acceptable score on the GRE (an average quantitative, verbal, and analytical score above the fiftieth percentile), and three supporting recommendations. Exceptions may be made for students with special backgrounds, abilities, and interests at the discretion of the program. When openings are limited, the best-qualified candidates are given priority.

The basic expectations for admission from undergraduate studies include:

- 3 credits in physiology,
- 3 credits in biochemistry,
- 3 credits in organic chemistry,
- 3 credits in introductory nutrition (equivalent to or more advanced than NUTR 251 at Penn State), and
- 3 credits in advanced nutrition.

If these courses were taken more than 10 years prior to application, they may be accepted at the Programs Director’s discretion. Students can be provisionally admitted (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/provisional-admission) to the program without these basic expectations, but they must complete all identified deficiencies with a 3.00 grade-point average or above on a 4.00 scale within the first two semesters after acceptance, prior to beginning graduate course work.

Master of Science (M.S.) and Doctor of Philosophy (Ph.D.)

Scores from the Graduate Record Examinations (GRE), or from the Medical College Admission Test (MCAT), are required for admission. At the discretion of the graduate program, the GRE or other test scores may be waived for an individual on a case-by-case basis.

College graduates with an undergraduate degree in nutrition, animal sciences, food science, dietetics, or a related biological or social science will be considered for admission. Applicants should have a minimum grade-point average of 3.00 (on a 4.00 scale), an acceptable score on the GRE (an average quantitative and verbal score above the fiftieth percentile), and three supporting recommendations. Exceptions may be made at the discretion of the program for students with special backgrounds, abilities, and interests. When openings are limited, the best-qualified candidates are given priority.

The basic expectations for admission from undergraduate studies include: 6 credits in chemistry (organic and inorganic); 3 credits each in physiology, biochemistry, and nutrition; and physics, calculus, and analytical chemistry for some research areas in nutrition science, and social science for public health and community nutrition. Students with more than 8 credits of deficiency and a superior record may be provisionally admitted (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/provisional-admission) to the graduate degree program. The deficiencies identified must be made up with a 3.00 grade-point average or better within the first two semesters.
**Degree Requirements**

**Master of Professional Studies (M.P.S.)**

Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

The program can be completed on a full-time basis in 24 months or students may elect to complete the program on a part-time basis. Requirements for the completion of the Master of Professional Studies in Nutritional Sciences degree include 30 credits at the 500 and 800 level, with a minimum of 6 credits of 500-level course work. There are 28 credits required in the following core courses:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>NUTR 805</td>
<td>Advanced Nutrient Metabolism</td>
<td>4</td>
</tr>
<tr>
<td>NUTR 540</td>
<td>Research Methods</td>
<td>3</td>
</tr>
<tr>
<td>NUTR 801</td>
<td>Leadership in the Nutrition Profession</td>
<td>1</td>
</tr>
<tr>
<td>NUTR 810</td>
<td>Nutritional Assessment and Diagnosis</td>
<td>3</td>
</tr>
<tr>
<td>NUTR 820</td>
<td>Advanced Clinical Nutrition</td>
<td>3</td>
</tr>
<tr>
<td>NUTR 830</td>
<td>Advanced Nutrition and Health Program Planning</td>
<td>3</td>
</tr>
<tr>
<td>NUTR 840</td>
<td>Advanced Nutrition Counseling</td>
<td>3</td>
</tr>
<tr>
<td>NUTR 850</td>
<td>Leadership Concepts and Application for the Nutrition Professional</td>
<td>3</td>
</tr>
</tbody>
</table>

**Electives**

Elective credits may be chosen from a list of approved electives maintained by the program office.

**Culminating Experience**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>NUTR 860</td>
<td>Capstone Project in Nutritional Sciences</td>
<td>2-5</td>
</tr>
</tbody>
</table>

All students must enroll in NUTR 860 and successfully complete the Capstone Project in order to earn the M.P.S. degree. Depending on the nature of the proposed Capstone Project, the program will approve between 2 and 5 credits of NUTR 860 to count towards the degree requirements. Elective credits may be chosen from a list of approved electives maintained by the program office.

**Master of Science (M.S.)**

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

The graduate program in Nutritional Sciences offers the M.S. degree with an emphasis in basic nutritional sciences, applied human nutrition, or nutrition in public health. The M.S. degree requires a minimum of 30 credits of course work at the 400, 500, 600, or 800 level, including at least 12 credits in 500-level courses and 6 credits in thesis research (NUTR 600 or NUTR 610).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>NUTR 501</td>
<td>Regulation of Nutrient Metabolism I</td>
<td>4</td>
</tr>
<tr>
<td>NUTR 502</td>
<td>Regulation of Nutrient Metabolism II</td>
<td>3</td>
</tr>
<tr>
<td>NUTR 520</td>
<td>Readings in Nutrition</td>
<td>2</td>
</tr>
<tr>
<td>NUTR 551</td>
<td>Seminar in Nutrition</td>
<td>1</td>
</tr>
</tbody>
</table>

**Electives**

Elective credits may be chosen from a list of approved electives maintained by the program office.

**Doctor of Philosophy (Ph.D.)**

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

The Ph.D. requires a minimum of 25 credits of course work at the 400, 500, 600, or 800 level, including 13 credits in the following core required courses:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>NUTR 501</td>
<td>Regulation of Nutrient Metabolism I</td>
<td>4</td>
</tr>
<tr>
<td>NUTR 502</td>
<td>Regulation of Nutrient Metabolism II</td>
<td>3</td>
</tr>
<tr>
<td>NUTR 520</td>
<td>Readings in Nutrition</td>
<td>1</td>
</tr>
<tr>
<td>NUTR 551</td>
<td>Seminar in Nutrition</td>
<td>1</td>
</tr>
</tbody>
</table>

**Electives**

12 elective credits chosen in consultation with advisers and doctoral committee, from a list of approved electives maintained by the program office.
and Translational Sciences Bulletin page

admissions requirements of the Clinical and Translational Sciences dual-title program, students must apply for admission to and meet the requirements for admission to the dual-title degree program. After admission to their home department.

English Competence
Written and oral English competency will be determined by the qualifying examination committee and remediation assigned, if necessary. Competence must be formally attested by the program before the doctoral student’s comprehensive examination is scheduled.

Dual-Titles

Dual-Title Ph.D. Degree in Nutritional Sciences and Clinical and Translational Sciences

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-208/dual-title-graduate-degree-programs). This dual-title degree program emphasizes interdisciplinary scholarship at the interface of basic sciences, clinical sciences, and human health. Students in the dual-title program are required to have two advisers from separate disciplines: one individual serving as the primary adviser in the Graduate Program in Nutritional Sciences and another individual serving as the secondary adviser in an area covered by the dual-title program who is a member of the Clinical and Translational Sciences faculty.

Doctoral students with research and educational interests in clinical and translational science may apply for the Dual-Title Ph.D. Degree in Nutritional Sciences and Clinical and Translational Sciences following admission to the Graduate School and Nutritional Sciences and prior to taking the qualifying examination in Nutritional Sciences. An admissions committee comprised of faculty affiliated with the dual-title program will evaluate applicants. Applicants must have a graduate GPA of at least 3.5 in a research area related to human health. Prospective dual-title program students will write a statement of purpose that addresses the ways in which their research and professional goals will be enhanced by an interdisciplinary course of study in clinical and translational sciences.

Students must apply and be admitted to the graduate program in Nutritional Sciences and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Clinical and Translational Sciences dual-title program. Refer to the Admission Requirements section of the Clinical and Translational Sciences Bulletin page (p. 172). Doctoral students must be admitted into the dual-title degree program in Clinical and Translational Sciences prior to taking the qualifying examination in their home department.

To qualify for the dual-title degree, students must satisfy the degree requirements for the Ph.D. in Nutritional Sciences. In addition, students pursuing the dual-title Ph.D. in Nutritional Sciences and Clinical and Translational Sciences must complete the degree requirements for the dual-title Ph.D. in Clinical and Translational Sciences, listed on the Clinical and Translational Sciences Bulletin page (p. 172). Approximately 12 credits of course work required for the CTS dual-title may also be counted as required elective courses for the Ph.D. in Nutritional Sciences.

The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Nutritional Sciences and must include at least one Graduate Faculty member from the Clinical and Translational Sciences program. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. There will be a single qualifying examination, containing elements of both Nutritional Sciences and Clinical and Translational Sciences. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of a Nutritional Sciences and Clinical and Translational Sciences dual-title Ph.D. student must include at least one member of the Clinical and Translational Sciences Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in Clinical and Translational Sciences, the member of the committee representing Clinical and Translational Sciences must be appointed as co-chair. The Clinical and Translational Sciences representative on the student’s dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their dissertation committee and reflects their original research and education in Nutritional Sciences and Clinical and Translational Sciences. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

Graduate assistantships are only available for students in the M.S. and Ph.D. degree programs.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.
Learning Outcomes

Master of Science (M.S.)
1. **Know:** Students will demonstrate knowledge of the basic principles of nutrition science and an understanding of the primary literature both in basic and applied areas of research. The core demonstration will include comprehension of current knowledge in the field and an understanding of study design, methods, results, and significance and the application of this comprehension/understanding to problems in biology, biochemistry, medicine, and public health.

2. **Apply/Create:** Students will be able to synthesize the research findings in their specialty area and generate ideas for a novel research project; they will be able to articulate the rationale for the proposed novel research project and clearly describe a specific hypothesis to be tested; they will demonstrate the ability to use best-practices in the field of nutrition science to design a research study to test this hypothesis and carry it to completion.

3. **Communicate:** Students will be able to convey ideas or arguments in clear, concise, well-organized papers and proposals as well as in formal, oral presentations.

4. **Critical thinking:** Students will master the ability to critique the primary nutrition science literature. This will be demonstrated by the student’s ability to identify the research question, experimental design and conclusions in a scientific article in the field; they will also be able to apply their knowledge of statistics and experimental design to critique methodology and conclusions in a scientific article in the field.

5. **Professional practice:** Students will demonstrate knowledge and comprehension of research ethics issues which are relevant to the field of nutrition science including working with animal and human populations, ethical principles related to authorship, plagiarism, and conflicts of interest. They will also contribute to the profession through service.

Doctor of Philosophy (Ph.D.)

1. **Know:** Students will demonstrate knowledge of the basic principles of nutrition science and an understanding of the primary literature both in basic and applied areas of research. The core demonstration will include comprehension of current knowledge in the field and an understanding of study design, methods, results, and significance and the application of this comprehension/understanding to problems in biology, biochemistry, medicine, and public health.

2. **Apply/Create:** Students will be able to synthesize the research findings in their specialty area and generate ideas for a novel research project; they will be able to articulate the rationale for the proposed novel research project and clearly describe a specific hypothesis to be tested; they will demonstrate the ability to use best-practices in the field of nutrition science to design a research study to test this hypothesis and carry it to completion.

3. **Communicate:** Students will be able to convey ideas or arguments in clear, concise, well-organized papers and proposals as well as in formal, oral presentations.

4. **Critical thinking:** Students will master the ability to critique the primary nutrition science literature. This will be demonstrated by the student’s ability to identify the research question, experimental design and conclusions in a scientific article in the field; they will also be able to apply their knowledge of statistics and experimental design to critique methodology and conclusions in a scientific article in the field.

5. **Professional practice:** Students will demonstrate knowledge and comprehension of research ethics issues which are relevant to the field of nutrition science including working with animal and human populations, ethical principles related to authorship, plagiarism, and conflicts of interest. They will also contribute to the profession through service.

Contact

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World Campus
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Email: tjb17@psu.edu
Mailing Address: University Park, PA 16802-610
Telephone: (814) 865-3448
Program Website: Nutritional Sciences at World Campus (http://nutrition.hhdev.psu.edu/graduate)

Operations Research

Graduate Program Head: Jose A. Ventura
Campus(es): University Park
Degrees Conferred: Dual-Title
The Graduate Faculty
View (http://gs/faculty/facultylist.cfm?program=141)

Students electing this option through participating programs earn a degree with a dual-title at both the Ph.D. and the M.S., M.A., or M.Eng. levels, i.e., Ph.D. in (graduate program name) and Operations Research, or M.S., M.A., or M.Eng. in (graduate program name) and Operations Research.

The following graduate programs offer dual-title degrees in Operations Research:

- Agricultural and Biological Engineering
- Animal Science
- Business Administration
- Chemical Engineering
• Civil Engineering
• Computer Science and Engineering
• Economics
• Electrical Engineering
• Energy, Environmental, and Food Economics
• Energy and Mineral Engineering
• Entomology
• Forest Resources
• Geography
• Geosciences
• Hospitality Management
• Industrial Engineering
• Mathematics
• Statistics
• Workforce Education and Development

The Operations Research dual-title degree program is administered by an Operations Research committee, which is responsible for management of the program. The committee maintains program definition, identifies faculty and courses appropriate to the option, and recommends policy and procedures for its operation to the dean of the Graduate School. This dual-title degree program is offered by graduate major programs in eight colleges. The dual-title program enables students from diverse graduate programs to attain and be identified with the tools, techniques, and methodology of operations research, while maintaining a close association with areas of application. Operations research is the analysis--usually involving mathematical treatment--of a process, problem, or operation to determine its purpose and effectiveness and to gain maximum efficiency.

Admission Requirements
Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

Students must apply and be admitted to one of the approved graduate programs and The Graduate School before they can apply for admission to the dual-title degree program.

For the M.S., M.A., M.Eng. dual-title degree in Operations Research, in addition to those prescribed by the graduate major program, prerequisites for acceptance to the program without deficiency include the following or their equivalent:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 140</td>
<td>Calculus With Analytic Geometry I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 141</td>
<td>Calculus With Analytic Geometry II</td>
<td>4</td>
</tr>
<tr>
<td>MATH 220</td>
<td>Matrices</td>
<td>2-3</td>
</tr>
<tr>
<td>CMPSC 101</td>
<td>Introduction to C++ Programming</td>
<td>3</td>
</tr>
</tbody>
</table>

For the Ph.D. dual-title degree in Operations Research, in addition to those prescribed by the graduate major program, prerequisites for acceptance to the program without deficiency include the following or their equivalent:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 401</td>
<td>Introduction to Analysis I</td>
<td>3</td>
</tr>
<tr>
<td>MATH 436</td>
<td>Linear Algebra</td>
<td>3</td>
</tr>
<tr>
<td>CMPSC 101</td>
<td>Introduction to C++ Programming</td>
<td>3</td>
</tr>
<tr>
<td>3 credits of probability and statistics</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

Doctoral students must apply and be admitted to the Operations Research dual-title program prior to taking the qualifying exam.

Degree Requirements
Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

To qualify for a dual-title degree, students must satisfy the requirements of the graduate major programs in which they are enrolled, in addition to the minimum requirements, or their equivalent, in the Operations Research program. Students must enroll in OR 590 for at least 1 credit in each year enrolled in the program and in residence.

Master’s Degrees
For the M.S. or M.A. dual-title degree in Operations Research, the minimum requirements are:

• 6 credits in stochastic/statistical methods, including a minimum of 3 credits in each of the areas of statistical methods and stochastic processes;
• 6 credits in optimization, including a minimum of 3 credits in linear programming;
• 3 credits in computational methods; and
• 3 credits in applications/specialization. (Application courses are those that involve problem solving through the use of decision methods.)

A minimum of 9 credits must be in the 500 series. Particular courses may satisfy both the graduate major program requirements and those in the Operations Research program. A list of courses that will satisfy these requirements is maintained by the graduate program office.

A thesis may be required by the graduate major program, the supervisor of which must be a member of the Graduate Faculty recommended by the chair of the program granting the degree and approved by the Operations Research committee as qualified to supervise thesis work in operations research. If the graduate major program has an approved non-thesis track for the M.A./M.S. degree, a scholarly paper may be written in lieu of a thesis. All M.Eng. students and M.A./M.S. students who choose to submit a scholarly paper instead of a thesis must take an additional 6 credits in the Operations Research program. It is the prerogative of the graduate major program to assign these credits to one or more of the following categories: stochastic/statistical methods, optimization, computational methods, or applications.

Doctoral Degrees
The minimum requirements for the Ph.D. dual-title degree in Operations Research are:

• 9 credits in stochastic/statistical methods, including a minimum of 3 credits in each of the areas of statistical methods and stochastic processes;
• 9 credits in optimization, including a minimum of 3 credits in linear programming;
• 6 credits in computational methods, including a minimum of 3 credits in simulation; and
• 12 credits in applications/specialization.

A minimum of 18 credits must be in the 500 series, and particular courses may satisfy both the graduate major program requirements and those in the Operations Research program.

The qualifying examination committee for the dual-title Ph.D. degree must include at least one Graduate Faculty member from the Operations Research program. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. There will be a single qualifying examination, containing elements of both the primary graduate degree program and Operations Research. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the chair and at least two members of the dissertation committee of an Operations Research dual-title Ph.D. student must be members of the Operations Research Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. The Operations Research representatives on the student’s dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their dissertation committee and reflects their original research and education in both their primary graduate program and Operations Research. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

Minor Requirements
Requirements listed here are in addition to requirements for minors in Graduate Council policies listed under GCAC-600 Research Degree Requirements (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/research-degree-requirements) and GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies/gcac-700/professional-degree-requirements).

A Ph.D. minor program in Operations Research is available for doctoral students who find it advantageous to include advanced quantitative methods of systems analysis in their programs of study and have been approved to do so by their dissertation committees. To qualify for a minor in Operations Research, students must satisfy the requirements of their graduate major programs, meet the same admissions prerequisites as the M.S. dual-title degree students, and meet the following minimum degree requirements: 6 credits in stochastic/statistical methods, including a minimum of 3 credits in each of the areas of statistical methods and stochastic processes; 6 credits in optimization; and 3 credits in computational methods. A minimum of 6 credits must be taken at the 500 level.

Official requests to add the minor to a doctoral student’s academic record must be submitted to Graduate Enrollment Services prior to establishment of the dissertation committee and prior to scheduling the comprehensive examination. At least one Graduate Faculty member from Operations Research must serve on the candidate’s dissertation committee.

Student Aid
Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/credit-loads-graduate-assistants) set by The Graduate School.

Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact
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Mailing Address: 356 Leonhard Building, University Park, PA 16802
Telephone: (814) 865-3841
Program Website: Operations Research (http://www.or.psu.edu)

Organization Development and Change

Graduate Program Head Roy Clariana
Program Code ODC
Campus(es) World Campus (M.P.S.)
Degrees Conferred Master of Professional Studies (M.P.S.)
The Graduate Faculty View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=ODC)

The MPS in Organization Development and Change (MPS-OD&C) is an online program of study designed for professionals working primarily in organization change and workforce development related careers.

The program will highlight the changing nature of the field of Organization Development, including the impact of the globalization of private and public organizations and the growing importance of organization change and development in the workforce. It will culminate in a field-based project course in which students will demonstrate their understanding of the curriculum and apply it to their professional areas of interest. Students will be expected to complete an organization development-related project and are encouraged to solicit project ideas from a work-
related environment to ensure that the problems or opportunities they identify are grounded in the reality of organization development. Upon completion of the MPS-OD&C degree, students will be equipped to work as professionals in corporate development, talent management, workforce development, performance improvement, training and development, and with private employers, government agencies, and non-profit organizations.

**Admission Requirements**

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Applicants to the MPS-OD&C must submit the following materials:

- Penn State Graduate School application form (http://gradschool.psu.edu/prospective-students/how-to-apply) and nonrefundable application fee
- World Campus program application
- A statement of career and educational goals including documentation of a minimum of two years of related full-time work. The statement should be an essay (2-3 pages in length) that demonstrates the applicant’s written communication skills. A resume should be attached as a supplement.
- Three letters of recommendation that attest to the applicant’s readiness for graduate study and that he or she has the requisite minimum of two years of work experience
- Official transcripts from all post-secondary institutions attended (http://www.gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission)
- TOEFL score, if applicable

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. See GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

Admissions decisions for the program are based on the quality of the applicant's credentials. The decisions are based on a review of the complete application portfolio. During the admission process, students who appear to be better suited for another graduate level program will be encouraged to apply to the appropriate program. Graduate Record Examination (GRE) scores are not required.

**Degree Requirements**

**Master of Professional Studies (M.P.S.)**

Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

The MPS in OD&C is conferred upon students who earn a minimum of 33 credits of course work while maintaining a grade-point average of 3.0 or better in all course work, including at least 18 credits at the 500-level or above (with at least 6 credits at the 500-level), and who complete a quality culminating field-based project course in consultation with a graduate adviser. The program curriculum includes:

- nine prescribed courses (27 credits), which provide a strategic body of knowledge in assessment, diagnosis, feedback, and marketing of organization development, process consultation, appreciative inquiry, and facilitation of groups and teams;
- one elective course (3 credit hours) designed to allow students to develop additional expertise in related areas of professional interest and in consultation with their graduate advisers; and
- one required field-based project course (3 credit hours), which provides a culminating experience for students to demonstrate their knowledge, understanding, theoretical framework, and practical application of Organization Development and Change, building upon their knowledge acquired from the curriculum.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>WFED 572</td>
<td>Foundations in Organization Development and Change</td>
<td>3</td>
</tr>
<tr>
<td>TRDEV 555</td>
<td>Implementing Training and Development Programs</td>
<td>3</td>
</tr>
<tr>
<td>WFED 582</td>
<td>Assessing Data: Organizational Diagnosis</td>
<td>3</td>
</tr>
<tr>
<td>WFED 578</td>
<td>Process Consultation in Organization Development</td>
<td>3</td>
</tr>
<tr>
<td>WFED 884</td>
<td>Appreciative Inquiry</td>
<td>3</td>
</tr>
<tr>
<td>WFED 585</td>
<td>Appraising Organization Change and Development Consulting</td>
<td>3</td>
</tr>
<tr>
<td>WFED 881</td>
<td>Marketing Organization Development</td>
<td>3</td>
</tr>
<tr>
<td>WFED 880</td>
<td>Facilitating Groups and Teams</td>
<td>3</td>
</tr>
<tr>
<td>WFED 405</td>
<td>Project Management for Professionals</td>
<td>3</td>
</tr>
</tbody>
</table>

**Electives**

Select one elective course

**Culminating Experience**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>WFED 595A</td>
<td>Field Based Project for Workforce Development Professionals</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits: 33

¹ Substitutions for the prescribed courses, either with resident-instruction courses, alternate online courses, or courses from other institutions, will be considered on a case-by-case basis, and must be petitioned and approved by the Program Chair, with input from the student’s graduate adviser.

² Elective courses can be taken at any time during degree progression. Students will need to obtain prior approval from their academic adviser before taking any 400- or 500-level graduate courses to fulfill the elective requirements. Students may also be able to transfer credits into the program, in consultation with their academic adviser and subject to restrictions outlined in GCAC-309 Transfer Credit (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/transfer-credit). An extensive variety of elective courses are available; the most current list is maintained by the program office.

³ Students will take WFED 595A and complete an organization development and change related capstone project as a culminating experience.

**Student Aid**

World Campus students in graduate degree programs may be eligible for financial aid. Refer to the Tuition and Financial Aid section (http://www.worldcampus.psu.edu/tuition-and-financial-aid) of the World Campus website for more information.
Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Learning Outcomes

1. KNOW. Graduates will be able to obtain a critical knowledge base in organization development, appreciate inquiry, and change.
2. APPLY. Graduates will be able to use various resources for developing, implementing, evaluating, and marketing organization development programs.
3. COMMUNICATE. Graduates will be able to observe group dynamics, facilitate change efforts, and communicate professional organization development knowledge in written and oral presentation formats in a manner appropriate to the audience.
4. CRITICAL THINKING. Graduates will be able to become an effective organization development practitioner through critical thinking and hands-on experience.
5. PROFESSIONAL PRACTICE. Graduates will be able to address ethical issues in practicing organization development activities, including engagement in professional service to the profession.
6. TEAMWORK. Graduates will be able to observe group dynamics and strategically lead and facilitate both small group and large group change initiatives.

Contact

Graduate Program Head: Roy Clariana
Director of Graduate Studies/Professor-in-Charge: Mark Threeton
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Telephone: (814) 865-0473

Program Website: Organizational Development and Change (http://www.worldcampus.psu.edu/degrees-and-certificates/organization-development-change-masters/overview)

Pathobiology

Graduate Program Head
Gary Perdew
PATHB

Program Code
University Park (Ph.D., M.S.)

Degrees Conferred
Doctor of Philosophy (Ph.D.)
Master of Science (M.S.)
Dual-Title Ph.D. in Pathobiology and Clinical and Translational Sciences

The Graduate Faculty

The graduate program in Pathobiology is designed to provide flexibility in graduate work while providing opportunities to study immunology, microbiology, nutrition, biochemistry, virology, veterinary pathology, physiology, or toxicology, usually as related to problems seen in human, domestic animal, and wildlife health.

Graduate instruction is directed by Graduate Faculty members from the Department of Veterinary Science and related units with research interests in animal science, biochemistry, biology, biophysics, immunology, nutrition, physiology, zoology, and others.

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Scores from the Graduate Record Examinations (GRE), or from a comparable substitute examination accepted by the Pathobiology graduate program, are required for admission. At the discretion of Pathobiology, a student may be admitted for graduate study in a program without these scores.

Applicants with a 3.0 or better grade-point average (on a 4.00 scale) in undergraduate science courses and appropriate course backgrounds will be considered for admission. Applicants should have a baccalaureate degree in a biological science-related field, or a degree as a graduate veterinarian or equivalent. Undergraduate preparation should include biology, chemistry, physics, mathematics through calculus, and preferably biostatistics and biochemistry.

Degree Requirements

Master of Science (M.S.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

After a student has been admitted to graduate study in the department, an adviser will be appointed by the program director. This person may be a member of the eventual M.S. committee or someone else assigned the responsibility for directing the student’s scheduling of course work.

A minimum of 30 credits of coursework at the 400, 500, 600, and 800 levels is required for the M.S. degree, of which at least 18 credits must be taken in 500- and 600-level courses.

Satisfactory completion of the following courses or their equivalent is required of all M.S. degree candidates:

- Statistics, 3 credits;
- Biochemistry or molecular and cell biology, 3 credits (usually chosen from BMB 400 and BMBB 501)
- VBSC 520

All Pathobiology students are required to complete one semester of VBSC 590 each year as well as 8 elective credits from a list of courses that is maintained by the Pathobiology program office.

Pathobiology requires no program-specific qualifying examinations, and there is no communication/language requirement for the M.S.
A thesis is required of all candidates for the M.S. degree, including 6 credits of VBSC 600.

**Doctor of Philosophy (Ph.D.)**

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

The Ph.D. program is designed for completion in three to four academic years. Doctoral students usually complete certain required courses and obtain laboratory experience before selecting an area of specialization and completing an original research problem, including the defense of the Ph.D. dissertation.

After a student has been admitted to graduate study in the department, an adviser will be appointed by the program director. The person may be a member of the eventual dissertation committee or someone else designated the responsibility for directing the student’s scheduling of course work. The adviser is also responsible for initiating the scheduling of the qualifying examination.

The doctor of philosophy degree places a strong emphasis on research. It is conferred in recognition of the capacity to carry out independent research and the attainment of a high level of scholarship. General requirements for the doctorate specify:

- a minimum period of residence (two semesters, excluding summer sessions, within a 12-month period),
- the passing of a qualifying examination,
- comprehensive and final oral examinations, and
- the writing of a satisfactory dissertation.

The particular combination of courses, seminars, individual study, and research that constitutes an individual student’s program is arranged by the dissertation committee and should include the courses that have been designated in the Pathobiology graduate curriculum.

The Pathobiology graduate program requires a total of 21 credits of course work at the 400, 500, 600, and 800 level for the Ph.D. degree. A minimum grade-point average of 3.00 for work done at the University is required.

There are formal communications requirements for the Ph.D. degree in Pathobiology that are required by Graduate Council. The dissertation committee will assess the technical writing and oral communication skills of the candidate and may require that formal course work or other means to improve these skills be undertaken.

The graduate program in Pathobiology requires that each graduate student have 3 credits in statistics. Ph.D. students in Pathobiology additionally are expected to have statistical skills equivalent to those learned in STAT 501 and STAT 502. In addition, the qualifying examination committee and the dissertation committee may require that additional course work in statistics be taken if deficiencies are noted.

A qualifying examination is given to students in the Ph.D. program after they complete at least 18 credits of post-baccalaureate course work.

After passing the qualifying examination, each doctoral student is guided by a dissertation committee that meets all Graduate Council requirements (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation).

**Dual-Titles**

**Dual-Title Ph.D. in Pathobiology and Clinical and Translational Sciences**

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

Doctoral students with research and educational interests in clinical and translational science may apply for the Dual-Title Ph.D. Degree in Pathobiology and Clinical and Translational Sciences (CTS) following admission to the Graduate School and Pathobiology and prior to taking the qualifying examination in Pathobiology. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the CTS dual-title program. Refer to the Admission Requirements section of the CTS Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/clinical-translational-sciences).

This dual-title degree program emphasizes interdisciplinary scholarship at the interface of basic sciences, clinical sciences and human health. Students in the dual-title program are required to have two advisers from separate disciplines: one individual serving as the primary mentor in the graduate program in Pathobiology and another individual serving as the secondary mentor in an area covered by the dual-title program who is a member of the CTS faculty.

To qualify for the dual-title degree, students must satisfy the degree requirements for the degree they are enrolled in Pathobiology. In addition, students must complete the degree requirements for the dual-title in CTS, listed on the CTS Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/clinical-translational-sciences). Up to 6 credits of course work may be double-counted as elective courses to meet the requirements for the Ph.D. in Pathobiology.

For students in the dual-title program, the qualifying examination will include content from both the Graduate Program in Pathobiology and the CTS programs and will be completed with the other Pathobiology students in the third semester. The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Pathobiology and must include at least one Graduate Faculty member from the CTS program. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. There will be a single qualifying examination, containing elements of both Pathobiology and CTS. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of a Pathobiology and CTS dual-title Ph.D. student must include at least one member of the CTS Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in CTS, the member of the committee representing CTS must be appointed as co-chair. The CTS representative on the student’s dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.
Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their dissertation committee and reflects their original research and education in Pathobiology and CTS. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

**Student Aid**

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School's website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

**Courses**

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**Learning Outcomes**

**Master of Science (M.S.)**

1. **Know.** Graduates will demonstrate specific mastery of core concepts related to molecular mechanisms of disease in humans and animals, as well as evidence-based decision making in general.
2. **Research.** Graduates will demonstrate ability to create and execute a research plan aimed at understanding disease mechanisms and/or developing disease detection and diagnosis strategies.
3. **Communicate.** Graduates will demonstrate ability to effectively communicate scientific ideas, proposals, and research findings using both written and oral formats.
4. **Analyze.** Graduates will demonstrate ability to critically analyze and assess scientific ideas and results related to the area of human/animal disease research.
5. **Practice ethically.** Graduates will demonstrate knowledge and understanding of core ethical values and right conduct in research, and maintain the highest ethical standards in their own research.

**Doctor of Philosophy (Ph.D.)**

1. **Know.** Graduates will demonstrate specific mastery of core concepts related to molecular mechanisms of disease in humans and animals, as well as evidence-based decision making in general.
2. **Research.** Graduates will demonstrate ability to identify a knowledge gap based on reading and understanding the current scientific literature, to create a research plan that addresses the gap in knowledge, and to execute that research plan so that the result is a meaningful contribution to the understanding of disease mechanisms.
3. **Communicate.** Graduates will demonstrate ability to effectively communicate scientific ideas, proposals, and research findings using both written and oral formats.
4. **Analyze.** Graduates will demonstrate ability to critically analyze and assess scientific ideas and results related to the area of human/animal disease research.
5. **Practice ethically.** Graduates will demonstrate knowledge and understanding of core ethical values and right conduct in research, and maintain the highest ethical standards in their own research.

**Contact**

**Graduate Program Head:** Gary Perdew

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**Primary Program Contact:** Margaret Weber

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**Mailing Address:** 115 Henning Building, University Park, PA 16802

**Telephone:** (814) 863-5786

**Program Website:** Pathobiology (http://vbs.psu.edu/graduateprograms/pathobiology)

**Philosophy**

**Graduate Program Head**

- Amy Allen

**Program Code**

- PHIL

**Campus(es)**

- University Park (Ph.D., M.A.)
- Doctor of Philosophy (Ph.D.)
- Master of Arts (M.A.)
- Dual-title Ph.D. in Philosophy and African American and Diaspora Studies
- Dual-title Ph.D. in Philosophy and Classics and Ancient Mediterranean Studies
- Dual-title Ph.D. and M.A. in Philosophy and Women’s Studies

**The Graduate Faculty**

- View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=PHIL)

Graduate education in the Penn State Department of Philosophy coordinates our longstanding strength in Continental philosophy with our emerging specialties in feminist philosophy and critical philosophy of race. The graduate program’s signature style of pursuing these strengths involves engagement with and reflection on the history of philosophy. It also integrates our strengths with the study of ethics richly informed by a historical approach. We understand Continental philosophy, feminist philosophy, and critical philosophy of race necessarily draw from multiple traditions, including analytic and American as well as Continental philosophy. Likewise, the field of ethics draws on multiple traditions, and the history of philosophy can be and is pursued by means of different problematics and diverse philosophical traditions. Graduate students are trained in multiple traditions, helping produce a new generation of diverse students who are philosophically “multilingual.”
Interdisciplinary study is also possible across the humanities, the social sciences, the arts, the natural sciences, and interdisciplinary programs such as Women’s Studies and African American Studies. Doctoral minors are available in social thought and in literary theory, criticism, and aesthetics. Study abroad is possible as well, through exchange programs or individual arrangements with leading departments of philosophy.

**Admission Requirements**

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Scores from the Graduate Record Examinations (GRE), or from a comparable substitute examination accepted by the Philosophy graduate program, are required for admission. At the discretion of the graduate program, a student may be admitted provisionally (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/provisional-admission) for graduate study without these scores.

Undergraduate preparation in Philosophy is advisable.

Students with a 3.00 junior/senior grade-point average (on a 4.00 scale) and with appropriate course backgrounds will be considered for admission. The best-qualified applicants will be accepted up to the number of spaces that are available for new students. Exceptions to the minimum 3.00 GPA may be made for students with special backgrounds, abilities, and interests at the discretion of the program.

**Degree Requirements**

**Master of Arts (M.A.)**

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

Students receive an M.A. degree as a part of their work for the Ph.D. The M.A. is awarded after successful completion of the qualifying exam, part of which serves as the master’s scholarly paper, and after acquiring the minimum 30 credits of courses.

Students awarded an M.A. will have met the following requirements:

1. A minimum of 30 credits including at least 18 credits in 500-level courses.
   a. At least 18 credits must be in Philosophy. (At least 12 of these credits must be in 400 and 500 level courses).
   b. 6 credits may be in a Graduate Minor.
2. The submission of a qualifying examination portfolio, a portion of which serves as the master's scholarly paper. The portfolio must be accepted by the qualifying examination committee and the head of the graduate program.
3. Successful completion of the qualifying exam.

The department does not admit applicants for the terminal master’s degree.

**Doctor of Philosophy (Ph.D.)**

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

A minimum of 30 credits in residence at Penn State is required. 18 of these course credits must be at the 500 level in Philosophy. In addition, at least 9 credits must be taken at the 600 level in Philosophy. Students typically take 50 credits of course work and 36 research credits. At the program’s discretion, students may take up to 15 non- Philosophy credits toward a doctoral minor.

The foreign language requirement for the Philosophy Ph.D. degree is satisfied either by passing department translation examinations in two languages other than English, or by passing one language examination and PHIL 512.

To earn the Ph.D. degree, doctoral students must also write a dissertation that is accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

**Dual-Titles**

**Dual-Title Ph.D. in Philosophy and African American and Diaspora Studies**

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

Applicants entering with only an undergraduate degree should have a junior/senior cumulative average of at least 3.00 (on a 4.00 scale), and, where applicable, a minimum GPA of 3.50 for all graduate work previously undertaken. Exceptions to the minimum GPA requirement may be made for students with special backgrounds, abilities, and interests at the discretion of the program. Each applicant must provide the scores of the Graduate Record Examination (GRE) taken within five years previous to the date of application that have already been provided for admission to the graduate major program.

To qualify for the dual-title degree in Philosophy and African American and Diaspora Studies, students must satisfy the Philosophy Ph.D. degree requirements listed in the Degree Requirements section. In addition, students must complete the degree requirements for the dual-title in African American and Diaspora Studies, listed on the African American and Diaspora Studies Bulletin page (http://bulletins.psu.edu/graduate-programs/majors/african-american-diaspora-studies). The minimum course requirements for this dual-title Ph.D. degree are as follows:
15 credits of course work related to African American and Diaspora Studies, all at the 500 or 800 level. Of these 15 credits, 9 must come from the required core course sequence in African American and Diaspora Studies:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AFAM 501</td>
<td>Seminar in African American Studies</td>
<td>3</td>
</tr>
<tr>
<td>AFAM 502</td>
<td>Blacks and African Diaspora</td>
<td>3</td>
</tr>
<tr>
<td>AFAM 503</td>
<td>Sexual and Gender Politics in the African Diaspora</td>
<td>3</td>
</tr>
</tbody>
</table>

Choose 6 elective credits from the list of approved electives maintained in the African American and Diaspora Studies program office.

Total Credits 15

Credits earned at other institutions but not used to earn a degree may be applied toward the requirements for a graduate degree, subject to restrictions outlined in GCAC-309 Transfer Credit (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/transfer-credit).

**Qualifying Examination**

In accordance with Graduate Council policy, the qualifying examination committee must include at least one member of the African American and Diaspora Studies Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role.

Because students must first be admitted to a graduate major program of study before they may apply to and be considered for admission into a dual-title graduate degree program, dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

The dual-title field must be fully integrated into the qualifying exam for the doctoral program. In addition, students in the dual-title Ph.D. in African American and Diaspora Studies will be required to present to their committee a portfolio of work in African American and Diaspora Studies which includes a statement of the student’s interdisciplinary research interests, a program plan, and samples of writing that indicate the student’s interest in questions taken up by scholars of African American and Diaspora Studies.

**Dissertation Committee Composition**

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of a Philosophy and African American and Diaspora Studies dual-title doctoral degree student must include at least one member of the African American and Diaspora Studies Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not a member of the Graduate Faculty in African American and Diaspora Studies, the member of the committee representing African American and Diaspora Studies must be appointed as co-chair.

**Comprehensive Exams**

The African American and Diaspora Studies Graduate Faculty member on the student’s committee is responsible for developing and administering the African American and Diaspora Studies portion of the student’s comprehensive exams. The exam must incorporate written and oral components in African American and Diaspora Studies based on the student’s thematic or regional area of interest and specialization in African American and Diaspora Studies. The African American and Diaspora Studies portion of the exam will include the following components:

- broad history of the field,
- contemporary theory and debates,
- and either sexual and gender politics or
- a topic related to the student’s specific area of interest.

**Dissertation**

The candidate must complete a dissertation and pass a final oral defense of that dissertation on a topic that reflects their original research and education in both Philosophy and African American and Diaspora Studies in order to earn the dual-title Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

**Dual-Title Ph.D. in Philosophy and Classics and Ancient Mediterranean Studies**

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

**Admission Requirements**

Students must apply and be admitted to the graduate program in Philosophy and The Graduate School before they can apply for admission to the dual-title degree program. Applicants interested in the dual-title degree program may make their interest known on their applications to Philosophy. Students must apply and be admitted to the dual-title graduate program in Classics and Ancient Mediterranean Studies prior to taking the qualifying exam. In addition to the admission requirements set forth by the Graduate Council and the Department of Philosophy, students seeking admission to the dual-title program will be admitted to graduate study in CAMS by an admissions committee of CAMS faculty and the approval of the head of CAMS, and must meet the admissions requirements of the Classics and Ancient Mediterranean Studies dual-title program. Refer to the Admission Requirements section of the Classics and Ancient Mediterranean Studies (http://bulletins.psu.edu/graduate programas/majors/classics-ancient-mediterranean-studies) Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/african-american-diaspora-studies).

Applicants to this dual-title degree program should have an academic record that demonstrates expertise in a field relevant to ancient Mediterranean studies and proficiency at an intermediate level (e.g., 3 semesters of study) in one or more ancient languages. Prospective students seeking admission to this dual-title degree program are required to write a statement of purpose that addresses the ways in which their research and professional goals will reflect an interest in interdisciplinary research in the participating program and the disciplines and fields included in CAMS.

**GPA and GRE Requirements**

Applicants entering with only an undergraduate degree should have a junior/senior cumulative average of at least 3.00 (on a 4.00 scale) and, where applicable, a minimum GPA of 3.50 for all graduate work previously undertaken. Exceptions to the minimum GPA requirement may be made for students with special backgrounds, abilities, and interests at the discretion of the program. Each applicant must provide the scores of the
Graduate Record Examination (GRE) taken within five years previous to the date of application that have already been provided for admission to the graduate major program.

Degree Requirements
To qualify for the dual-title degree in Philosophy and Classics and Ancient Mediterranean Studies, students must satisfy the Philosophy Ph.D. degree requirements listed in the Degree Requirements section. In addition, students must complete the degree requirements for the dual-title in Classics and Ancient Mediterranean Studies, listed on the Classics and Ancient Mediterranean Studies (http://bulletins.psu.edu/graduate/programs/majors/classics-ancient-mediterranean-studies) Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/african-american-diaspora-studies). The minimum course requirements for this dual-title Ph.D. degree are as follows:

- 15 credits of CAMS-related coursework at the 400 or 500 level.

3 of these credits will come from CAMS 592. At least 3 credits will come from CAMS 593. The remainder may come from CAMS courses or courses relevant to the student’s research interests, as approved by the student’s dissertation committee. At least 6 of these credits must be in an ancient language.

Language Requirements
In addition to advanced proficiency in one ancient language, students will be expected to acquire and demonstrate reading proficiency in those modern foreign languages (e.g., but not exclusively, French, German, Italian) appropriate to their research interests, as identified by their dissertation committee.

Qualifying Examination
In accordance with Graduate Council policy, the qualifying examination committee must include at least one member of the Classics and Ancient Mediterranean Studies Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role.

Because students must first be admitted to a graduate major program of study before they may apply and be considered for admission into a dual-title graduate degree program, dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

The dual-title field must be fully integrated into the qualifying exam for the doctoral program. In addition, students in the dual-title Ph.D. in Classics and Ancient Mediterranean Studies must be required to present a portfolio of work in Classics and Ancient Mediterranean Studies which includes a statement of the student’s interdisciplinary research interests, a program plan, and samples of writing that indicate the student’s work in Classics and Ancient Mediterranean Studies.

Dissertation Committee Composition
In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of a Philosophy and Classics and Ancient Mediterranean Studies dual-title doctoral degree student must include at least one member of the Classics and Ancient Mediterranean Studies Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not a member of the Graduate Faculty in Classics and Ancient Mediterranean Studies, the member of the committee representing Classics and Ancient Mediterranean Studies must be appointed as co-chair.

Comprehensive Exams
The Classics and Ancient Mediterranean Studies Graduate Faculty member on the student’s committee is responsible for developing and administering the Classics and Ancient Mediterranean Studies portion of the student’s comprehensive exams. The exam must incorporate written and oral components in Classics and Ancient Mediterranean Studies based on the student’s thematic or historical area of interest and specialization in Classics and Ancient Mediterranean Studies.

Dissertation
The candidate must complete a dissertation and pass a final oral examination (the dissertation defense) on a topic that reflects their original research and education in both the primary discipline and Classics and Ancient Mediterranean Studies in order to earn the dual-title Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

Dual-Title M.A. and Ph.D. in Philosophy and Women's Studies
Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

Admission Requirements
Students must apply and be admitted to the graduate program in Philosophy and the Graduate School before they can apply for admission to the dual-title degree program. Applicants interested in the dual-title degree program may make their interest known on their applications to Philosophy. Students must apply and be admitted to the dual-title degree program in Women’s Studies prior to taking the qualifying exam. In addition to the admission requirements set forth by the Graduate Council and the Department of Philosophy, students will be admitted to the dual-title degree program in Women’s Studies by an admissions committee of Women’s Studies faculty, and must meet the admissions requirements of the Women’s Studies dual-title program. Refer to the Admission Requirements section of the Women’s Studies Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/womens-studies).

Students applying to the dual-title program must submit: a copy of the Graduate School Application originally submitted to the Philosophy Department; official transcripts from all previous course work; official GRE scores; a writing sample; a personal statement that describes how the dual-title degree program fits with their scholarly interests; and one letter of recommendation from a Women’s Studies faculty member at Penn State.

GPA and GRE Requirements
Applicants entering with only an undergraduate degree should have a junior/senior cumulative average of at least 3.00 (on a 4.00 scale), and, where applicable, a minimum GPA of 3.50 for all graduate work previously undertaken. Exceptions to the minimum GPA requirement may be made for students with special backgrounds, abilities, and interests at the discretion of the program.

Degree Requirements for the Dual-Title M.A.
To qualify for the dual-title degree in Philosophy and Women’s Studies, students must satisfy the Philosophy M.A. degree requirements listed in the Degree Requirements section. In addition to the Philosophy...
Department requirements, the minimum course requirements for this dual-title M.A. degree are as follows:

A total of 12 credits of course work in Women's Studies. Of these 12 credits, 9 must come from the required core course sequence in Women's Studies.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>WMNST 501</td>
<td>Feminist Perspectives on Research and Teaching Across the Disciplines</td>
<td>3</td>
</tr>
<tr>
<td>WMNST 502</td>
<td>Global Perspectives on Feminism</td>
<td>3</td>
</tr>
<tr>
<td>WMNST 507</td>
<td>Feminist Theory</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>3 credits chosen in consultation with the Women's Studies Graduate Officer.</td>
<td>3</td>
</tr>
<tr>
<td>Total Credits</td>
<td></td>
<td>12</td>
</tr>
</tbody>
</table>

Credits earned at other institutions but not used to earn a degree may be applied toward the requirements for a graduate degree, subject to restrictions outlined in GCAC-309 Transfer Credit (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/transfer-credit).

One faculty member from Women's Studies should be included on the master's committee. In addition, students should select a thesis topic that reflects their inquiry in women's studies. In the event that the master's thesis requirement is waived by the Philosophy Department, students need to take three additional credits of Women's Studies course work and complete a master's paper on a topic approved by the student's committee.

**Degree Requirements for the Dual-Title Ph.D.**

To qualify for the dual-title degree in Philosophy and Women's Studies, students must satisfy the Philosophy Ph.D. degree requirements listed in the Degree Requirements section. In addition to the Philosophy Department requirements, the minimum course requirements for this dual-title Ph.D. degree are as follows:

18 credits of course work in Women's Studies. Of these 18 credits, 9 must come from the required core course sequence in Women's Studies.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>WMNST 501</td>
<td>Feminist Perspectives on Research and Teaching Across the Disciplines</td>
<td>3</td>
</tr>
<tr>
<td>WMNST 502</td>
<td>Global Perspectives on Feminism</td>
<td>3</td>
</tr>
<tr>
<td>WMNST 507</td>
<td>Feminist Theory</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Select 9 credits: at least 6 must be at the 500 level, and all of them must be chosen in consultation with the Women's Studies Graduate Officer.</td>
<td>9</td>
</tr>
<tr>
<td>Total Credits</td>
<td></td>
<td>18</td>
</tr>
</tbody>
</table>

Credits earned at other institutions but not used to earn a degree may be applied toward the requirements for a graduate degree, subject to restrictions outlined in GCAC-309 Transfer Credit (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/transfer-credit).

**Qualifying Examination**

In accordance with Graduate Council policy, the qualifying examination committee must include at least one member of the Women's Studies Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role.

Because students must first be admitted to a graduate major program of study before they may apply to and be considered for admission into a dual-title graduate degree program, dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

The dual-title field must be fully integrated into the qualifying exam for the doctoral program. In addition, the student will be required to present a portfolio of work in Women's Studies to their committee. Such a portfolio would include a statement of the student's interdisciplinary research interests, a program plan, and samples of writing that indicate the student's work in Women's Studies.

**Dissertation Committee Composition**

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of a Philosophy and Women's Studies dual-title doctoral degree student must include at least two members who are Women's Studies-affiliated Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. If the chair of the committee representing Philosophy is not also a member of the Graduate Faculty in Women's Studies, a member of the committee representing Women's Studies must be appointed as co-chair.

**Comprehensive Exams**

The Women's Studies affiliated faculty members on the student's committee are responsible for administering a comprehensive examination in Women's Studies that constitutes a portion of the student's comprehensive exams. The women's studies portion of the exam will focus on the following areas:

- feminist theory,
- feminist methodology,
- global feminism, and
- feminist studies in the student's discipline.

**Dissertation**

The candidate must complete a dissertation and pass a final oral examination (the dissertation defense) on a topic that reflects their original research and education in both Philosophy and Women's Studies in order to earn the dual- title Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

**Student Aid**

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School's website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gradcreditloads-graduate-assistants) set by The Graduate School.

Every student admitted to the department's Ph.D. program receives full assistantship or fellowship funding (stipend and tuition waiver) for five years (assuming reasonable progress). The department awards annually an Edwin Erle Sparks Fellowship in the Humanities. In the last several years, Philosophy graduate students have received numerous external national and international fellowships and awards (such as DADD,
Fulbright, Javits, Mellon). Many Philosophy graduate students have received assistantship support for interdisciplinary teaching assignments in programs such as:

- American Studies,
- Classics and Ancient Mediterranean Studies,
- Religious Studies, and
- Women's Studies.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Learning Outcomes

1. Graduates will demonstrate command of and the ability to analyze historical philosophical ideas.
2. Graduates will demonstrate the ability to elaborate new ideas in relation to contemporary issues.
3. Graduates will demonstrate the ability to use research tools such as foreign languages and logic.
4. Graduates will demonstrate the ability to clearly and effectively present their research in both oral presentations and in written formats using appropriate conventions of the discipline.
5. Graduates will demonstrate knowledge of and commitment to the professional and ethical standards of scholarly and professional work in philosophy.

Contact

Graduate Program Head: Amy Allen
Director of Graduate Studies/Professor-in-Charge: Leonard Lawlor
Primary Program Contact: Claudia Horner
Email: cgh12@psu.edu
Mailing Address: 234 Sparks Building, University Park, PA 16802
Telephone: (814) 865-4485
Program Website: Philosophy (http://philosophy.la.psu.edu)

Physics

Graduate Program Head: Nitin Samarth
Program Code: PHYS
Campus(es): University Park (Ph.D., M.S., M.Ed.)
Degrees Conferred:
- Doctor of Philosophy (Ph.D.)
- Master of Science (M.S.)
- Master of Education (M.Ed.)
The Graduate Faculty

Graduate instruction and research opportunities are available in:

- atomic and molecular physics,
- laser physics,
- experimental and theoretical condensed matter and materials physics,
- surface physics,
- low-temperature physics,
- statistical physics,
- acoustics,
- nuclear physics,
- experimental and theoretical particle physics,
- quantum field theory,
- general relativity,
- cosmology and relativistic astrophysics, and
- quantum gravity.

Work in some areas is conducted in cooperation with the Materials Research Institute, the Applied Research Laboratory, and other interdisciplinary research facilities.

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Scores from the Graduate Record Examinations (GRE) are required for admission.

A bachelor's degree in physics or an allied field is required for admission to the M.S., and Ph.D. programs. Students with a 2.50 or higher junior/senior grade-point average (on a 4.00 scale) in physics and mathematics will be considered, and the best-qualified applicants will be accepted up to the number of spaces that are available for new students. Exceptions to the minimum 2.50 GPA may be made for students with special backgrounds, abilities, and interests. Exceptions may also be made for applicants for doctoral programs who have completed master's degrees at other institutions.

Admission and study programs for the M.Ed. degree are handled on an individual basis.

Degree Requirements

Master of Education (M.Ed.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

At least 18 credits in physics are required, of which up to 6 credits may be for research. Six additional nonresearch science credits (which may be in physics) and a 6-credit minor in a field of professional education also must be included. A thesis or term paper must be submitted and accepted by the department.
Master of Science (M.S.)
Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 530</td>
<td>Theoretical Mechanics</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 557</td>
<td>Electrodynamics</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 559</td>
<td>Graduate Laboratory</td>
<td>2</td>
</tr>
<tr>
<td>PHYS 561</td>
<td>Quantum Mechanics I</td>
<td>3-4</td>
</tr>
<tr>
<td>or PHYS 410</td>
<td>Introduction to Quantum Mechanics I</td>
<td></td>
</tr>
</tbody>
</table>

Total Credits 11-12

There are two options.

- Thesis option: The thesis must be based on at least 6 credits of PHYS 600 and must conform to Graduate School regulations.
- Nonthesis option: An additional 6 credits of 500-level physics courses beyond the required ones must be taken, and a short paper must be submitted to, and accepted by, the department.

There is no degree examination for either option.

Doctor of Philosophy (Ph.D.)
Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tr>
<td>PHYS 517</td>
<td>Statistical Mechanics</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 525</td>
<td>Methods of Theoretical Physics I</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 530</td>
<td>Theoretical Mechanics</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 557</td>
<td>Electrodynamics</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 559</td>
<td>Graduate Laboratory</td>
<td>2</td>
</tr>
<tr>
<td>PHYS 561</td>
<td>Quantum Mechanics I</td>
<td>3</td>
</tr>
<tr>
<td>PHYS 562</td>
<td>Quantum Mechanics II</td>
<td>3</td>
</tr>
<tr>
<td>First-Year Seminar Series</td>
<td></td>
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</tbody>
</table>

Total Credits 20

Courses required beyond these depend on the Ph.D. option. Students take at least four additional 3-credit, 500-level physics courses.

A qualifying examination is given at the end of the first year, a comprehensive examination approximately two years after the qualifying examination, and a final oral examination (the dissertation defense) takes place after the completion of the dissertation. There is no departmental foreign language requirement, although a reading knowledge of one foreign language may be needed in some areas of research.

Student Aid
Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School's website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

The following awards typically have been available to graduate students in this program:

Homer F. Braddock Graduate Fellowships
Available to exceptional Ph.D. candidates in several departments of the Eberly College of Science. They carry stipends of $3,500 to $7,500 per year for each of the first three years.

Wheeler P. Davey Memorial Fellowships
Carry stipend of variable amount and are available to a limited number of qualified graduate students in the Eberly College of Science.

David C. Duncan Graduate Fellowships
Available to first- and second-year graduate students in physics and carry a stipend of approximately $2,000 per year for each of the first two years.

Frymoyer Scholarship
W. Donald Miller Graduate Fellowship
David H. Rank Memorial Physics Award
The Nellie and Oscar L. Roberts Fellowships
Available to graduate students majoring in the physical sciences and in biochemistry and molecular biology. Each award is for $4,000 per year for one or two years.

Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Learning Outcomes
Master of Education (M.Ed.)
1. Graduates shall demonstrate advanced knowledge and understanding in several areas of physics core knowledge, and advanced knowledge of education theory and/or practice.
2. Graduates shall demonstrate, at a level appropriate to a departmental colloquium, (i) knowledge of several outstanding problems or questions in diverse sub-fields of physics, (ii) the experimental, observational, or theoretical origins of these problems, and (iii) the principal efforts proposed or underway to address them.
3. Graduates shall demonstrate the ability to communicate professionally, in written and oral form, physics and education research work and conclusions to expert and non-expert audiences.
4. Graduates shall demonstrate (i) knowledge and understanding of professional standards of ethics and ethical conduct, (ii) the ability to analyze situations to identify the standards that should apply and (iii) describe how they may be appropriately acted upon.
5. Graduates shall have a specialty area within the broad domain of physics, within which they shall demonstrate (i) advanced knowledge and understanding of the primary literature, (ii) the ability to analyze and judge new contributions to the primary literature, (iii) the ability to apply disciplinary knowledge and methodologies to understand and explore complex problems within the specialty area.
Master of Science (M.S.)

1. Graduates shall demonstrate advanced knowledge and understanding in physics core knowledge (statistical mechanics, theoretical mechanics, classical electrodynamics, and quantum physics) and experimental, observational, and theoretical methodologies, that underpin the practice of modern physics.

2. Graduates shall demonstrate, at a level appropriate to a departmental colloquium, (i) knowledge of several outstanding problems or questions in diverse sub-fields of physics, (ii) the experimental, observational, or theoretical origins of these problems, and (iii) the principal efforts proposed or underway to address them.

3. Graduates shall demonstrate the ability to communicate professionally, in written and oral form, research work and conclusions to physics sub-field expert and non-expert audiences.

4. Graduates shall demonstrate (i) knowledge and understanding of professional standards of ethics and ethical conduct, (ii) the ability to analyze situations to identify the standards that should apply and (iii) describe how they may be appropriately acted upon.

5. Graduates shall have a specialty area within the broad domain of physics, within which they shall demonstrate (i) advanced knowledge and understanding of the primary literature, (ii) the ability to analyze and judge new contributions to the primary literature, (iii) the ability to apply disciplinary knowledge and methodologies to understand and explore complex problems within the specialty area.

Doctor of Philosophy (Ph.D.)

1. Graduates shall demonstrate advanced knowledge and understanding in physics core knowledge (statistical mechanics, theoretical mechanics, classical electrodynamics, and quantum physics) and experimental, observational, and theoretical methodologies, that underpin the practice of modern physics.

2. Graduates shall demonstrate, at a level appropriate to a departmental colloquium, (i) knowledge of several outstanding problems or questions in diverse sub-fields of physics, (ii) the experimental, observational, or theoretical origins of these problems, and (iii) the principle efforts proposed or underway to address them.

3. Graduates shall demonstrate the ability to communicate professionally, in written and oral form, research work and conclusions to physics sub-field expert and non-expert audiences.

4. Graduates shall demonstrate (i) knowledge and understanding of professional standards of ethics and conduct, (ii) the ability to analyze situations to identify the standards that should apply and (iii) describe how they may be appropriately acted upon.

5. Graduates shall have a specialty area within the broad domain of physics, within which they shall demonstrate (i) advanced knowledge and understanding of the primary literature, (ii) the ability to analyze and judge new contributions to the primary literature, (iii) the ability to pose complex research problem(s) and identify the knowledge and methodologies required to address them, and (iv) the ability to apply that knowledge and those methodologies to create new knowledge and/or develop new experimental techniques that advance (or show the potential to advance) knowledge and understanding within the specialty area.

Contact

Graduate Program Head: Nitin Samarth

Primary Program Contact: Julianne Mortimore

Email: jrm62@psu.edu

Mailing Address: 108 Davey Lab, University Park, PA 16802

Telephone: (814) 865-7533

Program Website: Physics (http://www.phys.psu.edu/graduate)

Piano Performance

Graduate Program Head: David Frego

Program Code: PIANO

Campus(es): University Park (D.M.A.)

Degrees Conferred: Doctor of Musical Arts (D.M.A.)

The Graduate Faculty

View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=PIANO)

The School of Music is an accredited institutional member of the National Association of Schools of Music.

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

The School of Music requires the completion of a recognized baccalaureate degree in music or music education, with a junior/senior grade-point average of 3.00 or higher (on a 4.00 scale).

Admission to the D.M.A. (major in piano performance) requires an audition in person or by video recording of an extensive memorized program; students admitted to this program must perform musically at least at the level required to complete the degree Master of Music at Penn State, and must show potential ability to perform professionally.

Additional requirements include an interview in person or by interactive video to assess language skills.

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. See GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac-300/admission-requirements-international-students) for more information.

Degree Requirements

Doctor of Musical Arts (D.M.A.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

The Doctor of Musical Arts is offered with a major in Piano Performance. Four semesters in residence are required. The degree is designed to provide students with a thorough background of preparation and experience in professional-level performance and in the literature of the instrument, while becoming sufficiently knowledgeable about the discipline of music as a whole, in order to teach at the collegiate or
FOUR FORMS OF STUDENT AID ARE DESCRIBED IN THE TUITION & FUNDING SECTION OF THE GRADUATE SCHOOL'S WEBSITE. STUDENTS ON GRADUATE ASSISTANTSHIPS MUST ADHERE TO THE COURSE LOAD LIMITS (HTTP://GRADSCHOOL.PSU.EDU/GRADUATE-EDUCATION-POLICIES/GSAD/CREDIT-LOADS-GRADUATE-ASSISTANTS) SET BY THE GRADUATE SCHOOL.

A QUALIFYING EXAMINATION WILL FOLLOW UPON TWO SEMESTERS COMPLETED IN RESIDENCE. THE COMPREHENSIVE EXAMINATION WILL OCCUR UPON THE COMPLETION OF COURSE WORK, BEFORE THE FINAL RECITAL. THE CULMINATING EXPERIENCE OF THE D.M.A. DEGREE IS PUBLIC PERFORMANCE: THREE MEMORIZED SOLO RECITALS ARE REQUIRED (THE FINAL RECITAL IS PREPARED INDEPENDENTLY), AND TWO RECITALS OF CHAMBER MUSIC. ALTHOUGH NO WRITTEN DISSERTATION IS REQUIRED, A LECTURE-RECITAL IS REQUIRED, WITH A PRE-APPROVED MONOGRAPH TEXT.

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact

Graduate Program Head: David Frego

Director of Graduate Studies/Professor-in-Charge: Sue Haug

Primary Program Contact: Irene Kohute

Email: iel1@psu.edu

Mailing Address: School of Music, 233 Music Building I, University Park, PA 16802

Telephone: (814) 863-0418

Program Website: Piano Performance (https://music.psu.edu/admissions/degrees/doctor-musical-arts-degree-major-piano-performance)

Plant Biology

Graduate Program Head: Teh-Hui Kao

Program Code: PLBIO

Campus(es): University Park (Ph.D., M.S.)

Degrees Conferred

Doctor of Philosophy (Ph.D.)
Master of Science (M.S.)

The Graduate Faculty

The Intercollege Graduate Degree Program in Plant Biology includes faculty from nine departments in the College of Agricultural Sciences, College of Engineering, and Eberly College of Science. Each student becomes associated with the adviser’s department, which may provide financial support, research facilities, and office space. Applicants are encouraged to explore opportunities by contacting faculty who may be prospective advisers.

The objective of this program is to educate and train plant biologists using the most modern techniques available today. Graduates from this program have gone on to a diverse range of careers, including positions in colleges and universities, research institutes, industry, and government. Research interests of the program faculty span the breadth of scientific areas ranging from molecular, cell, and evolutionary biology, biochemistry, biophysics, genetics, and functional genomics to whole-plant physiology and ecology. Student training includes a comprehensive set of team-taught courses that reflects this breadth of scientific approaches.

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Scores from the Graduate Record Examinations (GRE) Aptitude Test (verbal, quantitative, analytical) are required for admission.

Students with a 3.00 junior/senior grade-point average (on a 4.00 scale) and with appropriate course background will be considered for admission. The best-qualified applicants will be accepted up to the number of spaces available for new students. Students entering this program should have a strong foundation in the biological sciences, including biochemistry, general physics, and college mathematics through calculus. Students with limited deficiencies may be admitted but must make up their deficiencies concurrently with their graduate studies. B.S.-level applicants with good academic records who have had strong training in plant biology and related courses, including research experience, are generally admitted directly into the Ph.D. program.

Degree Requirements

Master of Science (M.S.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

All M.S. degree candidates will be required to complete 30 credits of course work at the 400, 500, 600, or 800 level, with at least 18 credits at
the 500 and 600 level, combined. All students must complete the core courses:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLBIO 512</td>
<td>Plant Resource Acquisition and Utilization</td>
<td>4</td>
</tr>
<tr>
<td>PLBIO 513</td>
<td>Integrative Plant Communication and Growth</td>
<td>4</td>
</tr>
<tr>
<td>MCIBS 591</td>
<td>Ethics in the Life Sciences</td>
<td>1</td>
</tr>
<tr>
<td>PLBIO 590</td>
<td>Colloquium</td>
<td>1</td>
</tr>
</tbody>
</table>

**Electives**

Elective credits may be chosen from a list of approved electives maintained by the program office.

**Culminating Experience**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLBIO 600</td>
<td>Thesis Research</td>
<td>6</td>
</tr>
<tr>
<td>or PLBIO 610</td>
<td>Thesis Research Off Campus</td>
<td></td>
</tr>
</tbody>
</table>

Total Credits 30

Students are required to write a thesis, and at least 6 credits in thesis research (PLBIO 600 or PLBIO 610) must be taken in conjunction with completing the thesis. The thesis must be accepted by the advisers and/or committee members, the head of the program, and the Graduate School, and the student must pass a thesis defense.

**Doctor of Philosophy (Ph.D.)**

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

Students in the Ph.D. program must successfully pass the qualifying, comprehensive, and final oral examinations required by Graduate Council. To earn the Ph.D. degree, doctoral students must also write a dissertation that is accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

Ph.D. candidates must complete a minimum of 17 credits, including the following courses:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLBIO 512</td>
<td>Plant Resource Acquisition and Utilization</td>
<td>4</td>
</tr>
<tr>
<td>PLBIO 513</td>
<td>Integrative Plant Communication and Growth</td>
<td>4</td>
</tr>
<tr>
<td>PLBIO 514</td>
<td>Modern Techniques and Concepts in Plant Ecophysiology</td>
<td>2</td>
</tr>
<tr>
<td>PLBIO 515</td>
<td>Modern Techniques and Concepts in Plant Cell Biology</td>
<td>2</td>
</tr>
<tr>
<td>PLBIO 516</td>
<td>Modern Techniques and Concepts in Plant Molecular Biology</td>
<td>2</td>
</tr>
<tr>
<td>MCIBS 591</td>
<td>Ethics in the Life Sciences</td>
<td>1</td>
</tr>
<tr>
<td>PLBIO 590</td>
<td>Colloquium</td>
<td>2</td>
</tr>
<tr>
<td>Two biochemistry courses ^1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total Credits 17

^1 A list of courses approved to count towards the biochemistry course requirement is maintained by the graduate program office.

Upon consultation with the head of the graduate program, equivalent courses taken at another university may be substituted for some of the above requirements. Based on the results of the qualifying examinations, the student's adviser and dissertation committee will determine other course requirements.

One of the main goals of the qualifying examination is to determine the potential of a student to successfully obtain a Ph.D. degree, and it is intended to be a rigorous test of a student's abilities prior to the major investment in time and effort necessary to pass the comprehensive examination. Students enrolled in the Ph.D. program must pass a written English competency evaluation based on the dossier of papers written for PLBIO 512 and PLBIO 513. This evaluation is done at the end of the student's first year. The oral qualifying examination is based on two of the papers, jointly chosen by the student and the Qualifying Examination Committee, and must be passed by the end of the student's third semester.

**Student Aid**

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School's website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistantss) set by The Graduate School.

In most participating departments, Plant Biology applicants are eligible for departmental teaching or research assistantships, and other assistantships supported by grant funds of individual faculty who make the award decisions. More detailed and up-to-date information about student aid may be found in the Plant Biology Student and Faculty Handbook (https://www.huck.psu.edu/content/graduate-programs/plant-biology/requirements), which is updated annually during the summer.

**Courses**

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**Learning Outcomes**

1. Know: Students will demonstrate in-depth knowledge of essential background and key developments in diverse areas of plant biology, and demonstrate knowledge of modern techniques/methodologies used in plant biology research.

2. Apply/Create: Students will demonstrate ability to design and carry out a major research project in the chosen area of plant biology, including formulating hypotheses based on previous work in the field, and assembling new findings into a written work that advances understanding in the field.

3. Think: Students will demonstrate ability to critically analyze work by others in their specialty area.

4. Communicate: Students will demonstrate ability to convey scientific ideas and results in clear, concise, and well-organized writing, as well as in formal oral or poster presentations at professional conferences/meetings.

5. Professional Practice: Students will demonstrate knowledge and comprehension of research ethics issues, including ethical principles related to authorship, research reporting, data fabrication, plagiarism, conflicts of interest, peer review, data sharing.
Plant pathology is the study of disease in plants and concerns the dynamic interaction between the plant, the causal agent (bacteria, fungi, viruses, nematodes, etc.), and their environments. A student prepares for a professional career in research, teaching, extension, or industry through advanced studies of the principles of plant infection, the physiology of disease in plants, the ecology of root diseases, and the nature and inheritance of disease resistance in plants, epidemiology, microbial ecology, phytopathology, translational taxonomy, ecology and physiology of air pollution injury to plants, or plant disease management by biological or chemical means. A student may specialize in the etiology and integrated management of diseases of forest trees, agronomic or horticultural crops. Advanced studies in molecular systematics of fungi and applied mycology, related to the production of the commercial mushroom, are also available. Modern, well-equipped laboratories, controlled environment facilities and greenhouses, and well-developed field research areas are available for graduate study.

### Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies). Scores from the Graduate Record Examinations (GRE), or from a comparable substitute examination accepted by the Plant Pathology graduate program, are required for admission. At the discretion of the graduate program, a student may be admitted for graduate study in the program without these scores.

Students scoring in the fiftieth percentile or above on each section of the GRE will be given preference. The best-qualified applicants will be accepted up to the number of spaces and advisers that are available for new students. Students with a 3.00 junior/senior average (on a 4.00 scale) and with appropriate course backgrounds will be considered for admission. Exceptions to the minimum 3.00 grade-point average may be made at the program's discretion for students with special backgrounds, abilities, and interests.

Students are expected to have a strong foundation in biological and physical sciences. Generally, students with B.S. degrees in biology, microbiology, plant science, molecular biology, or biochemistry are well prepared for graduate study in Plant Pathology.

### Degree Requirements

#### Master of Science (M.S.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

The Master of Science degree program in Plant Pathology leads students either to the development of special proficiencies in Plant Pathology, which will allow the individual to directly enter a professional career, or to the development of a basic knowledge of the discipline, allowing for advancement to the Ph.D. degree. M.S. degree students will be introduced to the broad aspects of the field of plant pathology, including:

- exposure to the various causal agents of plant disease and the diseases they incite;
- diseases of current and classical importance affecting a wide range of crop plants;
- a variety of techniques used to isolate, characterize, and identify causal agents of plant disease; and
- an appreciation for the relationship between plant pathology and other biological and physical sciences.

A minimum of 31 credits at the 400, 500, 600, or 800 level is required, with at least 18 credits in the 500 and 600 series combined.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PPEM 405</td>
<td>Microbe-Plant Interactions: Plant Disease and Biological Control</td>
<td>3</td>
</tr>
<tr>
<td>PPEM 416</td>
<td>Plant Virology: Molecules to Populations</td>
<td>3</td>
</tr>
<tr>
<td>PPEM 417W</td>
<td>Mechanisms of Bacterial Pathogenesis in Plants</td>
<td>3</td>
</tr>
<tr>
<td>PPEM 425</td>
<td>Biology of Fungi</td>
<td>4</td>
</tr>
<tr>
<td>PATH 502</td>
<td>Plant Disease Diagnosis</td>
<td>3</td>
</tr>
<tr>
<td>PATH 522</td>
<td>Professional Development &amp; Ethics in Plant Pathology</td>
<td>1</td>
</tr>
<tr>
<td>PATH 590</td>
<td>Colloquium ¹</td>
<td>2</td>
</tr>
</tbody>
</table>

#### Electives

Select 6 additional credits at the 500-level in Plant Pathology from a list provided by the department.

### Culminating Experience

6

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¹ Colloquium: Students are required to give an oral presentation of an integrated view of their overall program of study to members of the Graduate Committee.
Admission Requirements
For admission to the dual-title doctoral degree in Biogeochemistry, a student must first apply and be admitted to the Plant Pathology graduate program and The Graduate School, preferably but not necessarily discussing the dual-title interest beforehand with a major adviser who has been appointed to the Biogeochemistry program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Biogeochemistry dual-title program. Refer to the Admission Requirements section of the Biogeochemistry Bulletin page (p. 123). Doctoral students must be admitted into the dual-title degree program in Biogeochemistry prior to taking the qualifying examination in their primary graduate program.

Degree Requirements
To qualify for the dual-title degree, students must satisfy the Plant Pathology Ph.D. degree requirements. In addition, students pursuing the dual-title Ph.D. in Plant Pathology and Biogeochemistry must complete the degree requirements for the dual-title Biogeochemistry Ph.D., listed on the Biogeochemistry Bulletin page (p. 123). Students are required to have two advisers from separate disciplines: one individual serving as a primary adviser in their major degree program and a secondary adviser in an area within a field covered by the dual-title program who is a member of the Biogeochemistry Graduate Faculty. The major program adviser normally will also be a member of the Biogeochemistry Graduate Faculty. The two faculty advisers can represent different academic programs, but this is not required, as faculty from a scientifically diverse department could represent very different areas of expertise.

The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Plant Pathology and must include at least one Graduate Faculty member from the Biogeochemistry program. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. There will be a single qualifying examination, containing elements of both Plant Pathology and Biogeochemistry. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of a Plant Pathology and Biogeochemistry dual-title doctoral degree student must include at least one member of the Biogeochemistry Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in Biogeochemistry, the member of the committee representing Biogeochemistry must be appointed as co-chair. The Biogeochemistry representative on the student’s dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students enrolled in the dual-title program are required to write and orally defend a dissertation on a topic that reflects their original research and education in Plant Pathology and Biogeochemistry. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

Dual-Titles
Dual-Title Ph.D. in Plant Pathology and Biogeochemistry
Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-208/dual-title-graduate-degree-programs).

Doctoral students with research and educational experiences in plant pathology and environmental microbiology may apply to the Plant Pathology/Biogeochemistry Dual-Title Doctoral Degree Program. The goal of the dual-title Ph.D. degree in Plant Pathology and Biogeochemistry is to enable PPATH graduate students to acquire the knowledge and skills of their major area of specialization in PPATH, while at the same time gaining expertise and skills in biogeochemistry. Graduate study in this program seeks to provide students with the intellectual foundation for integrated and mechanistic understanding of interactions between plant hosts, microbes, and environmental systems. Interdisciplinary training that includes biogeochemistry will prepare students for positions in academia, government, non-profit organizations, and the private sector. It will also prepare students for a wide array of research careers in the private sector, including agricultural and environmental sciences, energy industries, and the integrated study of the sustainability of biological systems.
Dual-Title M.S. and Ph.D. in Plant Pathology and International Agriculture and Development

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

Graduate students with research and educational interests in international education may apply to the Plant Pathology/INTAD Dual-Title Degree Program. The goal of the dual-title degree in Plant Pathology and INTAD is to enable graduate students to acquire the knowledge and skills of their primary area of specialization in Plant Pathology, while at the same time gain the perspective and methods needed for work in international agriculture. Graduate study in this program seeks to prepare students to assume leadership roles in science, science education, outreach, and project management anywhere in the world. Students are required to write research proposals and grants to support their research activities, reflecting the dual-title degree. As part of their professional development presentations, publication of research articles and active participation in professional societies is expected. Emphasis is placed upon the professional development of the student. Students are able to specialize in the research program areas of:

- plant-microbe interactions,
- plant disease biology and epidemiology,
- environmental microbiology,
- mycology,
- plant virology,
- mushroom biology,
- genomics, and
- disease management.

They will acquire a broad perspective on applying their research findings in the context of the broader international community. The dual-title will allow students to master their field of specialization from an international perspective allowing them to compare practices and outcomes between countries and regions.

Admission Requirements

Students must apply and be admitted to the graduate program in Plant Pathology and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the INTAD Dual-Title Program. Refer to the Admission Requirements section of the INTAD Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/international-agriculture-development). Doctoral students must be admitted into the dual-title degree program in INTAD prior to taking the qualifying examination in their primary graduate program.

Degree Requirements

To qualify for the dual-title degree, students must satisfy the degree requirements for the degree they are enrolled in Plant Pathology. In addition, students pursuing the dual-title in Plant Pathology and INTAD must complete the degree requirements for the dual-title in INTAD, listed on the INTAD Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/international-agriculture-development).

The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Plant Pathology and must include at least one Graduate Faculty member from the INTAD program. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. There will be a single qualifying examination, containing elements of both Plant Pathology and INTAD. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of a Plant Pathology and INTAD dual-title doctoral degree student must include at least one member of the INTAD Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in INTAD, the member of the committee representing INTAD must be appointed as co-chair. The INTAD representative on the student’s dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students enrolled in the dual-title program are required to write and orally defend a dissertation on a topic that reflects their original research and education in Plant Pathology and INTAD. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Learning Outcomes

Master of Science (M.S.)

1. Graduates will demonstrate breadth and depth in their knowledge of the principles, concepts and methods of the field of Plant Pathology and its related disciplines, and be able to critically evaluate, integrate, and apply that knowledge.

2. Graduates will execute a scientific plan that furthers knowledge in plant pathology and its related disciplines.

3. Graduates will effectively communicate in oral and written format research findings to professional peers, and be capable of translating knowledge to stakeholders and the public.

4. Students will engage in professional activities that promote values for diversity, mentorship and public and professional service, in
The purpose of the graduate program in Political Science is to train professional political scientists who intend to pursue careers in research, teaching, and public service. The department offers programs leading to the M.A. and Ph.D. degrees. The programs are designed to enable students to acquire both methodological sophistication and substantive knowledge in a variety of fields.

The graduate program in Political Science encourages the study of a variety of substantive concerns, methodological approaches, and research skills. Among the department’s special areas of strength are United States politics and political behavior (legislative politics, public opinion and voting, parties and interest groups, and judicial process); political and social theory; international relations and peace science; the politics of western and eastern Europe, Latin America, and South Asia; international conflict; international political economy; democratization; social movements; political culture; and gender and politics.

Penn State is a member of the Committee on Institutional Cooperation (CIC), an association of the Big Ten universities and the University of Chicago. The CIC sponsors the Traveling Scholars program, which provides doctoral-level students with an opportunity to study at another CIC university. In addition to participating in CIC programs, the department sponsors attendance at the ICPSR Summer program at the University of Michigan.

**Admission Requirements**

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Entrance to the Political Science graduate program occurs in the fall semester. Applications must be received by the department no later than January 15 for fall admission. However, the department will begin accepting applications as of September 1.

The Department of Political Science requires M.A. and Ph.D. program applicants to submit

- official transcripts from all post-secondary institutions attended (http://www.gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission),
- Graduate Record Examinations (GRE) scores (verbal, quantitative, and analytical),
- a statement of career plans and proposed emphasis in political science,
- at least three letters of recommendation from persons familiar with the applicant’s academic performance, and
- a writing sample demonstrating research and/or analytical skills.

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. See GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

Students can be admitted to the master’s degree program or, after passing a Ph.D. qualifying exam, can be admitted to the Ph.D. program with a master’s degree.
Degree Requirements

Master of Arts (M.A.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

Depending on the student’s previous methodological training, 30 credits of course work, including an essay, are required for a master’s degree. At least 18 credits must be at the 500 level. The course work includes:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLSC 501</td>
<td>Methods of Political Analysis</td>
<td>3</td>
</tr>
<tr>
<td>PLSC 502</td>
<td>Statistical Methods for Political Research</td>
<td>3</td>
</tr>
<tr>
<td>PLSC 503</td>
<td>Multivariate Analysis for Political Research</td>
<td>3</td>
</tr>
<tr>
<td>12 credits in a primary field (including the survey seminar in the field)</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>6 credits in a secondary field</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>3 credits for the M.A. essay</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Total Credits</td>
<td>30</td>
<td></td>
</tr>
</tbody>
</table>

Students also take a seminar on teaching and professional development in political science. There are no language requirements for the degree. Every master’s student is required to pass an examination of their master’s essay.

Credits earned at other institutions but not used to earn a degree may be applied toward the requirements for a graduate degree, subject to restrictions outlined in GCAC-309 Transfer Credit (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/transfer-credit).

Doctor of Philosophy (Ph.D.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

The Department of Political Science requires a minimum total of 60 post-baccalaureate credits for the Ph.D. At least 45 credits, exclusive of the dissertation, must be in political science. Course work accepted for the M.A. in Political Science at Penn State will count toward the department’s 60-credit requirement. In the case of students who have earned credits in an advanced degree program at another university or in another department at Penn State, a maximum of 30 credits may count toward the 60-credit departmental requirement.

In the case of transfer students, a maximum of 30 credits earned in an advanced degree program at another university or in another department at Penn State will count toward the 60-credit requirement.

The department requires that a student complete the designated “core” courses in methodology (PLSC 501, PLSC 502, and PLSC 503) and a seminar on teaching and professional development in political science. Ph.D. degree candidates must present three fields for the purposes of comprehensive examinations. The major and one of the minor fields must be selected from the department’s recognized fields, and one of the minor fields may be outside political science. The major field requires a minimum of 15 credits; each minor field requires a minimum of 9 credits.

The communication and foreign language requirement for the Ph.D. may be satisfied by advanced course work and competence developed in foreign languages, statistics, or other research methods.

Dual-Titles

Dual-Title Ph.D. in Political Science and African Studies

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

Political Science doctoral students who have research and educational interests in comparative policy analyses, environmental change and livelihood systems, socio-economic and political change, and other aspects of African Studies may apply to the dual-title doctoral degree program in Political Science and African Studies. The goal of the program is to enable graduate students from Political Science to complement their knowledge and skills in a major area of specialization in Political Science with in-depth knowledge of prevailing theories on and problem-solving approaches to thematic, regional, or national issues pertaining to African development and change.

The dual-title doctoral degree program provides interested Political Science doctoral students with a multidisciplinary approach that enhances their analytical capabilities for addressing key issues in African development and adds value to their Political Science degree by increasing their competitiveness in the job market. The well-rounded, regional specialist who graduates from this program, is likely to be employed in an international setting. The program, therefore, enhances the reputation of the Political Science department, the College of the Liberal Arts, and Penn State.

Admission Requirements

Students must apply and be admitted to the graduate program in Political Science and the Graduate School before they can apply for admission to the dual-title degree program. Applicants interested in the dual-title degree program may make their interest in the program known clearly on their applications to Political Science and include remarks in their statement of purpose that address the ways in which their research and professional goals in political science reflect an interest in African Studies-related research. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the African Studies dual-title program. Refer to the Admission Requirements section of the African Studies Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/african-studies). Doctoral students must be admitted into the dual-title degree program in African Studies prior to taking the qualifying examination in their primary graduate program.

Degree Requirements

To qualify for the dual-title degree, students must satisfy the degree requirements for the degree they are enrolled in Political Science. In addition, students must complete the degree requirements for the dual-title in African Studies, listed on the African Studies Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/african-studies). Final course selection is determined by the student in consultation with the Political Science and African Studies academic advisers. Upon acceptance by the African Studies admissions committee, the student will be assigned an African Studies academic adviser in consultation with the African Studies director and the African Studies admissions committee. As a student develops specific scholarly interests, s/he may request a different African Studies adviser from the one assigned by the
African Studies admissions committee. The student and Political Science and African Studies academic advisers are to establish a program of study that is appropriate for the student’s professional objectives and that is in accordance with the policies of the Graduate Council, the Political Science graduate program and the African Studies Program.

The Ph.D. in Political Science and African Studies is awarded to students who are admitted to the Political Science doctoral program and admitted subsequently into the dual-title degree in African Studies. The minimum course requirements for the dual-title Ph.D. degree in Political Science and African Studies are as follows.

- A minimum of 60 post-baccalaureate credits. Course work accepted for the M.A. in Political Science will count toward the 60-credit requirement. At least 45 credits, exclusive of dissertation research credits, must be in Political Science.
- Completion of course work in two major fields (the first of which is a Political Science subfield as detailed in the Political Science graduate handbook, and the second of which is in African Studies) and one minor field (in a regular Political Science subfield).
- Completion of the designated core of courses in methodology (PLSC 501, PLSC 502, and PLSC 503).
- Completion of two 1.5-credit seminars on teaching, writing, and professional development in Political Science.
- Completion of introductory field seminars appropriate to one’s two political science fields of study.
- AFR 501 (3)
- 15 credits of Africa-related course work at the 400 or 500-level; minimum of 3 of these credits must be taken from a list of courses maintained by the African Studies program chair.
- As many as 6 of the 15 credits may come from Political Science, as approved by the student’s Political Science and African Studies Program academic advisers.
- The remaining credits can be taken in AFR or in any department other than Political Science. Of these, no more than 6 credits may be taken at the 400-level and no more than 3 combined credits may come from 596 and 599 listings.
- Communication and foreign language requirements, which will be determined by the student, the Political Science and African Studies Program academic advisers in accordance with the existing Political Science language requirements.

Foreign Language/Research Skills Competency Requirement

The language requirement for a student in the dual-title doctoral degree program will be determined by the student, the Political Science and African Studies program academic advisers in accordance with the existing Political Science language requirements. The Political Science Foreign Language/Research Skills Competency Requirement, contained in the Political Science Graduate Handbook, indicates that doctoral students must satisfy one of the following four criteria to demonstrate proficiency in foreign language and/or research skills:

1. Reading proficiency and translation skills in two foreign languages. Proficiency is certified by the School of Languages and Literatures (http://sll.la.psu.edu/language-portal/language-proficiency-certification) at Penn State. The School’s website details the procedures that students must follow to obtain certification.
2. Superior command of one foreign language. Superior command is defined as the ability to use the language to conduct field research abroad. This may include the ability to live and work in the relevant foreign country; the ability to converse with librarians, government officials, and other gatekeepers of documents and information; and the ability to conduct interviews with citizens or officials. There is no single test or criterion for demonstrating superior command of a foreign language. Rather, the student must provide to the dissertation committee letters from language instructors, faculty who have conducted fieldwork in the language in question, and similar documents so that its members can determine if the language skill is sufficient given the student’s specialization and subfield.
3. Reading and translation proficiency in one foreign language plus a grade of B or higher in an advanced statistics course (i.e., material beyond that covered in PLSC 503) which has been approved by the student’s doctoral adviser and the Director of Graduate Studies.
4. A statistical methods specialization consisting of three advanced statistics courses (each covering material beyond what is covered in PLSC 503). Students must receive a grade of B or higher in each class. The selection of courses must be approved by the student’s doctoral adviser and the Director of Graduate Studies. These advanced courses may overlap with the advanced courses used if methodology is chosen as the student’s first or second minor field.

Qualifying Exam

The dual-title degree will be guided by the qualifying exam procedure of the Political Science graduate program. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable. There will be a single qualifying examination, containing elements of both Political Science and African Studies.

The qualifying examination committee for the dual-title degree will be composed of Graduate Faculty from Political Science and at least one Graduate Faculty member from the African Studies Program. The designated dual-title faculty member may be appointed from Political Science if that person holds a formal appointment with the African Studies program.

Dissertation Committee Composition

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of a Political Science and African Studies dual-title doctoral degree student must include at least one member of the African Studies Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. The African Studies representative to the committee may serve as the Outside Field Member, and may also serve as the Outside Unit Member, if his or her primary appointment is in an administrative unit outside the unit in which the dissertation adviser’s primary appointment is held.

If the chair of the committee representing Political Science is not also a member of the Graduate Faculty in African Studies, the member of the committee representing African Studies must be appointed as co-chair.

Comprehensive Exam

After completing all course work, doctoral students in the dual-title doctoral degree program in Political Science and African Studies must pass a comprehensive examination that includes written and oral components. Written components will be administered on the student’s major Political Science subfield and African Studies. The African Studies representative on the student’s dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination. The African Studies component of the exam will be based
on the student's thematic, national, or regional area of interest and specialization in African Studies.

**Dissertation and Dissertation Defense**

Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. Students enrolled in the dual-title program are required to write and orally defend a dissertation on a topic that reflects their original research and education in Political Science and African Studies. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

**Dual-Title Ph.D. in Political Science and Asian Studies**

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

Graduate students with research and educational interests in Asian studies may apply to the dual-title doctoral degree program in Political Science and Asian Studies. The goal of the dual-title degree in Political Science and Asian Studies is to enable graduate students from Political Science to acquire the knowledge and skills of their major area of specialization in Political Science while at the same time gaining the perspective of Asian Studies.

In order to prepare graduate students for the competitive job market, this program provides them with a solid disciplinary foundation that will allow them to compete for the best jobs in their field. For such students the dual-title Ph.D. in Political Science and Asian Studies will add value to their degree and their status as candidates. It will produce excellent political scientists who are experts in Asian Studies as well. The dual-title degree Political Science and Asian Studies will build curricular bridges beyond the student’s major field so as to provide a unique training regime for the global scholar.

**Admission Requirements**

For admission to the dual-title Ph.D. program, a student must first apply and be admitted to the Political Science graduate program and the Graduate School. After admission to the Political Science graduate program, a student must then apply for admission to the Asian Studies Program. Refer to the Admission Requirements section of the Asian Studies Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/asian-studies). Students already in their first and second years of the Political Science graduate program may also apply to the dual-title program. Doctoral students must be admitted into the dual-title degree program in Asian Studies prior to taking the qualifying examination in their primary graduate program.

In addition to the requirements of the Graduate School and Political Science, applicants interested in the dual-title program should also make their interest in the dual-title program known clearly on their applications and include remarks in their statement of purpose that address the ways in which their research and professional goals reflect an interest in interdisciplinary and Asian Studies-related research.

**Degree Requirements**

To qualify for an Asian Studies degree, students must satisfy the requirements of the Political Science program in which they are primarily enrolled. In addition, students must complete the degree requirements for the dual-title in Asian Studies, listed on the Asian Studies Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/asian-studies). Within this framework, final course selection is determined by the student, their Asian Studies adviser, and their Political Science program adviser.

Upon a student’s acceptance by the Asian Studies admissions committee, the student will be assigned an Asian Studies academic adviser in consultation with the Asian Studies chair. As students develop specific scholarly interests, they may request that a different Asian Studies faculty member serve as their adviser. The student and adviser will discuss a program of study that is appropriate for the student’s professional objectives and that is in accord with the policies of the Graduate School, the Political Science department and the Asian Studies program.

The doctoral degree in Political Science and Asian Studies is awarded only to students who are admitted to the Political Science doctoral program and admitted to the dual-title Ph.D. degree in Asian Studies. The minimum course requirements for the dual-title Ph.D. degree in Political Science and Asian Studies are as follows:

- A minimum total of 60 postbaccalaureate credits. Course work accepted for the M.A. in Political Science will count toward the 60-credit requirement. At least 45 credits, exclusive of dissertation, must be in political science.
- Completion of course work in two major fields (the first of which is a political science sub field as detailed in the Political Science graduate handbook, and the second of which is Asia-related) and one minor field (in a regular political science subfield).
- Completion of the designated core of courses in methodology (PLSC 501, PLSC 502, and PLSC 503).
- Completion of two, 1.5 credit seminars on teaching, writing, and professional development in political science.
- Completion of introductory field seminars appropriate to one’s three fields of study.
- 15 credits of Asia-related course work at the 400 or 500 level. At least 6 of these 15 credits will be from ASIA 501 and ASIA 502. As many as 6 may come from Political Science, as approved by the student’s doctoral adviser and the Asian Studies Program director of graduate studies. The remaining 3 credits can be taken in ASIA or in any department other than Political Science.
- All-skills proficiency in one Asian Language AND two years’ college study (or equivalent knowledge) of another Asian language OR alternative proficiency appropriate to the student’s field.

Particular courses may satisfy both the Political Science requirements and those of the Asian Studies program. Final course selection is determined by the student in consultation with their dual-title program advisers and their major program advisers.

**Language Requirement**

Students must show all-skills proficiency in one Asian language. All-skills proficiency in a foreign language can be assessed through the following mechanisms:

1. native speaker status,
2. completion of graduate-level research using the foreign language,
3. study abroad, and
4. independent study or examination.

All final determinations of all-skills proficiency will be made by a student’s Asian Studies doctoral adviser in consultation with the Asian Studies Director of Graduate Studies.
In addition to demonstrating all-skills proficiency in one Asian language, a student must also:

- Complete two years' college study (or equivalent knowledge) of another Asian language OR
- Achieve alternative proficiency appropriate to the student's field.

**Qualifying Exam**
The dual-title degree will be guided by the qualifying exam procedure of the Political Science graduate program. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable. There will be a single qualifying examination, containing elements of both Political Science and Asian Studies.

The qualifying examination committee for the dual-title degree will be composed of Graduate Faculty from Political Science and at least one Graduate Faculty member from the Asian Studies Program. The designated dual-title faculty member may be appointed from Political Science if that person holds a formal appointment with the Asian Studies program.

**Dissertation Committee Composition**
In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of a Political Science and Asian Studies dual-title doctoral degree student must include at least one member of the Asian Studies Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. The Asian Studies representative to the committee may serve as the Outside Field Member, and may also serve as the Outside Unit Member, if his or her primary appointment is in an administrative unit outside the unit in which the dissertation adviser's primary appointment is held.

If the chair of the committee representing Political Science is not also a member of the Graduate Faculty in Asian Studies, the member of the committee representing Asian Studies must be appointed as co-chair.

**Comprehensive Exam**
After completing all course work, doctoral students in the dual-title doctoral degree program in Political Science and Asian Studies must pass a comprehensive examination that includes written and oral components. Written components will be administered on the student's major Political Science subfield and Asian Studies. The Asian Studies representative on the student's dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.

**Dissertation and Dissertation Defense**
Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. Students enrolled in the dual-title program are required to write and orally defend a dissertation on a topic that reflects their original research and education in Political Science and Asian Studies. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

**Dual-Title Ph.D. in Political Science and Social Data Analytics**
Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

Political Science doctoral students seeking to attain and be identified with an interdisciplinary array of tools, techniques, and methodologies for social data analytics, while maintaining a close association with political science, may apply to pursue a dual-title Ph.D. in Political Science and Social Data Analytics.

Social data analytics is the integration of social scientific, computational, informational, statistical, and visual analytic approaches to the analysis of large or complex data that arise from human interaction. The dual-title Ph.D. aims to enable scientists who expand the capability of social data analytics, and use those capabilities creatively to answer important social scientific questions and to address grand social challenges, in both academic and nonacademic settings.

**Admission Requirements**
Students must apply and be admitted to the graduate program in Political Science and the Graduate School before they can apply for admission to the dual-title degree program. Applicants interested in the dual-title degree program may make their interest in the program known clearly on their applications to Political Science and include remarks in their statement of purpose that address the ways in which their research and professional goals in political science reflect an expanded interest in Social Data Analytics-related research. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Social Data Analytics dual-title program. Refer to the Admission Requirements section of the Social Data Analytics Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/social-data-analytics). Doctoral students must be admitted into the dual-title degree program in Social Data Analytics prior to taking the qualifying examination in their primary graduate program.

**Degree Requirements**
To qualify for the dual-title degree, students must satisfy the requirements of the Ph.D in Political Science. In addition, students must complete the degree requirements for the dual-title in Social Data Analytics, listed on the Social Data Analytics Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/social-data-analytics). Within this framework, final course selection is determined by the student in consultation with academic advisers from their primary graduate program adviser and Social Data Analytics.

The minimum course work requirements for the dual-title Ph.D. in Political Science and Social Data Analytics are as follows:

- Course work and other requirements of the Ph.D. in Political Science.
- SODA 501 (3 credits)
- SODA 502 (3 credits)
- 12 or more elective credits in Social Data Analytics from a list of courses maintained by the Social Data Analytics Committee. Collectively the elective credits must satisfy the following requirements:
  - (A) Core analytics distribution. 3 or more credits in courses focused on statistical learning, machine learning, data mining, or visual analytics. Courses approved as meeting this requirement are designated (A) on the list of approved electives.
  - (Q) Quantification distribution. 6 or more credits in courses focused on statistical inference or quantitative social science methodology. Courses approved as meeting this requirement are designated (Q) on the list of approved electives. *(A Political Science Ph.D. student would typically satisfy this distribution*...
The Social Data Analytics Program maintains a list of recommended background and skills that it recommends students have in place by the time they begin the interdisciplinary course work required to complete the Social Data Analytics degree. The qualifying exam is the appropriate setting for assessing the student’s preparation for the interdisciplinary work of the dual-title Ph.D. in Political Science and Social Data Analytics.

Dissertation Committee Composition
The dissertation committee must conform to all requirements of the primary program and the Graduate Council. In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of a Political Science and Social Data Analytics dual-title doctoral degree student must include at least one member of the Social Data Analytics Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. The Social Data Analytics representative to the committee may serve as the Outside Field Member, and may also serve as the Outside Unit Member, if his or her primary appointment is in an administrative unit outside the unit in which the dissertation adviser’s primary appointment is held.

If the chair of the committee representing Political Science is not also a member of the Graduate Faculty in Social Data Analytics, the member of the committee representing Social Data Analytics must be appointed as co-chair. The ideal arrangement then, is for a member of the Social Data Analytics Graduate Faculty with primary appointment in Political Science to act as dissertation chair, and for a member of the Social Data Analytics Graduate Faculty with primary appointment outside the administrative unit of the primary program to act as both Outside Field Member and Outside Unit Member.

Comprehensive Exam
After completing all course work, doctoral students in the dual-title doctoral degree program in Political Science and Social Data Analytics must pass a comprehensive examination that includes written and oral components.

Written components will be administered on a candidate’s major Political Science subfield and Social Data Analytics (acting as a first minor field). The Social Data Analytics representative(s) on the student’s dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.

The oral component of the comprehensive involves the defense of a dissertation prospectus, which must contain substantial Social Data Analytics content.

Dissertation and Dissertation Defense
Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. Students enrolled in the dual-title program are required to write and orally defend a dissertation on a topic that reflects their original research and education in Political Science and Social Data Analytics. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

Dual-Title M.A. and Ph.D. in Political Science and Women’s Studies
Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).
Graduate students with research and teaching interests in gender and politics may apply to the dual-title master’s or doctoral degree program in Political Science and Women’s Studies. The goal of the dual-title graduate degree program in Political Science and Women’s Studies is to enable graduate students from Political Science to acquire the knowledge and skills of their major area of specialization in Political Science while at the same time gaining the perspective of Women’s Studies.

In order to prepare graduate students for the competitive job market, this program provides them with a solid disciplinary foundation that will allow them to compete for the best jobs in their field. For such students the dual-title graduate degree in Women’s Studies will add value to their degree and their status as candidates. It will produce excellent political scientists who are experts in Women’s Studies as well. The dual-title graduate degree in Political Science and Women’s Studies will build curricular bridges beyond the student’s major field so as to provide unique training for the interdisciplinary scholar.

**Admission Requirements**

Students must apply and be admitted to the graduate program in Political Science and the Graduate School before they can apply for admission to the dual-title degree program in Women’s Studies. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Women’s Studies dual-title program. Refer to the Admission Requirements section of the Women’s Studies Bulletin page [here](http://bulletins.psu.edu/graduate/programs/majors/womens-studies). Doctoral students must be admitted into the dual-title degree program in Women’s Studies prior to taking the qualifying examination in their primary graduate program.

**Dual-Title Master of Arts (M.A.)**

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<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>PLSC 501</td>
<td>Methods of Political Analysis</td>
<td>3</td>
</tr>
<tr>
<td>PLSC 502</td>
<td>Statistical Methods for Political Research</td>
<td>3</td>
</tr>
<tr>
<td>WMNST 501</td>
<td>Feminist Perspectives on Research and Teaching Across the Disciplines</td>
<td>3</td>
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<tr>
<td>WMNST 502</td>
<td>Global Perspectives on Feminism</td>
<td>3</td>
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<tr>
<td>WMNST 507</td>
<td>Feminist Theory</td>
<td>3</td>
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**Electives**

Select 3 elective credits in Womens Studies approved courses (may double count if in political science field)

**Culminating Experience**

- Oral Exam
- MA Essay

| Total Credits | 30 |

For the dual-title Master of Arts degree in Political Science and Women’s Studies, the student’s committee will include at least one Women’s Studies-affiliated faculty member.

**Dual-Title Doctor of Philosophy (Ph.D.)**

The Department of Political Science requires a minimum total of 60 postbaccalaureate credits for the Ph.D. At least 45 credits, exclusive of the dissertation, must be in political science. Course work accepted for the M.A. in Political Science at Penn State will count toward the department’s 60-credit requirement. In the case of students who have earned credits in an advanced degree program at another university or in another department at Penn State, a maximum of 30 credits may count toward the 60-credit departmental requirement.

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</tr>
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<td>PLSC 502</td>
<td>Statistical Methods for Political Research</td>
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<td>PLSC 503</td>
<td>Multivariate Analysis for Political Research</td>
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<td>WMNST 501</td>
<td>Feminist Perspectives on Research and Teaching Across the Disciplines</td>
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<td>Global Perspectives on Feminism</td>
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<tr>
<td>WMNST 507</td>
<td>Feminist Theory</td>
<td>3</td>
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</tbody>
</table>

**Electives**

9 elective credits in Womens Studies approved courses (may double count if in political science field)

**Portfolio of Women’s Studies work**

| Total Credits | 51 |

Of these requirements at least 51 credits must be at the 500 level. In addition there is a 12-credit maximum for independent study.

**Qualifying Examination Committee Composition**

The qualifying examination committee for the dual-title degree will be composed of Graduate Faculty from Political Science and at least one Graduate Faculty member from the Women’s Studies Program. The designated dual-title faculty member may be appointed from Political Science if that person holds a formal appointment with the Women’s Studies program.

**Qualifying Exam**

There will be a single qualifying examination, containing elements of both Political Science and Women’s Studies. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

**Dissertation Committee Composition**

In addition to the general Graduate Council requirements for dissertation committees [here](http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of a Political Science and Women’s Studies dual-title Ph.D. student must include at least two members of the Women’s Studies Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. The Women’s Studies representative to the committee may serve as the Outside Field Member, and may also serve as the Outside Unit Member, if his or her
primary appointment is in an administrative unit outside the unit in which the dissertation adviser's primary appointment is held.

If the chair of the committee representing Political Science is not also a member of the Graduate Faculty in Women's Studies, the member of the committee representing Women's Studies must be appointed as co-chair.

**Comprehensive Exam**
After completion of required course work, doctoral students in the dual-title doctoral degree program must pass a comprehensive examination. The dual-title faculty representative on the student’s dissertation committee will participate in the writing and evaluation of the examination.

**Dissertation and Dissertation Defense**
Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. Students enrolled in the dual-title program are required to write and orally defend a dissertation on a topic that reflects their original research and education in their home discipline and Women's Studies. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

Students must pass the Ph.D. qualifying and comprehensive exams and have their dissertation proposal approved as specified in the Department of Political Science Graduate Student Handbook.

**Student Aid**
Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding section of The Graduate School's website. Student assistantships must adhere to the course load limits set by The Graduate School.

Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**Learning Outcomes**
1. Graduates will demonstrate command of contemporary relevant theories and debates in the discipline of Political Science and in their specific Political Science subfields of focus.
2. Graduates will demonstrate mastery of relevant literatures and cumulative knowledge in the discipline of Political Science and in their specific Political Science subfields of focus.
3. Graduates will demonstrate competence in the design and conduct of Political Science research.
4. Graduates will devise and execute independent original scholarly research projects relevant to the discipline of Political Science and in their specific Political Science subfields of focus.
5. Graduates will demonstrate competency in presenting their scholarly output in written and oral formats that meet standards and conventions in the discipline of Political Science and in their specific Political Science subfields of focus.
6. Graduates will demonstrate knowledge of the professional norm, standards and ethics of the discipline of Political Science.

**Contact**
**Graduate Program Head:** Lee Ann Banaszak
**Director of Graduate Studies/Professor-in-Charge:** Glenn Palmer
**Primary Program Contact:** Kristy Boob
**Email:** kmc248@psu.edu
**Mailing Address:** 203 Pond Lab, University Park, PA 16802
**Telephone:** (814) 863-1595
**Program Website:** Political Science (http://polisci.la.psu.edu)

**Project Management**
**Graduate Program Head** Greg Filbeck
**Program Code** PRMG
**Campus(es)** World Campus (M.P.M.)
**Degrees Conferred** Master of Project Management (M.P.M.)
**The Graduate Faculty**
View (https://secure.gradsch.psu.edu/gmpms/index.cfm?searchType=fac&prog=PRMGT)

The Master of Project Management (M.P.M.) is a graduate degree program that emphasizes all aspects of project management theory and practice. The M.P.M. is an interdisciplinary program that utilizes problem-based learning as well as web-based instructional methods to transcend time and space, and to support effective teaching and learning. The key areas of the M.P.M. include:

- planning, cost, and value management;
- project control;
- human issues in project management;
- strategic issues in project management; and
- commercial and procurement law as it relates to project management.

**Admission Requirements**
Applications are accepted for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Only candidates who demonstrate high promise of success for graduate work are admitted to the M.P.M. program. Successful admission to the M.P.M. Program can be achieved in one of the following three ways:

1. Applicants must achieve a minimum GMAT score of 450. Applicants must also submit a personal essay and 2 letters of recommendation for review.
2. Applicants have a cumulative undergraduate grade-point average of 3.0 or above and five or more years of relevant project management experience as approved by the program.
chair. Applicants must also submit a personal essay and 2 letters of recommendation for review.

3. Students may apply to enter the M.P.M. degree program upon successful completion of the Graduate Certificate in Project Management with a GPA of 3.0 or higher.

The M.P.M. program emphasizes application of course concepts to actual project management opportunities and problems. Therefore, students who currently are, or previously were, employed as project managers or project team members will derive the greatest benefit from the program. All applicants must provide evidence of sufficient current or previous work experience that will enable them to successfully complete course assignments requiring the application of course concepts to real project management situations. This evidence may be provided in either the form of two letters of recommendation from individuals who know the applicant in a professional capacity or through nomination to participate in the program by an appropriate official within the applicant’s employing organization. Those who write letters of recommendation or submit nominations on behalf of the applicant will be asked to attest to the applicant’s suitability for the program of study considering factors such as the applicant’s length of employment, level and areas of work responsibility, personal qualities, career goals, maturity of purpose, and program requirements to apply course concepts to work-related issues. Applicants are encouraged to consult with the program chair concerning the suitability of their work experiences in relationship to program requirements.

All students must be computer literate and have ready and reliable access to a computer and the internet to successfully complete the M.P.M. program. They must know how to use word processing software, log on to an Internet provider, and use email. Additionally, M.P.M. students will use Microsoft Office in their course work that will require they have a working knowledge of Microsoft Office programs such as Word, Excel, Power Point, and Access. Access to fax facilities may be needed as an additional form of communications between student and instructor or between students.

**Degree Requirements**

**Master of Project Management (M.P.M.)**

Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

Students complete eight required courses (24 credits) in which they apply course concepts to project management scenarios through the use of cases, simulations or actual situations in their employing organizations.

The recommended maximum course load is 6 credits per semester for students working full-time. MANGT 510 must be taken in the first semester of study and is a prerequisite or co-requisite for all other courses in the program.

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<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>MANGT 510</td>
<td>Project Management</td>
<td>3</td>
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<tr>
<td>MANGT 515</td>
<td>Cost and Value Management</td>
<td>3</td>
</tr>
<tr>
<td>MANGT 520</td>
<td>Planning and Resource Management</td>
<td>3</td>
</tr>
<tr>
<td>MANGT 525</td>
<td>Commercial Law and Project Procurement</td>
<td>3</td>
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<tr>
<td>MANGT 531</td>
<td>Organizations</td>
<td>3</td>
</tr>
<tr>
<td>MANGT 535</td>
<td>Interpersonal and Group Behavior</td>
<td>3</td>
</tr>
<tr>
<td>MANGT 540</td>
<td>Strategy: Corporate, Business and Project</td>
<td>3</td>
</tr>
</tbody>
</table>

All students must attend a minimum of one online orientation in order to complete the graduation requirements of the program.

**Electives**

6 credits of elective courses. Electives may include additional program-approved courses or an applied research project focusing on some aspect of project management completed as an independent study.

**Culminating Experience**

<table>
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<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MANGT 575</td>
<td>Management of Projects (Capstone Project)</td>
<td>3</td>
</tr>
</tbody>
</table>

The program culminates with a capstone project, which is completed while enrolled in MANGT 575. MANGT 575 is a problem-based capstone course that integrates the themes necessary to appreciate the overall challenge of project management. The course includes a final, integrative and comprehensive project based on the identification and analysis of real project management problems from the students’ work organizations. This written assignment requires the integration of theory from previous courses along with significant library and literature searches to analyze and propose solutions to these problems. MANGT 575 must be taken following completion of at least 18 credits. No more than one of the required courses may be taken concurrently with MANGT 575.

**Student Aid**

World Campus students in graduate degree programs may be eligible for financial aid. Refer to the Tuition and Financial Aid section (http://www.worldcampus.psu.edu/tuition-and-financial-aid) of the World Campus website for more information.

**Courses**

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**Learning Outcomes**

1. MPM LG1 - Project Strategy: Students will be able to connect project strategies with overall corporate strategies and manage the risks associated with actual project strategies

   - MPM LG1 OBJ 1 Students will understand how to develop an appropriate TOWS strategy matrix.
   - MPM LG1 OBJ 2 Students will recognize the value that a TOWS analysis provides (by applying to specific case scenarios).
   - MPM LG1 OBJ 3 Students will understand how risk affects project strategy and be able to manage it.
   - MPM LG1 OBJ 4 Students will identify critical stakeholders affected by as well as affecting the strategic decisions and actions of project management.
   - MPM LG1 OBJ 5 Students will understand the consequences of decisions/actions to and by stakeholders.
   - MPM LG1 OBJ 6 Students will develop well defined objectives for managing project strategies (using SMART c3 formats).
2. MPM LG2 - Planning, Resource Assignment, and Scheduling: Students will be able to apply appropriate concepts and techniques to develop comprehensive project plans and solve scheduling and resource assignment problems.

- MPM LG2 OBJ 1 Students will be able to develop comprehensive project plans including project scope documents and Work Breakdown Structures (WBS).
- MPM LG2 OBJ 2 Students will be able to develop comprehensive project schedules and are able to analyze the time/cost trade-offs in developing a project schedules.
- MPM LG2 OBJ 3 Students will understand different types of project risks and how to manage them.
- MPM LG2 OBJ 4 Students will understand how resource constraints impact project progress and analyze various resource allocation methods and how to effectively schedule resources.
- MPM LG2 OBJ 5 Students will be able to monitor project progress by applying appropriate evaluation and control techniques.

3. MPM LG3 - Project Leadership and Motivation: Students will be able to identify, analyze, and solve issues surrounding employee performance in project teams.

- MPM LG3 OBJ 1 Students will be able to define employee performance in terms of its dimensionality.
- MPM LG3 OBJ 2 Students will be able to identify multiple drivers of employee performance and discuss the direct and indirect effects of the drivers using multiple theories/perspectives.
- MPM LG3 OBJ 3 Students will be able to demonstrate a broad understanding of contemporary theory on each driver of employee performance.

4. MPM LG4 - Solve Project Management Challenges: Students will be able to critically evaluate project performance and identify key errors and opportunities and recommend relevant solutions to project problems.

- MPM LG4 OBJ 1 Students will be able to analyze projects and identify key strengths.
- MPM LG4 OBJ 2 Students will provide evidence of their knowledge of the basic concepts associated with projects and project management.
- MPM LG4 OBJ 3 Students will be able to describe techniques that have become fundamental to the current practice of project management.

5. MPM LG5 - Commercial Law and Project Procurement: Students will be able to identify and critically evaluate their project’s and organization’s supply chain.

- MPM LG5 OBJ 1 The student will identify the need to negotiate flexibility in long-term contracts, such as changes in prices in the cost of goods over time and other terms, to facilitate productive working relationships within in the supply chain, including tier vendors.
- MPM LG5 OBJ 2 The student will critically evaluate the legal impact of contract language with tier vendors and others in the supply chain.
- MPM LG5 OBJ 3 The student will be able to recommend performance objectives for each phase of a supplier’s contract payment terms.
- MPM LG5 OBJ 4 The student will identify the critical role that subcontractors play in the successful performance of the supply chain.
- MPM LG5 OBJ 5 The student will identify the critical risks in the procurement relationship and be able to draft appropriate contract provisions within the supply chain to address those risks.
- MPM LG5 OBJ 6 The student will understand the powerful impact that differing commercial law in other nations can have in negotiating contracts when the supply chain incorporates an international setting.

Contact
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Program Website: Project Management (http://www.worldcampus.psu.edu/degrees-and-certificates/project-management-masters/overview)

Psychology
Graduate Program Head: Melvin M. Mark
Program Code: PSYCH
Campus(es): Doctor of Philosophy (Ph.D.)
Doe of Science (M.S.)
Dual-Title Ph.D. in Psychology and Language Science
Dual-Title Ph.D. and M.S. in Psychology and Women’s Studies

The Graduate Faculty
The graduate Psychology program is characterized by highly individualized study leading to the Ph.D. degree. Emphasis is placed on research, teaching, and professional career development. Each student is associated with one of the six program areas offered in the department:

- Clinical (including Child Clinical)
- Cognitive
- Developmental
- Psychobiology
- Industrial/Organizational
- Social

An individual’s particular pattern of interests dictates in part the course of study followed. Within all areas, research is an integral part of study; usually, the research is empirical in focus, but it may be applied or basic, depending on the problem of interest.

The department has laboratories, computer facilities, darkroom, and shop, and students have access to the large resources of the University, which include excellent computation facilities and a large open-stack.
library. Opportunities for practicum experience are available; e.g., clinical students find practicum in local mental health centers, while industrial students find placement in appropriate business or industrial settings.

**Other Relevant Information**
The Department of Psychology makes every effort to recruit and train minority psychologists. Support for minority students is coordinated by the department, the Graduate School Minority Graduate Scholars Award Program, and the American Psychological Association Minority Fellowship Program. In addition, the department often has funded minority students through minority training programs and special minority research programs.

**Admission Requirements**
Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Scores from the Graduate Record Examinations (GRE) verbal and quantitative portions are required; scores from the Miller Analogies Test (MAT) are optional. All applicants who were psychology majors as undergraduates should provide scores from the advanced psychology (subject) GRE test. Applicants with superior undergraduate (particularly junior and senior years) or graduate grade-point averages will be considered for admission. Although a major in psychology is not required, applicants should have a broad undergraduate background that includes 12 credits in psychology. Undergraduate study in psychology should include a course in statistics and a psychological methodology course.

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. See GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

**Degree Requirements**

**Master of Science (M.S.)**
Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

The psychology department does not have a graduate program designed for students seeking only the master's degree. A master's thesis, or the department's equivalent (an acceptable published journal article), is required for the Ph.D. degree in Psychology. Usually, but not always, the master's thesis centers on an empirical research topic. The typical thesis involves:

- a literature review,
- data collection,
- analysis, and
- discussion.

A master's degree is not awarded unless a thesis is submitted to the Graduate School. Students must successfully propose a thesis study by the end of the second year and have successfully defended a thesis by the end of their third year in the program.

**Doctor of Philosophy (Ph.D.)**
Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

All students in their first year of residency must satisfactorily complete the department's English proficiency requirement (PSY 501).

Students must complete (within their first 60 graduate credits for students without previous graduate credit) 6 departmentally approved graduate credits in statistics with a grade of B or better. Students must complete 18 credits in a suitably selected major area; majors usually are defined by one of the six program areas. In addition to the major area credits, students must complete a minimum of 12 credits outside the major area. Two options exist for completing these 12 credits:

- completing four courses in APA-recommended breadth areas, or
- completing course work in a particular area of expertise outside the major.

Some areas may have additional recommended or required courses as well. The Ph.D. comprehensive examination must be taken by the time 70 graduate credits are earned, or prior to the student's fourth year in residence, whichever comes first. The department has no foreign language requirement.

**Applied Linguistics Option**
The program offers an option in Applied Linguistics which includes 18 credits in APLNG/LING offered in the Linguistics and Applied Language Studies program. Underpinning the option is the synthesis of knowledge related to how language is acquired, understood, and spoken by children and adults who use one or more languages.

**Dual-Titles**

**Dual-Title Ph.D. in Psychology and Language Science**
Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

Graduate students with research and educational interests in Psychology and Language Science may apply to Psychology and Language Science Ph.D. Graduate Program. The goal of the dual-title degree Psychology and Language Science is to enable graduate students from Psychology to acquire the knowledge and skills of their major area of specialization in Psychology, while at the same time gaining the perspective and methods of the Language Sciences.

**Admission Requirements**
To pursue a dual-title degree under this program, the student must first apply to the Graduate School and be admitted to the Psychology graduate program. Upon admission to the Psychology program and with a recommendation from a Language Science program faculty member in the Department of Psychology, the student's application will be forwarded to a committee that will include:

- the Director of the Linguistics program,
- one of the Co-Directors of the Center for Language Science, and
- a third elected faculty member within the Center for Language Science.
All three committee members will be affiliated with the program in Linguistics. Upon the recommendation of this committee, the student will be admitted to the dual-title degree program in Language Science. Refer to the Admission Requirements section of the Language Science Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/language-science). Doctoral students must be admitted into the dual-title degree program in Language Science prior to taking the qualifying examination in their primary graduate program.

**Degree Requirements**

- **Two Language Science proseminar courses** (LING 521 and LING 522; 6 credits).
- **One 3 credit research internship with a Language Science faculty mentor from an outside area.** The 3 credit internship required by the Psychology program may satisfy both the Psychology requirement and the Language Science requirement (for 6 total credits of internship to be completed with two faculty members from the Language Science program).
- **Students will choose one course among the following:** CSD 596, GER 596, LING 596, PSY 596, SPAN 596.

To qualify for the dual-title degree, students must satisfy the degree requirements for the degree they are enrolled in Psychology. In addition, students must complete the degree requirements for the dual-title in Language Science, listed on the Language Science Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/language-science). Final course selection is determined by the student in consultation with their dual-title program advisers and their major program advisers. Students who already hold a master's degree from another institution may petition to have equivalent course credits accepted.

The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Psychology and must include at least one Graduate Faculty member from the Language Science program. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. There will be a single qualifying examination, containing elements of both Psychology and Language Science. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of a Psychology and Language Science dual-title Ph.D. student must include at least one member of the Language Science Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in Language Science, the member of the committee representing Language Science must be appointed as co-chair. The Language Science representative on the student's dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by the dissertation committee and reflects their original research and education in Psychology and Language Science. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

**Dual-Title M.S. and Ph.D. in Psychology and Women's Studies**

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

**Admission Requirements**

Students must apply and be admitted to the graduate program in Psychology and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Women's Studies dual-title program. Refer to the Admission Requirements section of the Women’s Studies Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/womens-studies) for admission to the dual-title degree program in Women's Studies prior to taking the qualifying examination in their primary graduate program.

**Degree Requirements**

To qualify for the dual-title degree, students must satisfy the degree requirements for the degree they are enrolled in Psychology. In addition, students must complete the degree requirements for the dual-title in Women's Studies, listed on the Women's Studies Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/womens-studies). Doctoral students must be admitted into the dual-title degree program in Women's Studies prior to taking the qualifying examination in their primary graduate program.

Students who already hold a master’s degree from another institution may petition to have equivalent course credits accepted.

The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Psychology and must include at least one Graduate Faculty member from the Women’s Studies program. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. There will be a single qualifying examination, containing elements of both Psychology and Women's Studies. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of a Psychology and Women's Studies dual-title Ph.D. student must include at least two members of the Women's Studies Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in Women's Studies, the member of the committee representing Women's Studies must be appointed as co-chair. The Women's Studies representative on the student's dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by the dissertation committee and reflects their original research and education in Psychology and Women's Studies. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.
Learning Outcomes

1. **Scientific Knowledge.** Students will demonstrate (a) integrated understanding of major psychological concepts, theories, and scientific foundations across multiple disciplines of psychology and (b) the ability to apply psychological theories and methods in their research and/or practice.

2. **Critical Thinking.** Students will demonstrate (a) critical thinking skills in the evaluation and critique of empirical and theoretical research (in their specific area of specialization) (b) the ability to identify questions and solve issues in scholarly and professional environments (c) competence in formulating one’s own scholarly opinions based on the integration of knowledge from diverse Psychological findings.

3. **Communication.** Students will demonstrate the ability to (a) communicate (verbal and written format) effectively in scholarly and professional environments (b) defend their ideas to others in research and practice (c) disseminate their knowledge and skills to enhance psychological awareness to the general population.

4. **Research Skills.** Students will demonstrate the ability to (a) critically analyze and integrate diverse research findings. (b) systematically identify and frame research questions, design a research study, analyze the resulting qualitative/quantitative data, and draw appropriate conclusions using scientific methodology and statistical analysis (c) organize their findings in written format, and/or present the findings in academic presentations or professional meetings.

5. **Diversity and Ethical Considerations.** Students will demonstrate (a) awareness of, and ability to work professionally with diverse individuals, groups, and communities, who represent various cultural and personal backgrounds and characteristics (b) knowledge and application of ethical principles related to the responsible conduct of research, as well as to scientific and professional activities with individuals, groups, and organizations.

Contact

**Graduate Program Head:** Melvin Mark

**Director of Graduate Studies/Professor-in-Charge:** Alicia Grandey

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**Mailing Address:** 125A Bruce V. Moore Building, University Park, PA 16802

**Telephone:** (814) 863-1721

**Program Website:** Psychology (http://psych.la.psu.edu/graduate)

**Psychology of Leadership**

**Graduate Program Head**

**Program Code**

**Campus(es)**

**Degrees Conferred**

**The Graduate Faculty**

**Program Website:** Psychology of Leadership (http://psych.la.psu.edu/graduate)

The M.P.S. degree in Psychology of Leadership is designed for individuals who are in the early and middle stages of their organizational careers, currently in or aspiring to leadership positions. The content of the program is appropriate for individuals employed in a wide range of functional specialties and industry sectors, including public agencies.

The M.P.S. degree in Psychology of Leadership examines the nature and role of leadership across varied organizational settings. Leadership is broadly defined as the process of influencing others (individually or collectively) in organizational settings. The program is based on well-supported psychological research and theory that have been shown to increase leadership effectiveness in work groups and organizations. While based in research, the program emphasizes the application of learned knowledge. Courses address the ways that various aspects and techniques of leadership can enhance the motivation, attitudes, and performance of individuals and teams in organizations.

**Admission Requirements**

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

**Educational Background**

Students who do not have a GPA of at least 3.0 will be considered on a case-by-case basis depending on the quality of their overall application. Applicants who are still completing their baccalaureate requirements at the time of application may be admitted to the Graduate School provisionally (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/provisional-admission), pending the awarding of the baccalaureate degree. Students are also expected to have a minimum of two years of full-time work experience prior to admission.

**Core Application Packet**

- Completed official online Graduate School application (http://gradschool.psu.edu/prospective-students/how-to-apply) and payment of nonrefundable application fee.
- Statement of purpose: a 2-3 page essay articulating career and educational goals that demonstrates the student’s written communication skills.
- A current vita or resume.
• Three letters of recommendation that attest to the student's readiness for graduate study and document the requisite minimum of two years of paid work experience. Letters must be submitted through the online application. Within the online application the student will be asked to enter the names and email addresses of three individuals who will be providing recommendations. Those individuals will receive a note via email asking them to complete a brief form that will serve as the recommendation. The student should inform all recommenders they must submit the form in order for the application to be complete.
• Official transcripts from all post-secondary institutions attended (http://www.gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission)

Degree Requirements
Master of Professional Studies (M.P.S.)
Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

Total required credits for the MPS: 33 credits at the 400, 500, or 800 level; at least 27 must be at the 500 or 800 level, with at least 6 at the 500 level. Students must complete 9 credits of required courses and a 3-credit capstone course that serves as the culminating experience. Students choose the remaining 21 credits from a list of approved electives maintained by the program office.

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<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>PSY 532</td>
<td>Psychological Foundations of Leadership</td>
<td>3</td>
</tr>
<tr>
<td>PSY 539</td>
<td>Foundations of Behavior, Motivation, and Attitudes at Work</td>
<td>3</td>
</tr>
<tr>
<td>PSY 833</td>
<td>Ethics and Leadership: Psychological and Social Processes</td>
<td>3</td>
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</table>

Electives
Select 21 credits from list of approved electives maintained by the program office.

Culminating Experience
PSY 894 Capstone Experience (Scholarly Paper) 3

Total Credits 33

The culminating experience provides students with an opportunity to apply their knowledge of the psychological theories and principles concerning leadership to an applied research project. The choice of research project topic will be mutually determined by the instructor and each student. A written paper based on the applied project is required and must contain project description, analysis, and interpretation of its findings, as well as a review of relevant published literature.

Student Aid
World Campus students in graduate degree programs may be eligible for financial aid. Refer to the Tuition and Financial Aid section (http://www.worldcampus.psu.edu/tuition-and-financial-aid) of the World Campus website for more information.

Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Learning Outcomes
1. Graduates will be able to explain relevant theories underlying and related to the psychology of leadership.
2. Graduates will be able to apply psychological theories to leadership issues and situations.
3. Graduates will be able to analyze leadership situations with respect to ethics and understand the implications of leader behavior in self and others.
4. Graduates will be able to analyze leadership situations in order to evaluate leader behaviors and predict their effectiveness in self and others.
5. Graduates will be able to analyze leadership situations with respect to ethics and understand the implications of leader behavior in self and others.
6. Graduates will be able to evaluate their own leadership behaviors and plan steps for improvement.
7. Graduates will be able to plan strategies for improving leadership and organizational effectiveness.

Contact
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Telephone: (814) 865-0704
Program Website: Psychology of Leadership (http://www.worldcampus.psu.edu/degrees-and-certificates/penn-state-online-psychology-leadership-masters/overview)

Public Administration
Graduate Program Head: Triparna Vasavada
Program Code: PADM
Campus(es): Harrisburg (Ph.D., M.P.A.)
Degree(s): Master of Public Administration (M.P.A.)
               Joint J.D./M.P.A. with Dickinson Law
The Graduate Faculty
View (https://secure.gradsch.psu.edu/gpms/index.cfm?
searchType=fac&prog=PADM)

The Master of Public Administration (M.P.A.) program is intended for those with career interests in public management, health and human services, government, and other public service and nonprofit organizations. The curriculum blends theoretical and applied concepts and assures “real-world” experiences for the novice administrator. In
In addition, it requires that students devote attention to general professional development. The M.P.A. program is accredited by the National Association of Schools of Public Affairs and Administration (NASPAA).

The mission of the Ph.D. program in Public Administration is to provide advanced graduate education in theory and research in the field to prepare students for academic, research, and advanced professional careers in public administration. Each student is expected to graduate with:

1. Research experience working with public administration faculty
2. Experience in presentation of scholarly papers and posters at national and regional conferences
3. Experience in developing, authoring, or co-authoring with a faculty member, and submitting at least one article for a refereed publication
4. Teaching experience at the college/university level

**Admission Requirements**

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

**Master of Public Administration (M.P.A.)**

Applicants who are still completing their baccalaureate requirements at the time of application may be provisionally admitted (http://gradschool.psu.edu/prospective-students/how-to-apply/ provisional-admission) to the Graduate School conditional on the awarding of the baccalaureate degree.

Admission to the MPA program is based on clear suitability for the program as demonstrated by the application as a whole, including the following:

- a completed application with the nonrefundable application fee;
- official transcripts from all post-secondary institutions attended (http://gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission);
- a statement of career and educational goals;
- a successful undergraduate record with a grade-point average of 3.00 (either as the cumulative GPA or for the last 60 hours of relevant course work);
- satisfactory scores on the Graduate Record Examination (GRE), Graduate Management Admission Test (GMAT), or Law School Admission Test (LSAT) if the GPA is less than 3.0; and
- recommendations from three references.

**Doctor of Philosophy (Ph.D.)**

Individuals with superior academic records and a strong interest in careers emphasizing research and scholarship are encouraged to apply to the program. The program typically admits a Ph.D. cohort of full-time students to begin each fall semester.

Admission to the Ph.D. program is based on the applicant’s undergraduate and graduate academic records, standardized test scores, letters of reference, and the compatibility of their backgrounds and interests with those of the program faculty members, as expressed in the applicant’s statement of goals and research interests. All applicants must have completed a master’s degree. A completed master of public administration (M.P.A.) degree is preferred, but students with master’s degrees in related areas (political science, public policy, economics, sociology, anthropology, social work, business management, and health administration, for example) or Juris Doctorate degrees (law) will also be considered.

**Application Deadlines**

There are two deadlines for applications for the fall semester of the following academic year: January 15 and March 15 of each year. For those applicants seeking research or teaching assistantships, the deadline to submit all application materials is January 15. Late applications may be considered if assistantships are still available. Applicants who wish to finance their education with their own funds or other sources (foreign governments that fund international students for Ph.D. studies in the United States and other funding agencies, such as Fulbright commissions) must submit all application materials by March 15.

**Application Package**

A complete application must include:

1. A completed online Graduate School application (http://www.gradschool.psu.edu/prospective-students/how-to-apply)
2. Payment of a non-refundable application fee
3. Official Graduate Record Examination scores (verbal, quantitative, and analytical) taken within the five years prior to the date of application
4. A resume that includes:
   a. work experience,
   b. volunteer activities,
   c. academic and professional honors,
   d. honorary societies,
   e. extracurricular activities,
   f. offices held,
   g. any publications and
   h. other significant activities
5. A statement of goals and research interests, including evidence of research aptitude and interest as well as "fit" with the faculty interests in the Ph.D. program at Penn State Harrisburg. The applicant should make the case why this Ph.D. program at Penn State Harrisburg would be a good fit for him/her
6. A writing sample that reflects the applicant's background in conducting academic research and potential to conduct academic research in the future
7. At least three letters of recommendation, preferably from faculty members who can comment upon the applicant's potential as a doctoral student
8. Official transcripts from all post-secondary institutions attended. (http://www.gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission)

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. See GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.
Degree Requirements

Master of Public Administration (M.P.A.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

Students may begin the program in any semester. Three courses (or 9 credits) per semester are considered a normal course load for full-time students. Part-time students typically take one or two 3-credit courses each semester and one or two courses during the summer session to maintain steady progress toward the degree. The program, including an internship in a public agency or nonprofit organization for those without three years of managerial, supervisory, or professional experience, requires eighteen to twenty-four months of full-time study, or three to five years on a part-time basis.

The M.P.A. degree program requires a minimum of 39 credits:

- 18 credits in core courses,
- 15 credits in electives,
- 3 credits for the research project that serves as the culminating experience for the degree, and
- a 3 credit internship.

The 3-credit internship may be waived at the discretion of the program for students who have at least two years of full-time relevant work experience that consists of supervisory, managerial, or professional work, or who gain this experience while enrolled in the program. Students for whom the internship requirement is waived can complete the program with a minimum of 36 credits. Up to 6 credits of 400-level courses may be taken as electives, with the approval of an adviser.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PADM 500</td>
<td>Public Organization and Management</td>
<td>3</td>
</tr>
<tr>
<td>PADM 502</td>
<td>Governmental Fiscal Decision Making</td>
<td>3</td>
</tr>
<tr>
<td>PADM 503</td>
<td>Research Methods</td>
<td>3</td>
</tr>
<tr>
<td>PADM 505</td>
<td>Human Resources in the Public and Nonprofit Sectors</td>
<td>3</td>
</tr>
<tr>
<td>PADM 507</td>
<td>Introduction to Public Policy Analysis</td>
<td>3</td>
</tr>
<tr>
<td>PADM 510</td>
<td>Organization Behavior</td>
<td>3</td>
</tr>
<tr>
<td><strong>Internship in Public Administration</strong></td>
<td><strong>Internship</strong></td>
<td><strong>3</strong></td>
</tr>
</tbody>
</table>

Electives

With the faculty adviser’s approval, a student selects 15 credits of electives from a list of approved electives maintained by the program office.

Culminating Experience

- PADM 594 Research Topics (Capstone Course) 3

Total Credits 39

Doctor of Philosophy (Ph.D.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

A Ph.D. student must first successfully complete the prerequisite courses specified by the program to make up for deficiencies, if any exist. After these are completed, a student must take a minimum of 42 credits:

- five 3-credit foundation courses,
- four 3-credit research methods courses, and
- five 3-credit specialization area courses.

All doctoral students must pass a qualifying examination, a comprehensive written and oral examination, and a final oral examination (the dissertation defense). To earn the Ph.D. degree, doctoral students must also write a dissertation that is accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

Prerequisite Courses and Provisional Admission

Applicants who do not have the necessary background, but otherwise meet the criteria for admission may be admitted provisionally (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/provisional-admission) and must make up any deficiencies in graduate courses in public administration noted in the letter of acceptance. Students who must make up deficiencies are considered to be provisionally admitted (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/provisional-admission) into the program.

Provisionally admitted students are required to take one or both of the following prerequisite courses: PADM 500 and PADM 507. In consultation with the program faculty members, the coordinator of the Ph.D. program makes the decisions on which prerequisite courses each student should be required to take.

A student may remain in this temporary classification for a period of no longer than two semesters following admission. Upon successful completion of the prerequisite courses noted in the letter (with at least a 3.5 grade-point average), the student will be removed from provisional status and be regularly enrolled. The provisional status must be removed before a student takes his/her qualifying exam.

Foundations of Public Administration

All the students in the program will be required to take the following foundational courses before they are eligible to take the qualifying examination:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PADM 570</td>
<td>Scope and Methods of Public Administration</td>
<td>3</td>
</tr>
<tr>
<td>PADM 571</td>
<td>Seminar in Organizational Theory</td>
<td>3</td>
</tr>
<tr>
<td>PADM 573</td>
<td>Research and Theory in Public Policy and Governance</td>
<td>3</td>
</tr>
<tr>
<td>PADM 574</td>
<td>Research and Theory in Public and Nonprofit Management</td>
<td>3</td>
</tr>
<tr>
<td>PADM 572</td>
<td>Research and Theory in Public Budgeting and Finance</td>
<td>3</td>
</tr>
</tbody>
</table>

Specialization Area Courses

In consultation with the student’s adviser and dissertation committee, each doctoral student will develop a public administration specialization that consists of five 3-credit courses. These specialization areas are not pre-defined. They may be tailor-made by the student and his/her committee, based on the student’s interests and the availability of the courses in the School of Public Affairs and other colleges and graduate programs at Penn State. Examples of possible specialization areas are

Finance

Governance

Management
• public and nonprofit management,
• organizations and human resource management,
• public budgeting and finance,
• public policy analysis,
• state and local government administration,
• criminal justice,
• health administration, and
• homeland security.

Research Methods Courses
Students are required to take four 3-credit research methods courses.
The following two research methods courses are required for all Public Administration Ph.D. students:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PADM 503</td>
<td>Research Methods</td>
<td>3</td>
</tr>
<tr>
<td>PADM 575</td>
<td>Advanced Research Design</td>
<td>3</td>
</tr>
</tbody>
</table>

Students also will select two in-depth 3-credit research methods courses on the basis of their research interests (quantitative, qualitative, or mixed methods), suitability of the courses in preparing students for their dissertation studies, and the availability of the courses.

Students may find suitable courses in the Ph.D. program in Public Administration or other graduate programs at Penn State. These two in-depth methods courses should be approved in advance by the student’s dissertation committee. A student’s committee may also allow him/her to take in-depth methods courses that are offered by other universities or research institutions if the equivalent courses cannot be found within Penn State, if the equivalency of these courses to 3-credit graduate-level courses offered at Penn State can be verified by Graduate Enrollment Services, and if the costs of taking these courses can be covered by the student or another arrangement can be made to cover the costs.

Qualifying Examination
Only students who complete the required courses in the Foundations of Public Administration successfully, with a minimum 3.5 GPA, may take the qualifying examination. The qualifying examination will cover topics about the intellectual history and enduring questions in the field. Many of these subjects are covered in the required foundational doctoral courses; they include such topics as public administration and democratic theory, public organizations and management, and constitutional and legal foundations. The exam is written and graded by the Public Administration Graduate Faculty.

Comprehensive Examination
Upon successful completion of the specialization courses and research methods courses, with a minimum 3.5 GPA, a doctoral student takes a comprehensive written and oral examination. Comprehensive examinations are administered by the student’s dissertation committee. In comprehensive examinations, students are tested about the contents of their specialization areas and they will be required to propose a research design on a relevant topic.

Dissertation
After passing the comprehensive examination, a student must work with his or her adviser and dissertation committee to develop a full dissertation proposal within three months of the exam. Once the dissertation committee approves the full proposal, dissertation research can begin. Students will be required to conduct their dissertation research and write and defend their dissertations in accordance with Graduate Council policy and as agreed on by their dissertation committees.

Grade Point Average and Time Limit
Full-time students are expected to finish the program in four to five years. Graduate Council policy requires that a student must complete the program within eight years after passing the qualifying examination. The Ph.D. program in Public Administration requires that students have at least a 3.50 grade-point average in order to graduate.

Joint Degrees
Joint J.D./M.P.A. with Penn State Dickinson Law
Requirements listed here are in addition to requirements listed in GCAC-211 Joint Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/joint-degree-programs).

Penn State Dickinson Law and the School of Public Affairs, Penn State Harrisburg, the Capital College, offer a joint degree program leading to the degrees of Juris Doctor, granted by Dickinson Law, and Master of Public Administration, granted by Penn State Harrisburg.

Admission Requirements
In order to be admitted to the program, students must first be admitted to Penn State Dickinson Law under its regular admission procedures. Subsequently, the student must be recommended for admission to the M.P.A. program by Dickinson Law, and must apply for admission to the M.P.A. degree program as described on the Admission Requirements tab. Penn State Harrisburg will make independent admissions decisions as to all joint degree applicants.

Admissions requirements and applications for Dickinson Law are available at the Admissions & Aid (https://dickinsonlaw.psu.edu/admissions-aid) section of its website.

Degree Requirements
Students must fulfill all requirements for each degree in order to be awarded that degree, subject to the double-counting of credits as outlined below. Degree requirements for the J.D. program are listed on the Dickinson Law website (https://dickinsonlaw.psu.edu/academics/curriculum/jd-program). Degree requirements for the M.P.A. degree are listed on the Degree Requirements tab.

A maximum of 9 credits of Dickinson Law course work may be double-counted for credit toward the M.P.A. degree at Penn State Harrisburg, subject to program approval based on relevance to the M.P.A. degree.

A maximum of 9 credits of M.P.A. course work with a grade of B or better may be double-counted for credit toward the J.D. degree at Dickinson Law, subject to approval by Penn State Dickinson Law.

A student in the joint degree program can graduate with one degree prior to completing the other, if all requirements for that degree have been completed. Students must earn at least a 3.0 grade-point average to be eligible for the M.P.A. degree. If students accepted into the joint degree program are unable to complete the J.D. degree, they are still eligible to receive the M.P.A. degree if all the M.P.A. degree requirements have been satisfied.

Student Aid
Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School’s website. Students on graduate assistantships must adhere to the course
load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

Qualified Ph.D. students will be supported with 9-month merit-based research or teaching assistantships. The assistantship granted to a student may be renewed at the end of each academic year, based on the student’s academic performance in the program. While these are not guaranteed, funding opportunities may also be available for admitted students during the summer semesters. Such opportunities may include, but are not limited to, teaching and involvement in faculty-sponsored research. Students may also apply for other financial aid programs through the University’s Office of Student Aid (http://studentaid.psu.edu).

In addition, the program faculty may admit to the program qualified full-time students who will finance their educations with scholarships from sources outside Penn State or with personal funds. These sources may include foreign governments that fund international students for Ph.D. studies in the United States and other funding agencies, such as Fulbright commissions.

World Campus students in graduate degree programs may be eligible for financial aid. Refer to the Tuition and Financial Aid section (http://www.worldcampus.psu.edu/tuition-and-financial-aid) of the World Campus website for more information.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Learning Outcomes

1. Graduates will demonstrate in-depth knowledge of the foundations (major concepts and theories) of public administration and policy processes.
2. Graduates will demonstrate in-depth knowledge of relevant research methods to be used in their dissertation studies and publications.
3. Graduates will demonstrate in-depth knowledge of the knowledge of the specialization area of their choice.
4. Graduates will demonstrate their ability to apply relevant research methods in their class papers and dissertation studies.
5. Graduates will demonstrate their ability to communicate their conceptual knowledge of foundational topics, specialization area topics, and research methods in written and oral forms.
6. Graduates will demonstrate their analytical and critical thinking abilities on the topics relevant to public policymaking and public administration processes.
7. Graduates will demonstrate their knowledge of the rules of ethics and professional conduct in public policy and administrative processes and the knowledge of ethical research practices and apply them in their studies in the program.

Contact

Graduate Program Head: Triparna Vasavada
Director of Graduate Studies/Professor-in-Charge: Goktug Morcol

Primary Program Contact: Jordyn McCrady
Email: jam5497@psu.edu
Mailing Address: School of Public Affairs, 777 West Harrisburg Pike, 159W Olmsted Bldg., Middletown, PA 17057-4898
Telephone: (717) 948-6773
Program Website:
Public Administration at Harrisburg (https://harrisburg.psu.edu/public-affairs/public-administration/master-public-administration)
Public Administration at World Campus (http://www.worldcampus.psu.edu/degrees-and-certificates/public-administration-masters/overview)

Public Health

Graduate Program Head: Douglas Leslie
Program Code: PH
Campus(es): Hershey (M.P.H., Dr.P.H.)
Degrees Conferred:
Doctor of Public Health (Dr.P.H.)
Master of Public Health (M.P.H.)
Joint J.D./M.P.H. with Dickinson Law
Joint M.D./M.P.H. with the College of Medicine

The Graduate Faculty

View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=PH)

The Master of Public Health (M.P.H.) in Public Health program is a professional degree program that builds knowledge and skills in the areas of systems thinking, evidence-based public health, leadership, program planning and management, public health and health systems, communication, and interprofessional practice. In addition, the M.P.H. in Public Health program advances expertise in community and behavioral health, epidemiology and biostatistics, global health, and health systems organization and policy. The M.P.H. degree leads to careers in a wide variety of fields and settings, including local, state, and federal government agencies; health care settings; health insurance industry; health services networks; nonprofits; and the pharmaceutical industry.

The Doctor of Public Health (Dr.P.H.) in Public Health program is a professional degree program that provides advanced public health education and training to prepare its graduates for evidence-based practice and leadership in the application of translational science and implementation research findings. It allows graduates to pursue career opportunities in the federal, state, and local government, as well as in the non-profit, academic, and private sectors. Educationally it places an emphasis on discovery, teaching, integration, and application with a primary purpose of bridging research and practice to protect and improve the public’s health. The Dr.P.H. builds on Master of Public Health (M.P.H.) competency domains and, as a professional degree, integrates public health practice and project-based learning with local, state, and federal networks to enrich learning in health policy and program development and implementation. Dr.P.H. program of study includes course work, an advanced field experience, and integrative doctoral research and provides an opportunity for further specialization within a specified cognate.
Admission Requirements
Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Master of Public Health (M.P.H.)
Admission to the Penn State M.P.H. Program is granted jointly by the M.P.H. Program and the Graduate School at Penn State.

For admission to the M.P.H. Program, applicants must submit:

- Completed online Graduate School application (http://gradschool.psu.edu/prospective-students/how-to-apply) with nonrefundable application fee
- Resume or curriculum vitae
- Statement of purpose
- Two letters of recommendation
- Official transcripts from all post-secondary institutions attended (http://www.gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission)
- Official scores from one of the following standardized tests taken within the past five years; Graduate Record Examination (GRE), Medical College Admission Test (MCAT), or Law School Admission Test (LSAT)

Standardized Test Requirement Waiver 1: This requirement is waived for applicants who have an advanced degree beyond the baccalaureate.

Standardized Test Requirement Waiver 2: This requirement may be waived at the discretion of the program for applicants who, prior to submitting the application for admission, have successfully completed (with a grade of B or better in each course):
- At least one 3-credit graduate-level course in biostatistics; AND
- At least one 3-credit graduate-level course in epidemiology; AND
- At least one 3-credit graduate-level course in the social and behavioral sciences or health services administration core areas of public health.

Doctor of Public Health (Dr.P.H.)
For admission to the Dr.P.H. Program, applicants must submit:

- Completed online Graduate School application (http://gradschool.psu.edu/prospective-students/how-to-apply) with nonrefundable application fee
- Three recommenders to provide letters of academic and professional reference
- Statement of purpose
- Describe why you want to pursue a Dr.P.H., how you plan to use your education and training, the needs and/or challenges you perceive as important in your field of study, and any personal qualities, characteristics, skills and experiences you believe will enable you to be successful in public health
- Official Graduate Record Examination (GRE) scores taken within the past five years
- Official transcripts from all post-secondary institutions attended (http://www.gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission)
- CV or resume

Degree Requirements

Master of Public Health (M.P.H.)
Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

M.P.H. students must complete a total of 42 credits of graduate level course work, the majority of which are 500 level courses, specifically:

- 24 credits in prescribed courses, including:
  - 18 credits of core classroom-based courses
  - 3 credit practicum experience
  - 3 credit capstone
- 18 credits in elective courses

The Capstone Course (PHS 894) provides the students with the knowledge and skills to design, carry out, and present a scholarly public health project based upon competencies gained in previous courses. Topics include defining a scholarly project, selecting a topic and project type, describing the problem, reviewing the literature, identifying project methodology, presenting project results, ethics and scholarly work, writing and critiquing scholarly work, and creating and delivering a poster presentation.

Code Title Credits

<table>
<thead>
<tr>
<th>Required Courses</th>
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<tbody>
<tr>
<td>PHS 809 Principles of Public Health</td>
<td>3</td>
</tr>
<tr>
<td>PHS 504 Behavioral Health Intervention Strategies</td>
<td>3</td>
</tr>
<tr>
<td>or BBH 504 Behavioral Health Intervention Strategies</td>
<td></td>
</tr>
<tr>
<td>PHS 520 Principles of Biostatistics</td>
<td>3</td>
</tr>
<tr>
<td>PHS 536 Health Survey Research Methods</td>
<td>3</td>
</tr>
<tr>
<td>PHS 550 Principles of Epidemiology</td>
<td>3</td>
</tr>
<tr>
<td>PHS 571 Health Services Organization and Delivery</td>
<td>3</td>
</tr>
<tr>
<td>or HPA 520 Introduction to Health Services Organizations and Delivery</td>
<td></td>
</tr>
<tr>
<td>PHS 895A Master of Public Health Internship</td>
<td>3</td>
</tr>
</tbody>
</table>

Additional Courses
Select 18 credits from a list of approved courses that is maintained by the graduate program office. Multiple tracks of specialization are available.

Culminating Experience

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHS 894</td>
<td>Capstone Experience (Capstone Course)</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits: 42

Doctor of Public Health (Dr.P.H.)
Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

Dr.P.H. students must complete a minimum of 60 credits of graduate-level course work beyond a master’s degree, the majority of which are 500-level and 800-level courses, specifically:
Integrative Seminar in Public Health Leadership 3
Integrative Seminar in Public Health Policy 3
Integrative Seminar in Social & Behavioral Determinants of Health 3
Statistical Methods in Public Health I 3
Statistical Methods for Public Health II 3
Qualitative Research in Adult Education 3
Public Health Ethics 3
Directed Studies in Public Health 3
Advanced Field Experience 6

Electives
Select 21 credits from a list of approved courses that is maintained by the graduate program office. Multiple tracks of specialization are available.

Culminating Experience
Integrative Doctoral Research I 6
Integrative Doctoral Research II 3

Total Credits 60

Dr.P.H. students must meet Penn State doctoral degree requirements as outlined in GCAC-700 Professional Degree Requirements, including qualifying examinations, English competencies, and dissertation committee composition. Dr.P.H. students must also meet the following additional Dr.P.H.-specific requirements.

The Dr.P.H. degree is conferred in recognition of advanced preparation of a high order for work in the profession of education as evidenced by:

1. Satisfactory completion of a prescribed period of study;
2. Ability to apply translational science and implementation research findings in evidence-based public health practice;
3. Successful performance of qualifying and comprehensive examinations, covering public health core areas of study and a field of specialization; and
4. The preparation and acceptance of integrative doctoral research.

Residency requirement
The Doctor of Public Health requires 24 core credits to be taken in residence as a registered student engaged in academic work at the Hershey and Harrisburg campuses.

Additional Course Requirements for Applicants without a Master of Public Health
Applicants must have a graduate (e.g. master's) or advanced professional (e.g., M.D.) degree. Applicants without a Master of Public Health or related degree are required to take core courses to ensure a firm foundation in discipline-specific M.P.H. competency domains. These foundation courses include:

• 24 credits in prescribed, core classroom-based courses
• 21 credits in elective courses
  • 9 credits of track elective courses
  • 12 credits of general (cognate) elective courses
• 15 additional credits
  • 6 credits of Advanced Field Experience
  • 9 credits of integrative Doctoral Research

For applicants entering the program without a Master of Public Health, the minimum credits required for the Dr.P.H. degree will include these 15 credits of foundation courses, for a minimum total of 75. Some or all of the foundation courses may be waived based on previous graduate-level course work, in which case the total credits required for the degree may be reduced in an equivalent manner, down to the base minimum of 60 credits. Students must petition the head of the graduate program to obtain a waiver for the foundation courses, and students’ transcripts will be reviewed to assess their eligibility for a waiver.

Comprehensive Examination
Upon completing all core and most cognate course work, Dr.P.H. students will take comprehensive exams to ensure they meet Dr.P.H. core and track program competencies. Comprehensive exams will be overseen and evaluated by students’ doctoral committee.

Integrative Doctoral Research
Dr.P.H. students will be required to complete two major components for their Dr.P.H. integrative experience: two publishable-quality manuscripts and a doctoral portfolio.

With guidance from their doctoral adviser and doctoral committee, students will develop two manuscripts that comprehensively address, generate, and/or interpret and evaluate knowledge applicable to public health practice. Manuscripts are encouraged to be of an applied nature and must demonstrate students’ abilities to conduct independent research on a contemporary public health issue. Students will demonstrate the application of advanced public health practice skills and knowledge in the design and execution of a scholarly project, the analysis and interpretation of the findings, and the application of the new knowledge to advance public health practice. This work should contribute to the evidence base of public health practice, be of publishable quality, and demonstrate critical thinking and rigorous analytic strategies.

Throughout their doctoral program, students will develop a doctoral portfolio that will document how Dr.P.H. courses, advanced field experience, other experiential learning, and self-knowledge has informed their leadership style and approach to integrating evidence-based research into public health practice. Components of the portfolio may include, but are not limited to, research (e.g., publications, conference presentations), teaching (academic and non-academic, community-based teaching), and field and other service learning experiences. Portfolios will require reflection on in-class and out-of-class experiences and demonstrate students’ broad public health knowledge, specialized knowledge, translation of this knowledge into evidence-based public health practice, and leadership style. Integrative Doctoral Research will demonstrate the following competencies:

• data and analysis,
• communication, systems thinking,
• leadership,
• critical thinking, and
• problem solving.
Joint Degrees

Joint J.D./M.P.H. with Dickinson Law
Requirements listed here are in addition to requirements listed in GCAC-211 Joint Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/joint-degree-programs).

The M.P.H. in Public Health program and J.D. Program at Dickinson Law offer a joint degree program leading to the degrees of Juris Doctor (J.D.) and Master of Public Health (M.P.H.).

Admission Requirements
Admissions requirements for the J.D./M.P.H. program are the same as those for the J.D. and M.P.H. in Public Health programs. J.D./M.P.H. students will have to meet the admissions requirements of both programs, and each program will make a separate admissions decision. Admissions requirements and applications for admission for Dickinson Law are listed in the J.D. Admissions (https://dickinsonlaw.psu.edu/admissions-aid) section of the Dickinson Law website. The admission requirements for the Master of Public Health are listed on the Admission Requirements tab. Students will first apply and be accepted to the J.D. program at the Dickinson Law. After being accepted to and matriculating at the Dickinson Law, J.D. students will be eligible to submit a Penn State Graduate Application for Admission to the M.P.H. in Public Health. J.D. students may submit an application starting their first semester in the J.D. program up through the fourth semesters of law school.

J.D./M.P.H. students who, for whatever reason, withdraw from the J.D. program retain the option of remaining in the M.P.H. in Public Health program to earn the graduate degree.

Degree Requirements
Students must fulfill all requirements for each degree in order to be awarded that degree, subject to the double-counting of credits as outlined below. Degree requirements for the J.D. program are listed on the Dickinson Law website (https://dickinsonlaw.psu.edu/academics/curriculum/jd-program). Degree requirements for the M.P.H. degree are listed on the Degree Requirements tab.

Double-Counting of Courses
Twelve credits of J.D. course work may be double-counted toward the M.P.H. degree. In lieu of PHS 895A, J.D./M.P.H. students will complete IHCLN 997, which will double-count for both degrees. In addition, up to 9 law school elective credits will be double-counted towards the M.P.H.

Up to 9 credits of M.P.H. course work may be applied towards the J.D. degree. The Associate Dean for Academic Affairs at Dickinson Law will approve, in advance of the student’s enrollment in M.P.H. elective courses, which of those courses will double-count towards J.D. degree.

Advising of Students
All students in the J.D./M.P.H. program will have two academic advisers, one in the M.P.H. degree program and one in the J.D. program.

Joint M.D./M.P.H. with the College of Medicine
Requirements listed here are in addition to requirements listed in GCAC-211 Joint Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/joint-degree-programs).

The M.P.H. in Public Health program and M.D. Program at Penn State Hershey College of Medicine offer a joint degree program leading to the degree of Doctor of Medicine (M.D.) and Master of Public Health (M.P.H.).

Admission Requirements
Admissions requirements for the M.D./M.P.H. program are the same as those for the M.D. and M.P.H. in Public Health programs. M.D./M.P.H. students will have to meet the admissions requirements of both programs, and each program will make a separate admissions decision. The admission requirements for the M.P.H. degree are listed on the Admission Requirements tab. Admissions requirements and applications for admission for the Penn State College of Medicine are available at the M.D. Program (http://med.psu.edu/md) section of the Penn State College of Medicine website. Students will first apply and be accepted to the M.D. program at the Penn State College of Medicine. After being accepted to and matriculating at the Penn State M.D. program, M.D. students will be eligible to submit a Penn State Graduate Application for Admission to the M.P.H. in Public Health. M.D. students may submit an application starting their first semester in the M.D. program up through the fall semester of their third year of medical school.

M.D./M.P.H. students who, for whatever reason, withdraw from the M.D. program retain the option of remaining in the M.P.H. in Public Health program to earn the graduate degree.

Degree Requirements
M.D./M.P.H. degree requirements are the same as that of the standalone M.P.H. degree program. Students must fulfill all requirements for each degree in order to be awarded that degree, subject to the double-counting of credits as outlined below. Degree requirements for the M.D. program are listed on the M.D. Program (http://med.psu.edu/md) section of the Penn State College of Medicine website. Degree requirements for the M.P.H. degree are listed on the Degree Requirements tab.

Double-Counting of Courses
Sixteen credits of M.D. course work may be double-counted toward the M.P.H. degree.

Advising of Students
All students in the M.D./M.P.H. program will have two academic advisers, one in the M.P.H. degree program and one in the M.D. program.

Student Aid
Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact
Graduate Program Head: Douglas Leslie
The master’s program in Public Health Sciences includes graduate-level course work in biostatistics, epidemiology, and health services research, and provides knowledge and insight required in health-related research. Students learn population-based methods for planning, executing, analyzing, and disseminating research results, and methods for evaluating and improving health care practices.

### Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Prospective applicants for this program should have at least a bachelor’s degree in a biological, physical, or behavioral science.

### Degree Requirements

#### Master of Science (M.S.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

Each student in Public Health Sciences is expected to acquire breadth of knowledge in the disciplines of Biostatistics, Epidemiology, and Health Services Research, and skills in the areas of experimental design, data collection, and quantitative analysis. The PHS Master of Science degree can lead to careers in a wide variety of fields and settings, including academic health centers; the health insurance industry; health services networks; local, state, and federal government agencies; and the pharmaceutical industry.

Each student must complete at least 30 credits at the 500, 600, or 800 level. Each student must submit an original Master’s thesis according to the guidelines outlined by the Graduate School (http://gradschool.psu.edu/current-students/etd).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHS 500</td>
<td>Research Ethics for Clinical Investigators</td>
<td>1</td>
</tr>
<tr>
<td>PHS 520</td>
<td>Principles of Biostatistics</td>
<td>3</td>
</tr>
<tr>
<td>PHS 521</td>
<td>Applied Biostatistics</td>
<td>3</td>
</tr>
<tr>
<td>PHS 536</td>
<td>Health Survey Research Methods</td>
<td>3</td>
</tr>
<tr>
<td>PHS 550</td>
<td>Principles of Epidemiology</td>
<td>3</td>
</tr>
<tr>
<td>PHS 551</td>
<td>Advanced Epidemiological Methods</td>
<td>3</td>
</tr>
</tbody>
</table>

**Choose 8 credits from the following:**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHS 510</td>
<td>Grant Writing for Clinical Research</td>
<td></td>
</tr>
<tr>
<td>PHS 511</td>
<td>Methods Used in Translational Research</td>
<td></td>
</tr>
<tr>
<td>PHS 518</td>
<td>Scientific Communication</td>
<td></td>
</tr>
<tr>
<td>PHS 519</td>
<td>Patient Centered Research</td>
<td></td>
</tr>
<tr>
<td>PHS 522</td>
<td>Multivariate Biostatistics</td>
<td></td>
</tr>
<tr>
<td>PHS 535</td>
<td>Quality of Care Measurement</td>
<td></td>
</tr>
<tr>
<td>PHS 540</td>
<td>Decision Analysis I</td>
<td></td>
</tr>
<tr>
<td>PHS 541</td>
<td>Decision Analysis II</td>
<td></td>
</tr>
<tr>
<td>PHS 552</td>
<td>Molecular Epidemiology of Chronic Disease</td>
<td></td>
</tr>
<tr>
<td>PHS 570</td>
<td>Health Economics and Economic Evaluation</td>
<td></td>
</tr>
<tr>
<td>PHS 580</td>
<td>Clinical Trials: Design and Analysis</td>
<td></td>
</tr>
<tr>
<td>PHS 581</td>
<td>Clinical Trials: Case Studies</td>
<td></td>
</tr>
<tr>
<td>PHS 594</td>
<td>Research Topics</td>
<td></td>
</tr>
</tbody>
</table>

**Culminating Experience**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHS 600</td>
<td>Thesis Research</td>
<td>6</td>
</tr>
</tbody>
</table>

Total Credits 30

1. Courses in Health Policy and Administration (HPA) and Statistics (STAT) may be taken as elective courses and will be considered on an individual basis in consultation with the student’s academic adviser.

### Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

### Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

### Contact

**Graduate Program Head:** Douglas Leslie

**Director of Graduate Studies/Professor-in-Charge:** Li Wang

**Primary Program Contact:** Marjorie Sawyer

**Email:** mds21@psu.edu
Degree Requirements

Master of Public Policy (M.P.P.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

A minimum of 49 credits at the 400, 500, or 800 level, with at least 18 credits at the 500 or 800 level and a minimum of 6 credits at the 500 level, is required. More specifically, the program requires 24 credits in 8 core courses that are designed to establish a base of knowledge in key subject areas reflecting the statistical skills and the disciplinary foundations from economics, political science, and organizational theory and management needed for successful careers in public policy. Three additional courses in the core (9 credits) of the M.P.P. curriculum focus specifically on the practice of conducting prospective and retrospective public policy analyses.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PPOL 801</td>
<td>The Public Policy Process</td>
<td>3</td>
</tr>
<tr>
<td>PPOL 802</td>
<td>Economic Analysis for Public Policy</td>
<td>3</td>
</tr>
<tr>
<td>PPOL 503</td>
<td>Statistics for Public Policy I</td>
<td>3</td>
</tr>
<tr>
<td>PPOL 804</td>
<td>Public Sector Organization Theory</td>
<td>3</td>
</tr>
<tr>
<td>PPOL 805</td>
<td>Bureaucracy and the Policy Process</td>
<td>3</td>
</tr>
<tr>
<td>PPOL 506</td>
<td>Statistics for Public Policy II</td>
<td>3</td>
</tr>
<tr>
<td>PPOL 807</td>
<td>Managing Public Organizations</td>
<td>3</td>
</tr>
<tr>
<td>PPOL 808</td>
<td>Public Finance and Budgeting</td>
<td>3</td>
</tr>
<tr>
<td>PPOL 809</td>
<td>Public Policy Analysis</td>
<td>3</td>
</tr>
<tr>
<td>PPOL 810</td>
<td>Policy and Program Evaluation</td>
<td>3</td>
</tr>
<tr>
<td>PPOL 811</td>
<td>Project Design and Methods</td>
<td>3</td>
</tr>
<tr>
<td>PPOL 895</td>
<td>Public Policy Internship</td>
<td>1</td>
</tr>
<tr>
<td>PPOL 894</td>
<td>Capstone Experience (Capstone Project)</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits: 49

1 In addition to completing the core curriculum and the specialization curriculum, students are required to take a summer internship (PPOL 895, 1 credit), as approved by the M.P.P. program, between their two years of on-campus study. The internship placement should be of sufficient depth and professionalism that would allow the student to experience the integration of their curricular studies in an actual public policy professional environment. Successful completion of the internship will require an evaluation by the supervisor and a reflective paper.

In addition to these degree requirements, students must complete a capstone project as their master’s culminating experience. This entails completing both the Project Design and Methods class (PPOL 811, 3 credits and one of the 11 core courses listed above) and the capstone project requirement (PPOL 894, 3 credits). The capstone project will involve integrating and showing mastery of the subject matter of the
studies students develop business plans and analyze and predict corporate financial performance in a global marketplace. They emerge from Penn State as international leaders understanding the fundamentals of materials and processes and project confidence in product and manufacturing system design.

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

The program draws its students from two groups: practicing professionals from industry and individuals who have graduated from, or are currently enrolled in, a business administration, science, or engineering program. Applicants who expect to graduate with a baccalaureate in engineering, science, or business administration may apply for admission to the program in their senior year.

All applicants must submit scores from the GRE or the GMAT.

All applicants must have taken the prerequisite mathematics, computer science, and statistics courses or equivalents prior to starting the program. Applicants cannot register until they have completed these courses.

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. See GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-305/admission-requirements-international-students) for more information.

Degree Requirements

Master of Manufacturing Management (M.M.M.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

The M.M.M. degree requires 32 credits of course work at the 400, 500, or 800 level, on a part- or full-time basis. The courses are as follows:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>QMM 491</td>
<td>Introduction to Business Concepts for Manufacturing</td>
<td>3</td>
</tr>
<tr>
<td>or QMM 492</td>
<td>Introduction to Engineering Design Principles</td>
<td></td>
</tr>
<tr>
<td>QMM 552</td>
<td>Applied Statistical Process Control and Experimental Design</td>
<td>3</td>
</tr>
<tr>
<td>QMM 561</td>
<td>Manufacturing Systems Planning and Control I</td>
<td>3</td>
</tr>
<tr>
<td>QMM 562</td>
<td>Manufacturing Systems Planning and Control II</td>
<td>3</td>
</tr>
<tr>
<td>QMM 581</td>
<td>Manufacturing Processes of Materials</td>
<td>3</td>
</tr>
<tr>
<td>QMM 582</td>
<td>Manufacturing and Supply Chain Strategy</td>
<td>3</td>
</tr>
<tr>
<td>QMM 593</td>
<td>Field Experience in Manufacturing</td>
<td>2</td>
</tr>
<tr>
<td>QMM 851</td>
<td>Quality Management</td>
<td>3</td>
</tr>
<tr>
<td>QMM 871</td>
<td>Design Practice for Manufacturing I</td>
<td>3</td>
</tr>
<tr>
<td>QMM 872</td>
<td>Design Practice for Manufacturing II</td>
<td>3</td>
</tr>
<tr>
<td>QMM 891</td>
<td>Communication and Leadership Skills for Manufacturing Managers</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits: 32

Contact

Primary Program Contact: Christopher Witko

Email: cxw877@psu.edu

Telephone: (814) 865-7515

Quality and Manufacturing Management

Graduate Program Head
Diane Parente

Program Code
QMM

Campus(es)
Erie (M.M.M.)

Degrees Conferred
Master of Manufacturing Management (M.M.M.)

The Graduate Faculty

View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=QMM)

Penn State’s Master of Manufacturing Management (M.M.M.) degree is offered by the Quality and Manufacturing Management (QMM) program. The degree is offered at Penn State Erie, The Behrend College, and is administered jointly by the School of Engineering and the Black School of Business. This interdisciplinary graduate program is designed to prepare students for careers in manufacturing, consulting, services, and operations. The program is offered in a full-time format and in a flexible scheduling pattern. Full-time study requires twelve months of continuous study starting in July and ending the following June. The flexible scheduling pattern requires approximately 24 months to complete.

The program develops future executives who possess in-depth, relevant manufacturing knowledge bridging engineering and management. Graduates are afforded a life-changing experience that provides them with a unique set of engineering, business, and quality skills combined with a suite of communication skills critical to management success. Students fuse Six Sigma certification with corporate social responsibility and emotional intelligence to become well-rounded leaders. QMM
The graduate program is designed to prepare students for administrative, supervisory, research, and teaching positions in public and private recreation and park systems, in colleges and universities, in voluntary agencies and institutions, and in commercial ventures.

The program is oriented to meet the specific needs and research interests of the student. Students may pursue interests in the community, including public park and recreation systems, voluntary agencies, and private commercial enterprises; tourism; institution and community-oriented therapeutic settings concerned with many different disabilities and utilizing a variety of activity modalities; park planning, resource management, interpretive services, outdoor education, and outdoor recreation services.

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Scores from the Graduate Record Examination (GRE) are required for admission to the M.S. and Ph.D. programs.

For admission to the graduate program, a bachelor’s or master’s degree is required. Applicants from majors other than recreation and parks are welcome to apply; however, additional course work is required. Students with a 3.00 junior/senior average (on a 4.00 scale) and with appropriate course backgrounds will be considered for admission.

Degree Requirements

Master of Science (M.S.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

The master’s program is designed for students who wish to continue their studies at the doctoral level at Penn State. Students who wish to pursue a Ph.D. degree but do not have an M.S. degree will complete a thesis and earn a master’s degree in the process of working toward the doctorate.

The M.S. program requires a minimum of 30 graduate credits and a 3.00 (B) grade-point average for graduation. The master’s degree must be completed within eight years from matriculation as a degree student.

Prerequisites for graduate students who do not have an undergraduate degree in RPTM typically range from 3 to 9 credits, depending on the student’s background and experience. Prerequisites for incoming graduate students with undergraduate majors in RPTM range from 0 to 6 credits. Incoming graduate students with undergraduate degrees in Recreation, Park, and Tourism Management from Penn State are assumed to have met all prerequisite requirements. The graduate program director determines prerequisites for all incoming students.

Doctor of Philosophy (Ph.D.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

Students who wish to pursue a Ph.D. degree but do not have an M.S. degree will complete a thesis and earn a master’s degree in the process of working toward the doctorate.

The doctoral program builds on the master’s program to achieve depth in scholarship and research. Students who have not completed a data-based thesis as part of their master’s degree will be required to do so during the first three semesters as a doctoral student. The general requirements of the degree, sequentially, are:
1. course work,
2. qualifying examination by the third semester,
3. comprehensive examination (written and oral),
4. dissertation proposal presentation, and
5. final defense of dissertation.

Between the qualifying examination and completion of the degree program, a Ph.D. student must have attended Penn State in residence a minimum of two semesters over a twelve-month period. (This may include the semester in which the qualifying exam is taken.) Students have a limit of eight years after the qualifying exam to complete the doctoral program. A 3.00 (B) average is required for graduation.

Prerequisites for graduate students who do not have an undergraduate degree in RPTM typically range from 3 to 9 credits, depending on the student’s background and experience. Prerequisites for incoming graduate students with undergraduate majors in RPTM range from 0 to 6 credits. Incoming graduate students with undergraduate degrees in Recreation, Park, and Tourism Management from Penn State are assumed to have met all prerequisite requirements. The graduate program director determines prerequisites for all incoming students.

1 The master’s thesis and oral defense may be used for the qualifying examination for continuing students.

**Dual-Titles**

**Dual-Title M.S. and Ph.D. in Recreation, Park, and Tourism Management and Human Dimensions of Natural Resources and the Environment**

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

**Admission Requirements**

Students must apply and be admitted to the graduate program in Recreation, Park, and Tourism Management and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Human Dimensions of Natural Resources and the Environment dual-title program. Refer to the Admission Requirements section of the Human Dimensions of Natural Resources and the Environment Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/human-dimensions-natural-resources-environment). Doctoral students must be admitted into the dual-title degree program in Human Dimensions of Natural Resources and the Environment prior to taking the qualifying examination in their primary graduate program.

**Degree Requirements**

To qualify for the dual-title degree, students must satisfy the degree requirements for the degree they are enrolled in Recreation, Park, and Tourism Management. In addition, students must complete the degree requirements for the dual-title in Human Dimensions of Natural Resources and the Environment, listed on the Human Dimensions of Natural Resources and the Environment Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/human-dimensions-natural-resources-environment).

The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Recreation, Park, and Tourism Management and must include at least one Graduate Faculty member from the Human Dimensions of Natural Resources and the Environment program. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. There will be a single qualifying examination, containing elements of both Recreation, Park, and Tourism Management and Human Dimensions of Natural Resources and the Environment. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of a Recreation, Park, and Tourism Management and Human Dimensions of Natural Resources and the Environment dual-title Ph.D. student must include at least one member of the Human Dimensions of Natural Resources and the Environment Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in Human Dimensions of Natural Resources and the Environment, the member of the committee representing Human Dimensions of Natural Resources and the Environment must be appointed as co-chair. The Human Dimensions of Natural Resources and the Environment representative on the student’s dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their dissertation committee and reflects their original research and education in Recreation, Park, and Tourism Management and Human Dimensions of Natural Resources and the Environment. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

**Student Aid**

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

**Courses**

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**Learning Outcomes**

1. Demonstrate advanced knowledge of research design and methods.
2. Demonstrate advanced knowledge of the social psychological, philosophical, and social bases of leisure behavior.
3. Analyze and synthesize the literature from a variety of perspectives and disciplines in a specific area of recreation/leisure, park, or tourism management.

4. Integrate and apply transdisciplinary concepts of recreation/leisure, park, or tourism to contemporary recreation/leisure, park, or tourism management issues.

5. Design and implement independent research to address a contemporary issue in recreation/leisure, park, or tourism management.

6. Demonstrate advanced knowledge of and ability to interpret the results of quantitative and qualitative data analysis techniques.

7. Effectively communicate diverse and contrary perspectives regarding recreation, park, tourism, or leisure management orally and in writing.

Contact
Graduate Program Head: Peter Newman
Director of Graduate Studies/Professor-in-Charge: Birgitta Baker
Mailing Address: 801 F Ford Building, University Park, PA 16802
Program Website: Recreation, Park and Tourism Management (http://www.hhdev.psu.edu/rptm/graduate)

Renewable Energy and Sustainability Systems
Graduate Program Head: Ali Demirci
Program Code: RESS
Campus(es): World Campus (M.P.S.)
Degrees Conferred: Master of Professional Studies (M.P.S.)
The Graduate Faculty: View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=RESS)

The intercollege RESS professional master's program (iMPS-RESS) is an online-interdisciplinary master's degree program designed to prepare professionals in the fields of renewable energy and sustainability systems to lead the world's transformation from an unsustainable, fossil energy economy to a renewable, sustainable basis of operation. For example, attaining an ambitious national goal of 25% of energy from renewable resources by the year 2025 in the U.S. requires a tremendous increase in renewable energy production and use in ways that are sustainable, environmentally sound, and reliable. The iMPS-RESS program is designed to address the critical need for professionals with relevant expertise in renewable energy and sustainability systems.

The program provides broad coverage of topics related to renewable energy and sustainability systems while providing in-depth coverage of select topics such as solar, wind, bioenergy, and sustainability management and policy. Students are required to follow a focused curriculum that combines requisite rigor with flexibility appropriate to a rapidly changing field. Students take a number of core program courses that provide an in-depth understanding of the sustainability framework relevant to energy and sustainability systems and, in consultation with their program adviser, select additional courses from a broad array of electives designed to meet their individual learning goals. While not required to do so, students may choose from one of four program options that provide specialized technical instruction in various aspects of renewable energy and sustainability systems. A comprehensive Scholarship and Academic Research Integrity (SARI) plan embeds ethics and integrity training both at the start and at the end of the master's program. A capstone course is required of all students that serves to aggregate the material learned and provide a summative educational experience within the framework of a semester long group-based project.

Admission Requirements
Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Educational Background
Academic performance and/or professional experience must be equivalent to that expected for admission to a typical resident-program master's degree. Applications must include a statement of professional goals, a curriculum vita or resume, and three letters of recommendation. Official records of scores on the Graduate Record Exam (GRE) are also required. However, this requirement may be waived under certain circumstances; please contact the graduate program directly.

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. See GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-305/admission-requirements-international-students) for more information.

Core Application Packet
• Statement of Purpose: A statement of professional experience and goals (up to 500 words)
• Vita or resume
• Three letters of recommendation. The individuals writing letters should be familiar with you and comfortable discussing your professional and/or academic strengths and accomplishments. Preferably, all letters will be written within the last six months and reference the applicant's current career goals and/or ability to perform graduate level study.
• Official transcripts from all post-secondary institutions attended (http://www.gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission)
• Test of English as a Foreign Language (TOEFL) or International English Language Testing System (IELTS) score, if applicable
• Nonrefundable application fee

Admissions Process
Applications will be evaluated by the iMPS-RESS Admissions Committee based on the applicants’ technical qualifications for the program relative to their area of interest, their previous educational experience, and English Language proficiency. In general, successful applicants are expected to have earned a junior/senior grade-point average of at least 3.0 on a 4.0 scale. Applicants with a marginal record are encouraged to first complete a related Graduate Certificate before applying for admission to the iMPS-RESS program. Exemplary performance in the graduate certificate will be taken into consideration for possible admission into the iMPS-RESS program, but completion of a certificate does not imply or guarantee admission into a degree program.
Degree Requirements

Master of Professional Studies (M.P.S.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

The iMPS-RESS degree is conferred upon students who earn a minimum of 32 credits of course work while maintaining an average grade-point average of 3.0 or better in all course work, including at least 18 credits at the 500 or 800 level (with at least 6 credits at the 500 level), and who complete a quality culminating capstone project in consultation with a graduate adviser. The program curriculum includes:

- 11 credits of core courses,
- 9-12 credits of a selected option (or adviser-approved course of study),
- 6-9 credits of electives, and
- a 3-credit capstone course (ABE 589).

Substitutions for required courses, either with resident-education courses, alternate online courses, or courses from other institutions, will be considered on a case-by-case basis, and must be petitioned and approved by the Academic Program Chair, with input from the student's adviser.

### Degree Requirements

#### Required Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOET 533</td>
<td>Ethical Dimensions of Renewable Energy and Sustainability Systems</td>
<td>2</td>
</tr>
<tr>
<td>EME 504</td>
<td>Foundations in Sustainability Systems</td>
<td>3</td>
</tr>
<tr>
<td>EME 801</td>
<td>Energy Markets, Policy, and Regulation</td>
<td>3</td>
</tr>
<tr>
<td>EME 802</td>
<td>Renewable and Sustainable Energy Systems</td>
<td>3</td>
</tr>
</tbody>
</table>

#### Additional Courses

An additional 18 credits must be selected from the following list of courses. This listing includes 4 Program Options that provide focused instruction in a given aspect of renewable energy and sustainability systems. Detailed information about each option can be found below.

#### Bioenergy Option (12 credits)

- ABE 884 Biomass Energy Systems
- ABE 885 Biomass Harvesting and Logistics
- ABE 888 Conversion Technologies for Bioenergy Production
- FOR 880 Bioenergy Feedstocks

#### Solar Energy Option (12 credits)

- AE 862 Distributed Energy Planning and Management
- ABE 884 Biomass Energy Systems
- EME 803 Applied Energy Policy
- EME 810 Solar Resource Assessment and Economics
- EME 812 Utility Solar Power and Concentration
- MANGT 510 Project Management
- SCM 800 Supply Chain Management
- SYSEN 505 Technical Project Management
- SYSEN 507 Systems Thinking
- SYSEN 520 Systems Engineering
- SYSEN 533 Deterministic Models and Simulation

#### Culminating Experience

2. Distributed solar electric and solar thermal projects (e.g., residential and commercial built environment).

NOTE: A background in systems science, engineering, or physics is strongly recommended for students interested in this option. Students may contact the Option Leader for more information.

Students are required to take the following courses:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AE 878</td>
<td>Solar Project Development and Finance</td>
<td>3</td>
</tr>
<tr>
<td>EME 810</td>
<td>Solar Resource Assessment and Economics</td>
<td>3</td>
</tr>
<tr>
<td>SYSEN 505</td>
<td>Technical Project Management</td>
<td>3</td>
</tr>
<tr>
<td>SYSEN 507</td>
<td>Systems Thinking</td>
<td>3</td>
</tr>
<tr>
<td>SYSEN 520</td>
<td>Systems Engineering</td>
<td>3</td>
</tr>
<tr>
<td>SYSEN 533</td>
<td>Deterministic Models and Simulation</td>
<td>3</td>
</tr>
</tbody>
</table>

**ABE 589 Management and Design of Renewable Energy and Sustainability Systems (Capstone Course) 3**

**Total Credits** 32

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**Bioenergy Option**

The Bioenergy Option will create graduates who can lead the development of the rapidly expanding bioenergy industry. Many companies are not able to hire staff with appropriate training to meet their R&D, management, and production needs. As a result, there is a large and unmet need to train professionals at the master's level with skills in applied science, communication, business, social and industry perspectives for the emerging bio-based economy. Important components of this industry include crop production, harvesting, storage, ecology, genetics, fermentation, engineering, value chain systems modeling, marketing, economics, and sociology.

NOTE: A background or courses in calculus, physics, thermodynamics, and plant biology is advised for students interested in this option. Students may contact the Option Leader for additional information.

Students are required to take the following courses:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AE 862</td>
<td>Distributed Energy Planning and Management</td>
<td>3</td>
</tr>
<tr>
<td>AE 868</td>
<td>Commercial Solar Electric Systems</td>
<td>3</td>
</tr>
<tr>
<td>EME 811</td>
<td>Solar Thermal Energy for Utilities and Industry</td>
<td>3</td>
</tr>
</tbody>
</table>

**Total Credits** 32

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**Solar Energy Option**

The Solar Energy Option will create graduates who can lead project and policy development in the solar energy industry. The skills of master’s level solar systems project development include solar resource assessment for selected locales, effective communications to design to maximize the solar economic utility to the client/stakeholders, knowledge of thermal- and electric-derived solar conversion technologies, technical knowledge of design in hybridized solar systems design, and the social and policy context of solar systems project design. Courses in the solar option will have two parallel paths to address either:

1. Utility-industrial solar electric and solar thermal projects (e.g., large-scale solar and industrial processing); or
2. Distributed solar electric and solar thermal projects (e.g., residential and commercial built environment).

NOTE: A background in systems science, engineering, or physics is strongly recommended for students interested in this option. Students may contact the Option Leader for more information.

Students are required to take the following courses:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AE 862</td>
<td>Distributed Energy Planning and Management</td>
<td>3</td>
</tr>
<tr>
<td>AE 868</td>
<td>Commercial Solar Electric Systems</td>
<td>3</td>
</tr>
<tr>
<td>EME 811</td>
<td>Solar Thermal Energy for Utilities and Industry</td>
<td>3</td>
</tr>
</tbody>
</table>

**Total Credits** 32
Sustainability Management and Policy Option
The Sustainability Management and Policy Option will create graduates who will lead sustainability project planning and policy development, given the systems approach of sustainability in business and government. The demand is already high for graduate leaders with deep understanding of the science of sustainability, combined with systems acumen to assess risk and plan for renewable energy projects, and communication skills to develop new policy implementation. The expanded fields of renewable energy, energy trading, and sustainability systems management dictate that master’s level education be centralized to the science of sustainability, analysis of market and non-market strategies, communication to facilitate energy policy development, and systems thinking approaches to unify the project development approach.

Students are required to take the following courses:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BA 850</td>
<td>Sustainability Driven Innovation</td>
<td>3</td>
</tr>
<tr>
<td>EME 803</td>
<td>Applied Energy Policy</td>
<td>3</td>
</tr>
<tr>
<td>EME 805</td>
<td>Renewable Energy and Nonmarket Enterprise</td>
<td>3</td>
</tr>
<tr>
<td>EME 807</td>
<td>Technologies for Sustainability Systems</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Total Credits</td>
<td>12</td>
</tr>
</tbody>
</table>

Wind Energy Option
The Wind Energy Option will produce graduates who have broad understanding of the wind farm development process, as well as technical depth in turbine technology and the science of properly siting wind turbines. Graduates will be able to model wind project performance; balance the complexities of permitting, logistics, and the ecological impacts of wind project development; and conduct turbine load and acoustic analyses. They will also understand the limitations of models and will be equipped as leaders for producing advancement in the industry.

NOTE: A background in incompressible fluid mechanics, statics, and dynamics is highly recommended for students interested in this option. Students may contact the Option Leader for more information.

Students are required to take the following courses:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AERSP 583</td>
<td>Wind Turbine Aerodynamics</td>
<td>3</td>
</tr>
<tr>
<td>AERSP 880</td>
<td>Wind Turbine Systems</td>
<td>3</td>
</tr>
<tr>
<td>AERSP 886</td>
<td>Engineering of Wind Project Development</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Total Credits</td>
<td>9</td>
</tr>
</tbody>
</table>

Student Aid
World Campus students in graduate degree programs may be eligible for financial aid. Refer to the Tuition and Financial Aid section (http://www.worldcampus.psu.edu/tuition-and-financial-aid) of the World Campus website for more information.

Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Learning Outcomes
1. Execute and evaluate sustainability or renewable energy systems using baseline, techno-economic, life cycle, or cost/benefit analyses.
2. Demonstrate fundamental understanding of the principles of energy science, including resource availability and conversion technologies.
3. Demonstrate an appreciation for the commercialization process relative to project and product development.
4. Demonstrate the ability to make sound decisions in complex situations.
5. Evaluate sustainability decisions in the broader context of society’s interests.

Contact
Graduate Program Head: Ali Demirci
Primary Program Contact: Noelle Capparelle
Email: nlf5@psu.edu
Mailing Address: 2217 EES Bldg., University Park, PA 16802
Telephone: (814) 867-5401
Program Website: Renewable Energy and Sustainability Systems (https://www.ress.psu.edu)

Rural Sociology
Graduate Program Head: Laszlo Kulcsar
Program Code: RSOC
Campus(es): University Park (Ph.D., M.S.)
Degrees Conferred: Doctor of Philosophy (Ph.D.), Master of Science (M.S.)
Dual-Title Ph.D. and M.S. in Rural Sociology and Demography
Dual-Title Ph.D. and M.S. in Rural Sociology and Human Dimensions of Natural Resources and the Environment
Dual-Title Ph.D. and M.S. in Rural Sociology and International Agriculture and Development
Dual-Title Ph.D. and M.S. in Rural Sociology and Women’s Studies

The Graduate Faculty
View (https://secure.gradsch.psu.edu/gmps/index.cfm?searchType=fac&prog=RSOC)

All degree programs emphasize a comprehensive understanding of the various facets of societal organization pertinent to the rural sector. While
broadth is encouraged, areas of special interest and research include rural social change, community structure, population, rural community development, the structure of agriculture, natural resources, and the environment.

Admission Requirements
Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Scores from the Graduate Record Examinations (GRE), or from a comparable substitute examination accepted by the Rural Sociology graduate program, are required for admission. At the discretion of the graduate program, a student may be admitted provisionally for graduate study in a program without these scores.

Prerequisites for the master’s program include 3 credits in rural sociology or sociology, and additional credits in either field. If the entering student does not have these prerequisites, they must be made up at the University during the early part of the master’s program.

Students with a 3.00 junior/senior average (on a 4.00 scale) and with appropriate course backgrounds will be considered for admission. The best-qualified applicants will be accepted up to the number of spaces that are available for new students. Exceptions to the minimum 3.00 grade-point average may be made for students with special backgrounds, abilities, and interests.

Degree Requirements
Master of Science (M.S.)
Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

All students are required to have training in sociological theory, statistics, and research methods.

Doctor of Philosophy (Ph.D.)
Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

All students are required to have training in sociological theory, statistics, and research methods.

There is no foreign language requirement for the Ph.D. degree; the student is expected to substitute such courses and instruction necessary to generate superior capabilities of inquiry into an analysis of basic and/or applied rural sociological problems.

Dual-Titles
Dual-Title M.S. and Ph.D. in Rural Sociology and Demography
Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-208/dual-title-graduate-degree-programs).

Admission Requirements
Students must apply and be admitted to the graduate program in Rural Sociology and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Demography dual-title program. Refer to the Admission Requirements section of the Demography Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/demography). Doctoral students must be admitted into the dual-title degree program in Demography prior to taking the qualifying examination in their primary graduate program.

Degree Requirements
To qualify for the dual-title degree, students must satisfy the degree requirements for the degree they are enrolled in Rural Sociology. In addition, students must complete the degree requirements for the dual-title in Demography, listed on the Demography Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/demography).

The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Rural Sociology and must include at least one Graduate Faculty member from the Demography program. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. There will be a single qualifying examination, containing elements of both Rural Sociology and Demography. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of a Rural Sociology and Demography dual-title Ph.D. student must include at least one member of the Demography Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in Demography, the member of the committee representing Demography must be appointed as co-chair. The Demography representative on the student’s dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their dissertation committee and reflects their original research and education in Rural Sociology and Demography. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

Dual-Title M.S. and Ph.D. in Rural Sociology and Human Dimensions of Natural Resources and the Environment
Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-208/dual-title-graduate-degree-programs).

Admission Requirements
Students must apply and be admitted to the graduate program in Rural Sociology and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary
program, students must apply for admission to and meet the admissions requirements of the Human Dimensions of Natural Resources and the Environment dual-title program. Refer to the Admission Requirements section of the Human Dimensions of Natural Resources and the Environment Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/human-dimensions-natural-resources-environment). Doctoral students must be admitted into the dual-title degree program in Human Dimensions of Natural Resources and the Environment prior to taking the qualifying examination in their primary graduate program.

**Degree Requirements**

To qualify for the dual-title degree, students must satisfy the degree requirements for the degree they are enrolled in Rural Sociology. In addition, students must complete the degree requirements for the dual-title in Human Dimensions of Natural Resources and the Environment, listed on the Human Dimensions of Natural Resources and the Environment Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/human-dimensions-natural-resources-environment).

The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Rural Sociology and must include at least one Graduate Faculty member from the Human Dimensions of Natural Resources and the Environment program. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. There will be a single qualifying examination, containing elements of both Rural Sociology and Human Dimensions of Natural Resources and the Environment. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of a Rural Sociology and Human Dimensions of Natural Resources and the Environment dual-title Ph.D. student must include at least one member of the Human Dimensions of Natural Resources and the Environment Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in Human Dimensions of Natural Resources and the Environment, the member of the committee representing Human Dimensions of Natural Resources and the Environment must be appointed as co-chair. The Human Dimensions of Natural Resources and the Environment representative on the student's dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their dissertation committee and reflects their original research and education in Rural Sociology and Human Dimensions of Natural Resources and the Environment. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

**Dual-Title M.S. and Ph.D. in Rural Sociology and International Agriculture and Development**

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

Graduate students with research and educational experiences in rural sociology may apply to the Rural Sociology/INTAD dual-title degree program. The goal of the dual-title RSOC/INTAD degree program is to enable graduate students from RSOC to acquire the knowledge and skills of their major area of specialization in RSOC, while at the same time gaining the perspective and methods needed to work internationally. Graduate study in this program seeks to prepare students to assume leadership roles in professions in international agriculture and development requiring state-of-the-art methodological training, as well as conceptual expertise in rural sociology and in one or more of RSOC's four signature areas:

1. agriculture and food systems,
2. community and international development,
3. natural resources and environment,
4. rural social demography.

Students must apply and be admitted to the graduate program in Rural Sociology and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the International Agriculture and Development dual-title program. Refer to the Admission Requirements section of the International Agriculture and Development Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/international-agriculture-development). Doctoral students must be admitted into the dual-title degree program in International Agriculture and Development prior to taking the qualifying examination in their primary graduate program.

**Degree Requirements**

To qualify for a dual-title degree, students must satisfy the requirements of the Rural Sociology program in which they are primarily enrolled. In addition, students must complete the degree requirements for the dual-title in International Agriculture and Development, listed on the International Agriculture and Development Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/international-agriculture-development).

**Degree Requirements for the Dual-title M.S.**

The master’s in Rural Sociology and INTAD is a dual-title degree awarded to students who are admitted to the Rural Sociology master's program and admitted to the dual-title degree in INTAD. In addition to the requirements of the Rural Sociology degree, dual-title degree students must complete a minimum of 12 INTAD course credits (400, 500, or 800 level) as follows:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AEE 450</td>
<td>Program Design and Delivery</td>
<td>3</td>
</tr>
<tr>
<td>CEDEV/AEE 505</td>
<td>Leadership Development (online)</td>
<td>3</td>
</tr>
<tr>
<td>INTAD 820</td>
<td>International Agricultural Development Seminar</td>
<td>3</td>
</tr>
</tbody>
</table>

3 credits of internship or applied courses/ independent studies with international development content

Total Credits 12

Some courses may satisfy both the graduate major program requirements and those of the INTAD program.
Master’s Thesis & Final Oral Examination
Students must write a master’s thesis on a topic that reflects both the graduate program in Rural Sociology and the dual-title offering in INTAD. All members of the student’s committee for the dual-title master’s degree will be members of the Graduate Faculty. The committee must include at least one Graduate Faculty member from INTAD. A Degree Committee form should be filed upon selection of the committee members and should be approved by the INTAD Academic Program Committee Co-chair.

Students in the dual-title master’s degree program in RSOC and INTAD will also be required to pass a master’s thesis defense covering the general field of Rural Sociology and INTAD, with emphasis on the student’s area of specialization. The oral exam is to be administered by the student’s thesis committee. A favorable vote of a two-thirds majority is necessary for passing.

Degree Requirements for the Dual-Title Ph.D.
The Ph.D. degree in RSOC and INTAD is a dual-title degree awarded only to students who are admitted to the RSOC doctoral program and admitted to the dual-title degree in INTAD. The minimum course requirements for the dual-title Ph.D. degree in RSOC and INTAD, in addition to the RSOC requirements, are as follows.

Students must complete a minimum of 18 INTAD course credits with study in the following categories:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTAD 820</td>
<td>International Agricultural Development Seminar</td>
<td>3</td>
</tr>
<tr>
<td>RSOC 517</td>
<td>International Rural Social Change</td>
<td>3</td>
</tr>
<tr>
<td>RSOC 508</td>
<td>Sociology of Agriculture</td>
<td>3</td>
</tr>
<tr>
<td>or RSOC 555</td>
<td>Human Dimensions of Natural Resources</td>
<td></td>
</tr>
<tr>
<td>Select 9 credits from INTAD elective curriculum/courses with international development content/internships/independent study</td>
<td>9</td>
<td></td>
</tr>
</tbody>
</table>

Total Credits 18

Courses totaling a minimum of 18 credits must be taken at the 500 or 800 level; particular courses may satisfy both the RSOC requirements and those in the INTAD program. Final course selection is determined by the student in consultation with their INTAD advisors and their major program advisers. Students who already hold a master’s degree from another institution may petition to have equivalent course credits accepted.

Graduates of the dual-title INTAD master’s degree program who wish to pursue an INTAD doctoral degree must re-apply to the INTAD program for admission. INTAD master’s degree credits may be carried over to the doctoral program. Six additional INTAD credits will be required. INTAD master’s degree graduates who pursue an INTAD Ph.D. are required to take the INTAD 820 International Agricultural Development Seminar a second time.

Qualifying Exam
The qualifying examination will be based on the procedures of the major department and will have an international dimension. Although not encouraged, the dual-title degree student may require an additional semester or more to fulfill requirements for the dual-title degree program. Therefore, under exceptional circumstances, the qualifying exam may be delayed at the discretion of the student adviser in consultation with the INTAD program coordinators. The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from RSOC and must include at least one Graduate Faculty member from the INTAD program. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role.

Committee Composition
In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of an RSOC and INTAD dual-title Ph.D. student must include at least one member of the INTAD Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in INTAD, the member of the committee representing INTAD must be appointed as co-chair.

Comprehensive Exam
Each Ph.D. student must pass a comprehensive (combined written and oral) examination in rural sociology, research methods, and statistics, and two or more chosen areas of specialization. It is expected that one of these areas will be INTAD. A separate comprehensive examination is not required by the INTAD program, but the INTAD representative on the student’s dissertation committee must have input into the development of and participate in the evaluation of the comprehensive examination.

Doctoral Dissertation & Final Oral Examination
Ph.D. students enrolled in the dual-title degree program are required to write a doctoral dissertation on a topic that reflects their original research and education in both Rural Sociology and International Agriculture and Development. The dissertation should contribute to the body of knowledge in international agriculture. Upon completion of the student’s doctoral dissertation, a final oral examination is scheduled. The exam is administered by the student’s dissertation committee and focuses on the student’s dissertation research. A public oral presentation of the dissertation is also required. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School, and the student must pass the final oral examination.

Dual-Title M.S. and Ph.D. in Rural Sociology and Women’s Studies
Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

Admission Requirements
Students must apply and be admitted to the graduate program in Rural Sociology and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Women’s Studies dual-title program. Refer to the Admission Requirements section of the Women’s Studies Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/womens-studies). Doctoral students must be admitted into the dual-title degree program in Women’s Studies prior to taking the qualifying examination in their primary graduate program.

Degree Requirements
To qualify for the dual-title degree, students must satisfy the degree requirements for the degree they are enrolled in Rural Sociology. In addition, students must complete the degree requirements for the dual-title in Women’s Studies, listed on the Women’s Studies Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/womens-studies).
The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Rural Sociology and must include at least one Graduate Faculty member from the Women's Studies program. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. There will be a single qualifying examination, containing elements of both Rural Sociology and Women's Studies. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of a Rural Sociology and Women's Studies dual-title Ph.D. student must include at least two members of the Women's Studies Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in Women's Studies, the member of the committee representing Women's Studies must be appointed as co-chair. The Women's Studies representative on the student's dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their dissertation committee and reflects their original research and education in Rural Sociology and Women's Studies. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

**Student Aid**

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School's website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

**Courses**

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**Learning Outcomes**

**Master of Science (M.S.)**
1. Graduates will be able to demonstrate conceptual understanding in core rural sociological theory and research methods and ethics at the level required to contribute to the discipline and/or practice.
2. Graduates will be able to critically analyze the work of others in their field and apply that knowledge to problems of domestic and/or global interest.

3. Graduates will be able to synthesize theory and empirical literature to generate innovative approaches to research and execute a research strategy and explore implications for policy and/or practice.
4. Graduates will be able to effectively convey sociological ideas, arguments, and findings in formal presentations and in written work.
5. Graduates will demonstrate the ability to collaborate in a collegial and ethical manner with other professionals and a commitment to active citizenship in society at large.

**Doctor of Philosophy (Ph.D.)**
1. Graduates will be able to demonstrate deep conceptual understanding and proficiency in core rural sociological theory, research methods and ethics, as well as mastery in two selected concentration areas at the level required to contribute to the discipline.
2. Graduates will be able to critically analyze the work of others in their field and apply that knowledge to problems of domestic and/or global interest.
3. Graduates will be able to synthesize theory and empirical literature to generate innovative approaches to research and execute a research strategy to create new scientific knowledge and explore implications for policy and/or practice.
4. Graduates will be able to effectively convey sociological ideas, arguments, and findings in formal presentations and in written works to scholars in the field and to policy audiences.
5. Graduates will demonstrate the ability to collaborate in a collegial and ethical manner with other professionals within and across disciplines and demonstrate a commitment to active citizenship in the discipline and society at large.

**Contact**

**Graduate Program Head:** Laszlo Kulcsar  
**Director of Graduate Studies/Professor-in-Charge:** Kathryn Brasier  
**Primary Program Contact:** Dolores Pavliska  
**Email:** dlp5189@psu.edu  
**Mailing Address:** 111b Armsby Building, AESE/PSU, University Park, PA 16802  
**Telephone:** (814) 865-0456  
**Program Website:** Rural Sociology (http://aese.psu.edu/graduateprograms/rural-sociology)

**Russian and Comparative Literature**

**Graduate Program Head:** Thomas Beebee  
**Program Code:** RUSCL  
**Campus(es)**: University Park (M.A.)  
**Degrees Conferred:** Master of Arts (M.A.)  
**The Graduate Faculty**

The Department of Germanic and Slavic Languages and Literatures and the Department of Comparative Literature offer a joint master’s degree in Russian and Comparative Literature. The program enables students
to concentrate in Russian literature at the graduate level while having the advantages of a comparative context. Students completing this M.A. will acquire an in-depth understanding of Russian literature and culture and will be proficient in Russian and one other foreign language. This program prepares students for further graduate study in Russian, Slavic, or comparative literature, for service with the U.S. or other government, or for employment with an international corporation.

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Students with appropriate course backgrounds and a 3.00 junior/senior average (on a 4.00 scale) will be considered for admission. Scores from the Graduate Record Examination (GRE) are required. It is expected that students entering this degree program will have proficiency in the Russian language and will have completed a B.A. in Russian or Comparative Literature. Students in other humanistic fields such as philosophy or history who have studied some literature and are proficient in Russian are welcome to apply.

Degree Requirements

Master of Arts (M.A.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

Candidates for the M.A. degree must earn a minimum of 33 credits at the 400, 500, or 800 level of which at least 18 must be at the 500 level. There are 30 credits required in the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>RUS 405</td>
<td>Seminar in Russian Literature</td>
<td>3</td>
</tr>
<tr>
<td>Select 12 additional credits in Comparative Literature courses</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>Select 12 additional credits in Russian at the 400 or 500 level</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>Select 3 credits in Russian, Comparative Literature, or another approved area</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

Additional Requirements

Pass a proficiency examination in Russian

Demonstrate reading knowledge of one other foreign language

Culminating Experience

Complete an acceptable M.A. scholarly paper

Total Credits 33

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

A number of teaching assistantships are available in the Departments of Comparative Literature and Germanic and Slavic Languages and Literatures for students taking advanced degrees in these disciplines. There is also a graduate assistant position for an editorial assistant.

School Psychology

This intercollege program is based primarily on courses in educational psychology, psychology, and special education. In addition, courses are often drawn from counselor education, human development and family studies, educational theory and policy, educational administration, and curriculum and instruction. The objective is to develop a psychologist capable of providing health care who is interested in and knowledgeable about education and psychology in the school setting. The school psychologist must utilize professional skill and knowledge about children and youth to make contributions that are meaningful to and utilized by teachers, other school personnel, and parents. The development of competencies needed by a fully qualified school psychologist requires at least the education represented by a doctoral degree.

Practicum facilities, in addition to those in nearby public schools, include:

• the Center for Educational Diagnosis and Remediation,
• the School Psychology Clinic,
School Psychology

• the Communication Disorders Clinic,
• the Reading Center, and
• the Psychology Clinic.

Facilities for work with children are also available through other academic units, as well as through assistantship assignments.

The program has been accredited by the American Psychological Association, the National Commission for Accreditation in Teacher Education (NASP), and the Pennsylvania Department of Education.

**Admission Requirements**

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Only those students who anticipate a doctoral degree will be admitted. Students are selected within the limitations of program facilities. Priority is given to applicants with work experience with children.

An undergraduate major emphasizing work in psychology and/or education is preferred, but students with fewer than 20 upper-division credits in psychology, educational psychology, or special education may be admitted with limited deficiencies to be fulfilled concurrently with their graduate work. Requirements for admission include:

- a minimum of one-third of graduate credits of A quality;
- undergraduate GPA of B or higher;
- satisfactory recommendations from two or more professors, preferably psychologists; and
- a score of 1000 or higher on the two general sections or a score of 1500 or higher, including the analytical or an advanced test, of the Graduate Record Examination.

Exceptions may be made for students with special backgrounds, abilities, and interests.

**Degree Requirements**

**Master of Education (M.Ed.)**

Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

Students qualifying for a certificate to practice in the schools must meet standards specified by the Pennsylvania Department of Education. These include, but are not limited to,

- a master’s degree,
- about 60 graduate credits,
- practicum experiences, and
- successful completion of precertification tests.

**Doctor of Philosophy (Ph.D.)**

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

Students may be admitted with a master’s degree from school psychology programs from other institutions or from related programs in this or other universities. The doctoral program includes:

- a predissertation research requirement;
- the core program described here (which qualifies the candidate for a school psychology certificate);
- a special proficiency of 6 to 18 credits;
- an internship; and
- a dissertation.

Students completing the School Psychology Core Program will have courses in:

- the biological bases of behavior,
- the cognitive bases of behavior,
- the social bases of behavior,
- personality theory or abnormal psychology,
- human development,
- professional ethics and standards,
- research design and methodology,
- statistics,
- psychometrics,
- counseling theory,
- educational foundations,
- educational administration,
- the education of exceptional children, and
- curriculum.

**Dual-Titles**

**Dual-Title M.Ed., M.S., and Ph.D. in School Psychology and Comparative and International Education**

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

**Admission Requirements**

Students must apply and be admitted to the graduate program in School Psychology and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Comparative and International Education dual-title program. Refer to the Admission Requirements section of the Comparative and International Education Bulletin page (http://
forms of student aid are described in the Tuition & Funding Graduate assistantships available to students in this program and other Student Aid head of the graduate program, and the Graduate School.

The dissertation must be accepted by the dissertation committee, the final oral examination (the dissertation defense) to earn the Ph.D. degree. In School Psychology and Comparative and International Education.

defend a dissertation on a topic that is approved in advance by their dissertation committee and reflects their original research and education.

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of a School Psychology and Comparative and International Education dual-title Ph.D. student must include at least one member of the Comparative and International Education Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. There will be a single qualifying examination, containing elements of both School Psychology and Comparative and International Education.

dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of a School Psychology and Comparative and International Education dual-title Ph.D. student must include at least one member of the Comparative and International Education Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in Comparative and International Education, the member of the committee representing Comparative and International Education must be appointed as co-chair. The Comparative and International Education representative on the student’s dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their dissertation committee and reflects their original research and education in School Psychology and Comparative and International Education. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact

Graduate Program Head: James Diperna

Primary Program Contact: Samantha Walker

Email: slw5581@psu.edu

Mailing Address: 125D CEDAR Building, University Park, PA 16082

Telephone: (814) 865-1881

Program Website: School Psychology (http://www.ed.psu.edu/educ/epcse/school-psychology) and Social Data Analytics

Social Data Analytics

Graduate Program Head Burt Monroe

Program Code SODA

Campus(es) University Park

Degrees Conferred Dual-Title

The Graduate Faculty View (https://secure.gradsch.psu.edu/gmps/index.cfm?searchType=fac&prog=SODA)

Students electing this degree program through participating programs earn a degree with a dual-title at the Ph.D. level, i.e., in (graduate program name) and Social Data Analytics.

The following graduate programs offer a dual-title degree in Social Data Analytics:

• Ph.D in Human Development and Family Studies and Social Data Analytics
• Ph.D. in Political Science and Social Data Analytics
• Ph.D. in Sociology and Social Data Analytics
• Ph.D. in Statistics and Social Data Analytics

The Social Data Analytics dual-title degree program is administered by the Social Data Analytics Committee, which is responsible for the management of the program. The committee maintains program definition, identifies faculty and courses appropriate to the program, and recommends policy and procedures for its operation to the Dean of the Graduate School. The program enables students from diverse graduate programs to attain and be identified with an interdisciplinary array of tools, techniques, and methodologies for social data analytics, while maintaining a close association with a home discipline. Social data analytics is the integration of social scientific, computational, informational, statistical, and visual analytic approaches to the analysis of large or complex data that arise from human interaction. To pursue a dual-title degree under this program the student must apply to the Graduate School and register through one of the approved graduate programs.

Admission Requirements

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://
degree program in Social Data Analytics prior to taking the qualifying examination in their primary graduate program.

To be enrolled in the dual-title doctoral degree program in Social Data Analytics, a student must submit a letter of application and transcript, which will be reviewed by the Social Data Analytics Admissions Committee. An applicant must have a minimum grade point average of 3.0 (on a 4 point scale) to be considered for enrollment in the dual-title degree program. Students must be admitted into the dual-title degree program in Social Data Analytics prior to taking the qualifying examination in their primary graduate program.

Degree Requirements
Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

To qualify for the dual-title degree, students must satisfy the requirements of the primary graduate program in which they are enrolled. In addition, they must satisfy the requirements described below, as established by the Social Data Analytics Committee.

The minimum course work requirements for the dual-title Ph.D. degree in Social Data Analytics are as follows:

- Course work and other requirements of the primary program.
- SODA 501 (3 credits)
- SODA 502 (3 credits)
- 12 or more elective credits in Social Data Analytics from a list of courses maintained by the Social Data Analytics Committee. Collectively the elective credits must satisfy the following requirements:
  - (A) Core analytics distribution. 3 or more credits in courses focused on statistical learning, machine learning, data mining, or visual analytics. Courses approved as meeting this requirement are designated (A) on the list of approved electives.
  - (Q) Quantification distribution. 6 or more credits in courses focused on statistical inference or quantitative social science methodology. Courses approved as meeting this requirement are designated (Q) on the list of approved electives.
  - (C) Computational / informational distribution. 6 or more credits in courses focused on computation, collection, management, processing, or interaction with electronic data, especially at scale. Courses approved as meeting this requirement are designated (C) on the list of approved electives.
  - (S) Social distribution. 6 or more credits in courses with substantial content on the nature of human interaction and/or the analysis of data derived from human interaction and/or the social context or ethics or social consequences of social data analytics. Courses approved as meeting this requirement are designated (S) on the list of approved electives.
  - Cross-departmental distribution. 3 or more credits in approved courses with the prefix STAT or that of a primarily social science department.
  - 3 or more credits in approved courses with the prefix IST, GEOG, or that of a primarily computer science or engineering department.
  - 6 or more credits in approved courses outside the primary program.
  - 3 or fewer credits in approved courses at the 400-level.

Students or faculty may request that the Social Data Analytics Committee consider approval of elective designations for any course, including temporary approvals for experimental or variable-title courses. Students are encouraged to take interdisciplinary courses that carry multiple (A), (Q), (C), (S) designations, as well as to select SODA electives that also meet requirements of the primary program. Within this framework, final course selection is determined by the student in consultation with academic advisers from their home department and Social Data Analytics.

The Social Data Analytics Program maintains a list of background and skills that it recommends students have in place by the time they begin the interdisciplinary coursework required to complete the Social Data Analytics degree.

Qualifying Examination Committee Composition
The qualifying examination committee must conform to all requirements of the primary program and the Graduate Council. In accordance with Graduate Council, the qualifying examination committee must include at least one member of the Social Data Analytics Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role.

Qualifying Examination
The dual-title degree will be guided by the qualifying examination procedure of the primary graduate program and the Graduate Council. In accordance with Graduate Council, there will be a single qualifying examination, assessing both the primary graduate program and the dual-title program. Because students must first be admitted to a graduate major program of study before they may apply to and be considered for admission into a dual-title graduate degree program, dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

Dissertation Committee Composition
The dissertation committee must conform to all requirements of the primary graduate program and the Graduate Council. In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of a Social Data Analytics dual-title doctoral degree student must include at least one member of the Social Data Analytics Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in Social Data Analytics, the member of the committee representing Social Data Analytics must be appointed as co-chair.

Comprehensive Exam
The dual-title degree will be guided by the comprehensive exam procedure of the primary graduate program. After completion of
required course work, doctoral students in the dual-title doctoral degree program must pass a comprehensive examination. In programs where this includes evaluation of a written exam, the Social Data Analytics representative on the student’s dissertation committee will participate in the writing and evaluation of the exam, in accordance with procedures maintained by the primary graduate program. In programs where the comprehensive exam involves defense of a dissertation prospectus, the Social Data Analytics representative on the student’s dissertation committee will participate in the evaluation of the prospectus, including ensuring the proposed dissertation has substantial Social Data Analytics content.

Dissertation and Dissertation Defense
Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. Students enrolled in the dual-title program are required to write and orally defend a dissertation on a topic that reflects their original research and education in their home discipline and Social Data Analytics. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

Social Data Analytics Doctoral Minor
Requirements listed here are in addition to requirements for minors in Graduate Council policies listed under GCAC-600 Research Degree Requirements (http://gradschool.psu.edu/graduate-education-policies) and GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

Doctoral students may take a doctoral minor in Social Data Analytics. This is the appropriate option for doctoral students in programs that have not adopted the dual-title Ph.D. degree in Social Data Analytics, and for students otherwise pursuing an incompatible degree program, such as another dual-title.

As with all graduate minors, a student seeking a minor must have the approval of the student’s major program of study, the Social Data Analytics program, and the Graduate School, and official requests to add a minor to a doctoral candidate’s academic record must be submitted to Graduate Enrollment Services prior to establishing the dissertation committee and prior to scheduling the comprehensive examination. At least one Graduate Faculty member from Social Data Analytics must serve on the student’s dissertation committee.

The doctoral minor in Social Data Analytics requires at least 15 credits in approved courses, with at least 6 at the 500 level, and a minimum of 9 elective credits from a list of approved electives maintained by the Social Data Analytics program. Additional deviations from distribution minimums and maximums may be allowed, but must be approved by the Social Data Analytics program.

Student Aid
Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact
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Primary Program Contact: Kristy Boob
Email: kmc248@psu.edu
Mailing Address: 221 Pond Lab, University Park, PA 16801
Telephone: (814) 863-1595
Program Website: Social Data Analytics (http://bdss.psu.edu/soda)

Sociology
Graduate Program Head: Eric Baumer
Program Code: SOC
Campus(es): University Park (Ph.D., M.A.)
Degrees Conferred:
Doctor of Philosophy (Ph.D.)
Master of Arts (M.A.)
Dual-Title Ph.D. and M.A. in Sociology and Demography
Dual-Title Ph.D. in Sociology and Social Data Analytics

The Graduate Faculty
View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fa&prog=SOC)

The graduate program in Sociology offers advanced education for students who intend to pursue academic careers in sociology or who aspire to nonacademic research positions.

The M.A. and Ph.D. programs provide training in general social theory, research methodology, statistics, and a number of traditional and developing substantive specialties. In consultation with faculty advisers, students select two specialties that are among the department’s strengths, such as demography (including health and immigration); family, life course, and aging; criminology; stratification and inequality; sociology of education; urban and community studies; or quantitative methods.

Alternate specialty areas not listed above may be selected as the major or the minor, with the approval of the Graduate Director and the student’s dissertation committee. Students may elect to pursue a dual-title M.A. and Ph.D. in Sociology and Demography, or a dual-title Ph.D. in Sociology and Social Data Analytics. A separate Ph.D. program in Criminology (http://bulletins.psu.edu/graduate/programs/majors/criminology) is also housed within the department.

All students who intend to pursue doctoral work are expected to earn (or have earned) an M.A. degree in their normal progress to the Ph.D.

Course work outside the department is encouraged. Areas of study related to sociology, such as rural sociology, geography, economics,
business administration, statistics, cultural anthropology, political science, labor and employment relations, women’s studies, social thought, biobehavioral health, and human development and family studies are available at the University.

Special department-related research and training facilities include on-site computer laboratories and the Social Science Research Center, the Population Research Institute, the Center for Research on Crime and Justice, and the Pennsylvania Commission on Sentencing. Additional University facilities used by sociology faculty and graduate students include the Computation Center (containing information about the extensive databases provided through the Inter-University Consortium for Political and Social Research) and the Center on Healthy Aging.

**Admission Requirements**

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Applications will be accepted through January 1 for fall admission the following year. Selection is based on:

- undergraduate grades (and where applicable, record of previous graduate work);
- letters of recommendation;
- statement of purpose;
- areas of interest, and career goals;
- a sample of written work, such as a term paper; and
- Graduate Record Examinations (GRE) verbal, quantitative, and writing scores.

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. See GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

The best-qualified applicants will be accepted up to the number of spaces available. Students with limited prior training in sociology may be accepted, with the provision that they make up background deficiencies in the early part of their graduate program in consultation with and under the supervision of the Graduate Director. Acceptance into or continuation in the program is contingent on successful performance in these areas.

**Degree Requirements**

**Master of Arts (M.A.)**

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

Required courses for the M.A. are designed to enhance students’ knowledge of substantive specialty areas in sociology, social theory, sociological research methods, and statistics and include:

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<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOC 502</td>
<td>Theories of Society I</td>
<td>3</td>
</tr>
<tr>
<td>or SOC 503</td>
<td>Theories of Society II</td>
<td></td>
</tr>
</tbody>
</table>

For the M.A. in Sociology at Penn State, 38 course credits are required, no more than three of which may be for SOC 596. A minimum grade-point average of 3.00 for work done at Penn State is required for graduation.

Students must either complete an M.A. thesis by the end of their second year in the program or enter the program with an M.A. degree.

**Doctor of Philosophy (Ph.D.)**

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

**Qualifying Exam**

A qualifying examination is required of all students seeking the Ph.D. This evaluation by the departmental Graduate Committee is based on the student's seminar papers, their proposed dissertation research and record of course performance, and faculty assessments of the student's ability to complete a high-quality Ph.D. program. The qualifying examination occurs after the M.A. degree has been completed.

**The Dissertation Committee**

The student’s Ph.D. studies are conducted under the supervision of a dissertation committee. The dissertation committee must comply with the Graduate Council dissertation committee requirements (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation). The committee must include faculty members having recognized expertise in the major and minor areas of specialization selected by the student, as well as expertise in general social theory, research methods, and statistics. One faculty member is designated chair of the dissertation committee; ordinarily this person also serves as general adviser and director of the dissertation. Students are strongly encouraged to choose a committee chair as early as possible. The student’s chair can be of great help in selecting other committee members, especially members outside of the sociology department.

Students must identify and convene their dissertation committee no later than one semester following their qualifying examination. The dissertation committee supervises the Ph.D. student’s course of study, comprehensive examination, and dissertation. This includes approval
of proposed course work to meet requirements for the major and minor areas of specialty.

All Ph.D. students must have completed all courses required for the M.A. degree in Sociology at Penn State, or their equivalent. These include:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>SOC 500</td>
<td>Introduction to Graduate Study in Sociology</td>
<td>1</td>
</tr>
<tr>
<td>SOC 574</td>
<td>Statistical Methods for Social Research</td>
<td>3</td>
</tr>
<tr>
<td>SOC 575</td>
<td>Statistical Models for Nonexperimental Research</td>
<td>3</td>
</tr>
<tr>
<td>SOC 513</td>
<td>Sociological Research Methods</td>
<td>3</td>
</tr>
<tr>
<td>SOC 502</td>
<td>Theories of Society I</td>
<td>3</td>
</tr>
<tr>
<td>or SOC 503</td>
<td>Theories of Society II</td>
<td></td>
</tr>
</tbody>
</table>

Total Credits 13

All Ph.D. candidates are also required to complete a one-credit Lab in Teaching Sociology (SOC 591). The lab in teaching sociology cannot serve to meet other Ph.D. requirements to be described subsequently, such as the requirement for a minimum number of seminars in Sociology.

Major and Minor Areas of Specialization

In addition to the specific requirements common to all Ph.D. students, students must complete courses in which they acquire competence in a major and a minor area of specialization. The major and minor should be chosen by the student in consultation with the dissertation committee. A record of the chosen areas must be filed with and approved by the graduate officer. The major area may be selected from the department's primary Ph.D. program strengths:

1. demography (including health and immigration),
2. family, life course, and aging,
3. criminology,
4. stratification and inequality,
5. sociology of education,
6. urban and community studies, and
7. quantitative methods.

Alternatively, students may develop their own customized areas that have included in recent years (but are not restricted to): race and ethnicity, social theory, sociology of organizations, sociology of religion, and collective behavior and social movements. Each student, no matter their choice of specialty areas, in consultation with the dissertation committee develops a program of course work necessary for preparation of the major and minor areas.

At least 12 credits of course work are associated with the major area of specialization. Course work is subject to the following constraints:

1. at least three courses must be listed in the sociology department;
2. at least two courses must be in formal 500-level seminars;
3. no more than one course may be in SOC 596.

The minor area of specialization is developed in the same manner, in consultation with the dissertation committee and with the approval of the Graduate Officer and the graduate committee. Students are required to take at least 9 credits of course work in the area selected as their minor. Earlier-named specific course requirements, such as seminars in statistics, research methods, and theory, cannot be used to meet the nine-credit minimum for the minor area. The minor course requirements also are subject to the following constraints:

1. at least two courses must be in sociology;
2. at least one course must be in 500-level seminars.

One course may be double-counted in the major and minor areas.

Comprehensive Examination

After completing all course work and before the period of intensive dissertation research begins, doctoral students must pass a comprehensive examination that includes written and oral components. Written components will be administered in a candidate's major and minor areas of concentration. Members of the dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination. The oral component of the comprehensive examination involves the defense of a dissertation prospectus.

Dissertation and Dissertation Defense

To earn the Ph.D. degree, doctoral students must also write a dissertation that contains original research and reflects their education in sociology. Upon completion of the doctoral dissertation, the candidate also must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

The Department of Sociology has no formal foreign language or communication requirement. However, students are encouraged to pursue additional training in statistics, computer science, foreign language, technical writing, specialized methods, or specialized theory that will further dissertation and career plans.

Dual-Titles

**Dual-Title M.A. and Ph.D. in Sociology and Demography**

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

**Admission Requirements**

Students must apply and be admitted to the graduate program in Sociology and the Graduate School before they can be admitted to a dual-title degree program. Applicants interested in the dual-title degree program may note their interest in their applications to Sociology and include remarks in their personal statements, in which they address the ways in which their research and professional goals in sociology reflect related interests in Demographic research. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Demography dual-title program. Refer to the Admission Requirements section of the Demography Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/demography). Students admitted to the Sociology program will be admitted to the dual-title program in Demography upon the recommendation of a Demography Program faculty member in Sociology. Ph.D. students must apply and be admitted to the dual-title degree program in Demography prior to taking the qualifying exam.

**Degree Requirements**

To qualify for the dual-title degree, students must satisfy the degree requirements for the degree they are enrolled in Sociology. In addition, students must complete the degree requirements for the dual-title
in Demography, listed on the Demography Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/demography).

**Degree Requirements for the Dual-Title M.A.**

Dual-title M.A. students must complete four courses in demography, one in each of the following pedagogic categories:

1. Demography Survey Course (if a population survey course was not completed as an undergraduate),
2. Demographic Methods Course,
3. Seminar in Demographic Processes, and

Multiple courses are offered in each of these categories each year, and many of the courses can be taken within the sociology department and counted toward sociology degree requirements. Dual-title M.A. students must write a thesis on a topic that draws on research questions and literature from both sociology and demography.

**Degree Requirements for the Dual-Title Ph.D.**

Students pursuing the dual-title Ph.D. in Sociology and Demography select demography as their major area of specialization. However, dual-title students must complete a total of 24 course credits (12 credits, or 4 courses, at the M.A. plus 12 additional credits distributed among pedagogic categories) in demography. Some of these courses must be completed in disciplines outside the Department of Sociology. All demography courses taken within the sociology department can count toward both the sociology and demography degrees.

**Qualifying Examination Committee and Exam**

The qualifying examination committee will be composed in accordance with rules of the Sociology Ph.D. and will include an evaluation of at least one Graduate Faculty member from the Demography Program. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role.

The dual-title degree will be guided by the qualifying exam procedure of the Sociology graduate program. The qualifying exam for the dual-title degree will occur as soon as possible after completion of the M.A. requirements. There will be a single qualifying examination to assess both Sociology and Demography. Because students must first be admitted to a graduate major program of study before they may apply to and be considered for admission into a dual-title graduate degree program, dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

**Dissertation Committee Composition**

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of a Sociology and Demography dual-title Ph.D. student must include at least two members of the Demography Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. If the chair of the committee representing Sociology is not also a member of the Graduate Faculty in Demography, one member of the committee representing Demography must be appointed as co-chair.

**Comprehensive Exam**

After completing all course work, doctoral students in the dual-title doctoral degree program in Sociology and Demography must pass a comprehensive examination that includes written and oral components. Written components will be administered in a candidate's major sociology area of concentration in Demography and the chosen minor area. The Demography representative(s) on the student's dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination. The oral component of the comprehensive involves the defense of a dissertation prospectus, which must contain substantial Demographic content.

**Dissertation and Dissertation Defense**

Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. Students enrolled in the dual-title program are required to write and orally defend a dissertation on a topic that reflects their original research and education in Sociology and Demography. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

**Dual-Title Ph.D. in Sociology and Social Data Analytics**

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

Sociology doctoral students seeking to attain and be identified with an interdisciplinary array of tools, techniques, and methodologies for social data analytics, while maintaining a close association with sociology, may apply to pursue a dual-title Ph.D. in Sociology and Social Data Analytics.

Social data analytics is the integration of social scientific, computational, informational, statistical, and visual analytic approaches to the analysis of large or complex data that arise from human interaction. The dual-title Ph.D. program provides additional training with the aim of providing scientists with the skills required to expand the field of social data analytics, creatively to answer important social scientific questions, and communicate effectively with both academic and nonacademic audiences.

**Admission Requirements**

Students must apply and be admitted to the graduate program in Sociology and the Graduate School before they can apply for admission to the dual-title degree program. Applicants interested in the dual-title degree program may note their interest in the program on their applications to Sociology and include remarks in their personal statements, in which they address the ways in which their research and professional goals in sociology reflect related interests in Social Data Analytics-related research.

After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Social Data Analytics dual-title program. Refer to the Admission Requirements section of the Social Data Analytics Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/social-data-analytics). To apply to the dual-title doctoral Ph.D. in Sociology and Social Data Analytics, a student must submit a letter of application and transcript, which will be reviewed by the Social Data Analytics Program. An applicant must have a minimum grade-point average of 3.0 (on a 4.0 point scale) to be considered for enrollment in the dual-title degree program. Students must apply for enrollment into the dual-title Ph.D. in Social Data Analytics prior to taking the qualifying examination in Sociology.

**Degree Requirements**

To qualify for the dual-title degree, students must satisfy the requirements of the Ph.D. in Sociology. In addition, students must
complete the degree requirements for the dual-title in Social Data Analytics, listed on the Social Data Analytics Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/social-data-analytics). Within this framework, final course selection is determined by the student in consultation with academic advisers from their home department adviser and Social Data Analytics.

The minimum course work requirements for the dual-title Ph.D. in Sociology and Social Data Analytics are as follows:

• Course work and other requirements of the Ph.D. in Sociology.
  • SODA 501 (3 credits)
  • SODA 502 (3 credits)
• 12 or more elective credits in Social Data Analytics from a list of courses maintained by the Social Data Analytics Committee. Collectively the elective credits must satisfy the following requirements:
  • (A) Core analytics distribution. 3 or more credits in courses focused on statistical learning, machine learning, data mining, or visual analytics. Courses approved as meeting this requirement are designated (A) on the list of approved electives.
  • (Q) Quantification distribution. 6 or more credits in courses focused on statistical inference or quantitative social science methodology. Courses approved as meeting this requirement are designated (Q) on the list of approved electives. (A Sociology Ph.D. student would typically satisfy this distribution requirement as a function of completing the requirements of the Sociology Ph.D.)
  • (C) Computational / informational distribution. 6 or more credits in courses focused on computation, collection, management, processing, or interaction with electronic data, especially at scale. Courses approved as meeting this requirement are designated (C) on the list of approved electives.
  • (S) Social distribution. 6 or more credits in courses with substantial content on the nature of human interaction and/or the analysis of data derived from human interaction and/or the social context or ethics or social consequences of social data analytics. Courses approved as meeting this requirement are designated (S) on the list of approved electives. (A Sociology Ph.D. student would typically satisfy this distribution requirement as a function of completing the requirements of the Sociology Ph.D.)
  • Cross-departmental distribution.
    • 3 or more credits in approved courses with the prefix STAT or that of a primarily social science department. (A Sociology student would typically satisfy this distribution requirement as a function of completing the requirements of the Sociology Ph.D.)
    • 3 or more credits in approved courses with the prefix IST, GEOG, or that of a primarily computer science or engineering department.
    • 6 or more credits in approved courses outside Sociology.
    • 3 or fewer credits in approved courses at the 400-level.

Students or faculty may request that the Social Data Analytics Committee consider approval of elective designations for any course, including temporary approvals for experimental or variable-title courses. Students are encouraged to take interdisciplinary courses that carry multiple (A), (Q), (C), (S) designations, as well as to select SODA electives that also meet requirements of the primary program. In particular, the 12 elective credits can be met with as few as 6 credits of appropriately chosen course work. Within this framework, final course selection is determined by the student in consultation with academic advisers from Sociology and Social Data Analytics. There is no formal maximum number of credits from the primary SOC degree that can be double-counted toward the SODA degree. For those meeting the SODA elective requirement with the minimum of 12 credits, the outside-program minimum effectively limits the number of primary degree SOC credits that count toward SODA at 6. Dissertation committees may limit the number of credits taken for the SODA degree that can count toward the primary graduate program degree requirements.

Qualifying Examination Committee and Exam
The qualifying examination committee will be composed in accordance with rules of the Sociology Ph.D. and will include an evaluation of at least one Graduate Faculty member from the Social Data Analytics Program. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role.

The dual-title degree will be guided by the qualifying exam procedure of the Sociology graduate program. The qualifying exam for the dual-title degree will occur as soon as possible after completion of the M.A. requirements. Because students must first be admitted to a graduate major program of study before they may apply to and be considered for admission into a dual-title graduate degree program, with permission of the graduate officer, the qualifying examination of dual-title degree students may be delayed one semester beyond the normal period allowable. There will be a single qualifying examination to assess both Sociology and Social Data Analytics.

Dissertation Committee Composition
In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of a Sociology and Social Data Analytics dual-title doctoral degree student must include at least one member of the Social Data Analytics Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. If the chair of the committee representing Sociology is not also a member of the Graduate Faculty in Social Data Analytics, the member of the committee representing Social Data Analytics must be appointed as co-chair.

Comprehensive Exam
After completing all course work, doctoral students in the dual-title doctoral degree program in Sociology and Social Data Analytics must pass a comprehensive examination that includes written and oral components.

Written components will be administered in the student’s major sociology area of concentration and Social Data Analytics (acting as the minor area). The Social Data Analytics representative(s) on the student’s dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.

The oral component of the comprehensive involves the defense of a dissertation prospectus, which must contain substantial Social Data Analytics content.

Dissertation and Dissertation Defense
Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. Students enrolled in the dual-title program are required to write and orally defend a dissertation on a topic that reflects their original research and education in Sociology and Social Data Analytics. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.
Student Aid
Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits set by The Graduate School.

Teaching assistantships support many students admitted to the program. Research assistantships also are available to qualified students through individual faculty members’ grants and contracts. A number of federal agencies also offer fellowships for graduate study in sociology.

Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Learning Outcomes
Master of Arts (M.A.)
1. KNOW: Graduates will be able to demonstrate conceptual understanding of theoretical concepts, proficiency in quantitative analysis for continuous and discrete outcomes and predictors, and understanding of sociological approaches to a major substantive area at the level required to contribute to the discipline of sociology.
2. KNOW: Graduates will be able to demonstrate conceptual understanding of the ethical practice of research and research protections.
3. CRITICAL THINKING: Graduates will be able to critically conceptualize and define the sociological aspects of a problem as part of sociological research.
4. CRITICAL THINKING: Graduates will be able to critically analyze both strengths and weaknesses of competing sociological arguments at the level required to contribute to the discipline of sociology.
5. RESEARCH: Graduates will demonstrate the ability to design and execute a research strategy appropriate to answering a significant question having real-world applications in the field of sociology.
6. COMMUNICATE: Graduates will be able to effectively communicate a sociological argument, research design, analytic strategy, findings, and conclusions in formal presentations and in written works to scholars in the field as well as students at different levels.
7. PROFESSIONAL PRACTICE: Graduates will demonstrate a commitment to active citizenship in the discipline, including engagement in service to the profession and society at large.
8. PROFESSIONAL PRACTICE: Graduates will demonstrate a strict adherence to the ethical practice of research and professional honesty.

Doctor of Philosophy (Ph.D.)
1. KNOW: Students will demonstrate an understanding of major sociological theories, concepts, research designs, and analysis strategies appropriate to their MAJOR and MINOR areas of specialization.

2. APPLY/CREATE: Students will demonstrate an ability to evaluate and critique empirical research and theoretical approaches in their MAJOR area of specialization; identify questions and testable hypotheses that will make a contribution to the literature in their MAJOR area of specialization; and formulate their own arguments based on integrating the literature in their MAJOR area of specialization.
3. COMMUNICATION: Students will demonstrate an ability to communicate (in oral and written form) effectively to scholarly and student audiences; argue persuasively their positions; and contribute to the discipline through clearly written, well-organized manuscripts, proposals, and formal presentations.
4. RESEARCH SKILLS: Students will demonstrate an ability to devise a research design, conduct an analysis, and interpret results appropriate to the argument being made and the hypotheses being tested.
5. PROFESSIONAL PRACTICE: Students will demonstrate an awareness of professional norms and rules of civility in their personal interactions and communication; awareness of and compliance with the ethical practice of research; and awareness of and compliance with expectations of good citizenship in the organizations with which they are associated.

Contact
Graduate Program Head: Eric Baumer
Director of Graduate Studies/Professor-in-Charge: Jennifer Van Hook
Primary Program Contact: Eunice Hockenberry
Email: emf133@psu.edu
Mailing Address: 213 Oswald Tower, University Park, PA 16802
Telephone: (814) 865-3455
Program Website: Sociology (http://sociology.la.psu.edu)

Software Engineering
Graduate Program Head: Colin Neill
Program Code: SWENG
Campus(es): Great Valley (M.S.E.)
Degrees Conferred: Master of Software Engineering (M.S.E.)
The Graduate Faculty: View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=SWENG)

This professional master’s degree program, available at Penn State Great Valley, focuses on various aspects of software engineering. The primary goal of the program is to prepare students to develop the next generation of software products and services for consumers, industry, and government. The curriculum includes comprehensive, intensive coverage of modern software concepts and techniques, and emphasizes a holistic approach encompassing financial, legal, and presales issues; technical concepts; software design techniques; methods; and project management.
Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

The Master of Software Engineering (M.S.E.) program is designed for students with technical backgrounds. Admission will be granted if the applicant has the necessary program prerequisites and a faculty member in the student’s interest area agrees to serve as adviser. Applicants lacking in a modern programming language can meet that requirement by scheduling the 400-level software engineering studio. Scores from the Graduate Record Examinations (GRE) are not an entrance requirement unless the applicant has a junior/senior grade-point average below 3.00 (on a 4.00 scale).

Students with a 3.00 junior/senior average in an appropriate technical degree program will be considered for admission. The best-qualified applicants will be accepted. Exceptions to the minimum 3.00 grade-point average may be made for students with special backgrounds, abilities, and interests.

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. See GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

Degree Requirements

Master of Software Engineering (M.S.E.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

The program is constituted by four, 9-credit modules of study. Each module is designed for in-depth coverage of a specific area of study (e.g., modern software methods, algorithms, information science). Two of the modules are required; one centers on professional, skill-based topics such as software project management or business communications, and includes the option to select a professional paper or the advanced software studio. The second required module comprises 9 credits of advanced software engineering course work. Graduate instruction is under the direction of a faculty committee.

All students must complete two required 9-credit core modules, for a total core curriculum of 18 credits, and two other 9-credit modules. At least 15 credits of selected courses must be at the 500 level.

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/credit-loads-graduate-assistants) set by The Graduate School.

World Campus students in graduate degree programs may be eligible for financial aid. Refer to the Tuition and Financial Aid section (http://www.worldcampus.psu.edu/tuition-and-financial-aid) of the World Campus website for more information.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Learning Outcomes

1. KNOW. Graduates will be able to demonstrate mastery of concepts and methods for modeling, designing, developing and testing software solutions using legacy and contemporary environments.
2. CRITICAL THINKING. Graduates will be able to critically and creatively plan and manage development of software intensive systems using project management methods and tools.
3. PROBLEM SOLVING. Graduates will be able to demonstrate proficiency in exploring the trade space within a given set of internal and external constraints for a system under development.
4. COMMUNICATE. Graduates will be able to effectively communicate their ideas within their organization, to other practicing professionals and the general public.
5. TEAMWORK. Graduates will be able to work collaboratively within and with project teams including those that are geographically distributed.

Contact

Graduate Program Head: Colin Neill

Director of Graduate Studies/Professor-in-Charge: Raghu Sangwan

Primary Program Contact: Sharon Patterson

Email: svp40@psu.edu

Mailing Address: Penn State Great Valley, 30 East Swedesford Road, Malvern, PA 19355

Telephone: (610) 648-3250

Program Website:

Software Engineering at Great Valley (http://greatvalley.psu.edu/academics/masters-degrees/software-engineering)

Software Engineering at World Campus (http://www.worldcampus.psu.edu/degrees-and-certificates/software-engineering-masters/overview)
Applicants apply for admission to the program via the Graduate School. Admission Requirements for candidates in the subfields of Soil Science including:

- independent scholar. Faculty in this program are competent to prepare students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

The Soil Science program is administered in the Department of Ecosystem Science and Management, College of Agricultural Sciences. Each student will be associated with an adviser who may provide financial support, research facilities, and/or office space. Applicants are encouraged to explore, study, and research opportunities by contacting faculty who may be prospective advisers.

This program provides opportunities for candidates interested in soil and related water resources to become a professional leader and an independent scholar. Faculty in this program are competent to prepare candidates in the subfields of Soil Science including:

- soil genesis,
- soil classification,
- soil morphology,
- soil mapping,
- soil physics,
- soil chemistry,
- soil mineralogy,
- soil microbiology,
- soil fertility,
- soil conservation,
- geographic information systems,
- computer mapping,
- watershed analysis,
- soil hydrology,
- soil and water management,
- resource inventory and assessment,
- remote sensing,
- land evaluation,
- land waste disposal, and
- land management.

**Admission Requirements**

Applicants apply for admission to the program via the Graduate School. Admission Requirements for candidates in the subfields of Soil Science including:

- independent scholar. Faculty in this program are competent to prepare students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

The Soil Science program is administered in the Department of Ecosystem Science and Management, College of Agricultural Sciences. Each student will be associated with an adviser who may provide financial support, research facilities, and/or office space. Applicants are encouraged to explore, study, and research opportunities by contacting faculty who may be prospective advisers.

This program provides opportunities for candidates interested in soil and related water resources to become a professional leader and an independent scholar. Faculty in this program are competent to prepare candidates in the subfields of Soil Science including:

- soil genesis,
- soil classification,
- soil morphology,
- soil mapping,
- soil physics,
- soil chemistry,
- soil mineralogy,
- soil microbiology,
- soil fertility,
- soil conservation,
- geographic information systems,
- computer mapping,
- watershed analysis,
- soil hydrology,
- soil and water management,
- resource inventory and assessment,
- remote sensing,
- land evaluation,
- land waste disposal, and
- land management.

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- resource inventory and assessment,
- remote sensing,
- land evaluation,
- land waste disposal, and
- land management.

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Applicants apply for admission to the program via the Graduate School. Admission Requirements for candidates in the subfields of Soil Science including:

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- soil classification,
- soil morphology,
- soil mapping,
- soil physics,
- soil chemistry,
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- land management.

**Admission Requirements**

Applicants apply for admission to the program via the Graduate School. Admission Requirements for candidates in the subfields of Soil Science including:

- independent scholar. Faculty in this program are competent to prepare students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

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- soil genesis,
- soil classification,
- soil morphology,
- soil mapping,
- soil physics,
- soil chemistry,
- soil mineralogy,
- soil microbiology,
- soil fertility,
- soil conservation,
- geographic information systems,
- computer mapping,
- watershed analysis,
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- soil and water management,
- resource inventory and assessment,
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Applicants apply for admission to the program via the Graduate School. Admission Requirements for candidates in the subfields of Soil Science including:

- independent scholar. Faculty in this program are competent to prepare students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

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This program provides opportunities for candidates interested in soil and related water resources to become a professional leader and an independent scholar. Faculty in this program are competent to prepare candidates in the subfields of Soil Science including:

- soil genesis,
- soil classification,
- soil morphology,
- soil mapping,
- soil physics,
- soil chemistry,
- soil mineralogy,
- soil microbiology,
- soil fertility,
minimum of 15 credits of 400- or 500-level courses in a minor or general studies area, 6 credits of statistical methods beyond the baccalaureate degree, of which a minimum of 3 will be at the 500 level, and 12 credits of SOILS 600 or SOILS 610.

Doctoral students are required to participate regularly in a departmental colloquium and to register for at least 1 credit of Colloquium (SOILS 590) during the Ph.D. program. Ph.D. students are required to complete two separate semesters of Supervised Experience in College Teaching (SOILS 602) for 2 credits total; however, these 2 credits cannot be counted towards the degree requirements. Doctoral students must pass a qualifying examination, a comprehensive written and oral examination, and a final oral examination (the dissertation defense). To earn the Ph.D. degree, doctoral students must also write a dissertation that is accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

Dual-Titles

Dual-Title Ph.D. in Soil Science and Biogeochemistry

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

Doctoral students with research and educational experiences in soil science may apply to the Soil Science/Biogeochemistry dual-title doctoral degree program. The goal of the dual-title Ph.D. degree in Soil Science and Biogeochemistry is to enable SOILS graduate students to acquire the knowledge and skills of their major area of specialization in SOILS, while at the same time gaining expertise and skills in biogeochemistry. Graduate study in this program seeks to provide students with the intellectual foundation for integrated and mechanistic understanding of interactions between microbes, soils, and plants in diverse environmental systems. Interdisciplinary training that includes biogeochemistry will prepare students for positions in academia, government, non-profit organizations, and the private sector. It will also prepare students for a wide array of research careers in the private sector, including agricultural and environmental sciences, energy industries, and the integrated study of the sustainability of biological systems.

Admission Requirements

For admission to the dual-title doctoral degree in Biogeochemistry, a student must first apply and be admitted to the Soil Science graduate program and The Graduate School. It is preferable but not necessary to discuss the dual-title interest beforehand with a major adviser who has been appointed to the Biogeochemistry program. Refer to the Admission Requirements section of the Biogeochemistry Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/biogeochemistry). After admission to the Soil Science program, students must apply for admission to the Biogeochemistry dual-title program by submitting an application to the Biogeochemistry Graduate Program Coordinator. The application consists of a written personal statement describing the student’s biogeochemistry research interests and career goals that can be met by earning a dual-title SOILS/BGC degree. The statement should be signed by the student’s major adviser in support of the student’s taking on the academic responsibilities of the dual-title degree. The application will be reviewed by the BGC Program Coordinator, in consultation with the BGC Executive Committee, who will make the admission decision and notify the Graduate School. Students must be admitted into the BGC program prior to taking the qualifying exam.

Degree Requirements

To qualify for the dual-title degree, students must satisfy the Soil Science Ph.D. degree requirements. In addition, students pursuing the dual-title Ph.D. in Soil Science and Biogeochemistry must complete the degree requirements for the dual-title Biogeochemistry Ph.D., listed on the Biogeochemistry Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/biogeochemistry). Students are required to have two advisers from separate disciplines: one individual serving as a primary adviser in their major degree program and a secondary adviser in an area within a field covered by the dual-title program who is a member of the Biogeochemistry Graduate Faculty. The major program adviser normally will also be a member of the Biogeochemistry Graduate Faculty. The two faculty advisers can represent different academic programs, but this is not required, as faculty from a scientifically diverse department could represent very different areas of expertise.

The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Soil Science and must include at least one Graduate Faculty member from the Biogeochemistry program. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. There will be a single qualifying examination, containing elements of both Soil Science and Biogeochemistry. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of a Soil Science and Biogeochemistry dual-title doctoral degree student must include at least one member of the Biogeochemistry Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in Biogeochemistry, the member of the committee representing Biogeochemistry must be appointed as co-chair. The Biogeochemistry representative on the student’s dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students enrolled in the dual-title program are required to write and orally defend a dissertation on a topic that reflects their original research and education in Soil Science and Biogeochemistry. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

Dual-Title M.S. and Ph.D. in Soil Science and International Agriculture and Development

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

Graduate students with research and educational interests in international education may apply to the Soil Science/INTAD Dual-Title Degree Program. The goal of the dual-title degree in Soil Science and INTAD is to enable graduate students from Soil Science to acquire the knowledge and skills of their primary area of specialization in Soil Science, while at the same time gaining the perspective and methods needed for work in the international agriculture. Graduate study in this
program seeks to prepare students to assume leadership roles in science, science education, outreach, and project management anywhere in the world. Students are required to write research proposals and expected to write grants to support their research activities, reflecting the dual-title degree. As part of their professional development presentations, publication of research articles and active participation in professional societies is expected. Emphasis is placed upon the professional development of the student. Students are able to specialize in the research program areas of soil genesis, classification, morphology, mapping, microbiology, chemistry, physics, mineralogy, fertility, geographic information systems, remote sensing, watershed analysis, hydrology, and land management. At the same time they will acquire a broad perspective about how to apply their research findings in the context of the broader international community. Thus, the dual-title will allow students to master their field of specialization from an international perspective so that they can compare practices and outcomes between countries and regions.

**Admission Requirements**

For admission to the dual-title graduate degree under this program, a student must first apply and be admitted to the Soil Science graduate program. Once accepted into the Soil Science program, the student can then submit an application to the INTAD Academic Program Committee for the dual-title degree program. Refer to the Admission Requirements section of the INTAD Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/international-agriculture-development). The application consists of an application form, a written personal statement indicating the career goals that a student hopes to accomplish by earning a dual-title SOILS/INTAD degree, and a letter from the Soil Science academic adviser supporting the student’s taking on additional academic responsibilities. The letter also must confirm that the student is in good standing and is capable of taking on the dual-title degree. The application will be reviewed by the INTAD Academic Program Committee, which will make all final admission decisions. Doctoral students must be admitted into the INTAD program prior to taking the qualifying exam.

**Degree Requirements for the Dual-title M.S.**

To qualify for this dual-title degree, students must satisfy the requirements of the Soil Science Master of Science degree program. In addition, they must satisfy the INTAD program requirements for the dual-title master’s degree. Refer to the Master’s Degree Requirements section of the INTAD Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/international-agriculture-development). Some courses may satisfy both the primary graduate program requirements and those of the INTAD program. The double counting of credits must be approved by the student’s adviser(s), the head of the SOILS graduate program, and the INTAD Co-Chairs.

For the dual-title M.S. degree in Soil Science and INTAD, the thesis must reflect the student’s education and interest in both Soil Science and INTAD. All members of the student’s committee must be members of the Graduate Faculty. The master’s committee must include at least one Graduate Faculty member from INTAD. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role.

**Degree Requirements for the Dual-Title Ph.D.**

To qualify for the dual-title degree, students must satisfy the degree requirements for the Ph.D. in Soil Science. In addition, students must complete the degree requirements for the dual-title in INTAD, listed on the INTAD Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/international-agriculture-development). Some courses may satisfy both Soil Science and INTAD degree requirements. The double counting of credits must be approved by the student’s adviser(s), the head of the SOILS graduate program, and the INTAD Co-Chairs.

Graduates of the dual-title INTAD master’s degree program who wish to pursue an INTAD doctoral degree must re-apply to the INTAD program for admission. INTAD master’s degree credits may be carried over to the doctoral program. Six additional INTAD credits will be required. INTAD master’s degree graduates who pursue an INTAD Ph.D. are required to take the INTAD 820 International Agricultural Development Seminar a second time.

**Qualifying Examination**

Qualifying examination procedures will be based on the procedures of the Soil Science graduate degree program, but will integrate the fields of Soil Science and International Agriculture and Development. Although not encouraged, the dual-title degree student may require an additional semester or more to fulfill requirements for the dual-title degree program. Therefore, under exceptional circumstances, the qualifying exam may be delayed at the discretion of the student’s Soil Science adviser in consultation with the INTAD program coordinators. The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Soil Science and must include at least one Graduate Faculty member from INTAD.

**Committee Composition**

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of a Soil Science and INTAD dual-title Ph.D. student must include at least one member of the INTAD Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in INTAD, the member of the committee representing INTAD must be appointed as co-chair.

**Comprehensive Exam**

At the end of the course work, students in the dual-title doctoral degree program in Soil Science and INTAD will be required to pass an oral and written comprehensive examination based on their dissertation proposal and area of specialization in Soil Science, while reflecting their dual-title curriculum. A separate comprehensive examination is not required by the INTAD program, but international agriculture must be one of the key areas of the comprehensive exam and the INTAD representative on the student’s dissertation committee must have input into the development of and participate in the evaluation of the comprehensive examination.

**Dissertation and Dissertation Defense**

Ph.D. students enrolled in the dual-title degree program are required to write and orally defend a dissertation on a topic that reflects the integration of their original research and education in Soil Science and International Agriculture and Development. In order to satisfy the INTAD dissertation requirement, students may: 1) conduct all or part of their research in an international location, 2) conduct an analysis of a subject in an international context, 3) conduct an analysis of secondary data of international origin, or 4) incorporate another international dimension by approval of the INTAD committee member. Additionally, the dissertation should reflect the student’s technical knowledge, knowledge of and sensitivity to a wide diversity of cultures and backgrounds, and the perspective needed to transfer their knowledge in other cultures, particularly in the developing world. The dissertation should contribute to the body of knowledge in soil science and global agricultural development and have potential application in both U.S and international contexts. A public oral presentation of the dissertation is
required. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

**Student Aid**

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

**Courses**

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**Learning Outcomes**

**Master of Science (M.S.)**

1. **KNOW:** Graduates in these three masters programs will have obtained knowledge of core theories and methods as demonstrated by courses completed and grades earned at the bachelor’s level. Graduates will exhibit breadth and depth of understanding in their respective disciplines in courses completed at the master’s level.
2. **APPLY/CREATE:** Graduates in these three masters programs will be able to clearly synthesize literature and theories in their disciplinary areas and/or in their specialized thesis topics. Such synthesis will help generate new ideas or methods to develop unique solutions to the problems in the three disciplinary programs.
3. **COMMUNICATE:** Graduates in these three masters programs will effectively communicate ideas, arguments, and rationales in clear, concise, well-organized publications (abstracts, papers, proposals) and presentations (conferences, seminars, and research meetings).  
4. **THINK:** Graduates in these three masters programs will be able to critically analyze the work of others in their field of specialty. Such analyses will help graduate students to demonstrate proficiency in designing a research strategy to answer important questions and to improve their own work.
5. **PROF. PRACTICE:** Graduates in these three masters programs will demonstrate the highest ethical standards and core values (including Penn State Core Values) within their discipline and other diverse scientific backgrounds.

**Spanish**

**Graduate Program Head** Paola Dussias  
**Program Code** SPAN  
**Campus(es)** University Park (Ph.D., M.A.)  
**Degrees Conferred** Doctor of Philosophy (Ph.D.)  
**Dual-Title Ph.D. in Spanish and Language Science**

**The Graduate Faculty**

View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=SPAN)

The program offers M.A. options in literature and linguistics, as well as doctoral emphasis in either of these two areas.

**Admission Requirements**

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Scores from the Graduate Record Examinations (GRE) are required of all students educated (high school and college) in the continental United States.

The minimum requirement for admission normally will be 24 credits of post intermediate work in Spanish language and literature.
Students with a 3.00 junior/senior average (on a 4.00 scale) and with appropriate course backgrounds will be considered for admission. The best-qualified applicants will be accepted up to the number of spaces that are available for new students. Exceptions to the minimum 3.00 grade-point average may be made for students with special backgrounds, abilities, and interests.

**Degree Requirements**

**Master of Arts (M.A.)**
Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

A candidate for the M.A. degree must take a minimum of 30 credits at the graduate level including 6 credits in a related minor field. An M.A. essay and a comprehensive written examination also are required. The M.A. degree (or equivalent) is normally a prerequisite to entering the doctoral degree program.

**Doctor of Philosophy (Ph.D.)**
Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

For the Ph.D. degree, a student must complete at least 60 credits (including M.A. credits) of graduate-level work, including a 15-credit minor. Other requirements include:

1. a doctoral qualifying examination and written area examinations;
2. reading knowledge of two foreign languages or a comprehensive knowledge of one foreign language; and
3. a doctoral dissertation.

**Dual-Titles**

**Dual-Title Ph.D. in Spanish and Language Science**
Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

Graduate students with research and educational interests in Spanish may apply to the Spanish and Language Science dual-title degree program. The goal of the dual-title in Spanish and Language Science is to enable graduate students from Spanish to acquire the knowledge and skills of their major area of specialization in Linguistics while at the same time gaining depth and methodological expertise in the areas associated with the language sciences.

**Admission Requirements**
To pursue a dual-title degree under this program, the student must first apply to the Graduate School and be admitted through the Department of Spanish, Italian and Portuguese. Upon admission to the Spanish Program and with a recommendation from a Language Science program faculty member in the Department of Spanish, Italian and Portuguese, the student's application will be forwarded to a committee that will include the Director of the Linguistics Program, one of the Co-Directors of the Center for Language Science, and a third elected faculty member within the Center for Language Science. All three committee members will be affiliated with the Program in Linguistics. Upon the recommendation of this committee, the student will be admitted to the dual-title degree program in Language Science. Refer to the Admission Requirements section of the Language Science Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/language-science). Doctoral students must be admitted into the dual-title degree program in Language Science prior to taking the candidacy examination in their primary graduate program.

**Degree requirements**
The doctoral degree in Spanish and Language Science is awarded only to students who are admitted to the Spanish doctoral program and admitted to the dual-title degree in Language Science. To qualify for the dual-title degree, students must satisfy the degree requirements for the degree they are enrolled in Spanish. In addition, students must complete the degree requirements for the dual-title in Language Science, listed on the Language Science Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/language-science). The minimum course requirements for the dual-title Ph.D. degree in Spanish and Language Science, in addition to the Spanish Program requirements, are described below.

Total number of required credits: 60

The minimum course requirements for the dual-title Ph.D. degree in Spanish and Language Science, in addition to the Spanish Program requirements, are as follows:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>LING 521</td>
<td>Proseminar in the Language Science of Bilingualism</td>
<td>3</td>
</tr>
<tr>
<td>LING 522</td>
<td>Proseminar in Professional Issues in Language Science</td>
<td>3</td>
</tr>
<tr>
<td>LING 525</td>
<td>Experimental Research Methods in Psycholinguistics (or equivalent)</td>
<td>3</td>
</tr>
</tbody>
</table>

**Theoretical Linguistics**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>LING 500</td>
<td>Syntax II</td>
<td>3</td>
</tr>
<tr>
<td>or LING 504</td>
<td>Phonology II</td>
<td></td>
</tr>
</tbody>
</table>

**Cognitive Neuroscience or Psycholinguistics**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>LING/PSY 520</td>
<td>Seminar in Psycholinguistics (or equivalent)</td>
<td>3</td>
</tr>
<tr>
<td>or PSY 511</td>
<td>Seminar in Contemporary Psychology</td>
<td></td>
</tr>
</tbody>
</table>

**Research Internship**
Select research internships with two different Language Science faculty mentors of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSD 596</td>
<td>Individual Studies</td>
</tr>
<tr>
<td>GER 596</td>
<td>Individual Studies</td>
</tr>
<tr>
<td>LING 596</td>
<td>Individual Studies</td>
</tr>
<tr>
<td>PSY 596</td>
<td>Individual Studies</td>
</tr>
<tr>
<td>SPAN 596</td>
<td>Individual Studies</td>
</tr>
</tbody>
</table>

Particular courses may satisfy both the Spanish requirements and those in the Language Science program. Final course selection is determined by the student in consultation with the dual-title program advisers and the major program advisers. Students who already hold a master's degree from another institution may petition to have equivalent course credits accepted.

The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Spanish and must include at least one Graduate Faculty member from the Language Science program. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. There will be a single qualifying
examination, containing elements of both Spanish and Language Science. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of a Spanish and Language Science dual-title Ph.D. student must include at least one member of the Language Science Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in Language Science, the member of the committee representing Language Science must be appointed as co-chair. The Language Science representative on the student’s dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their dissertation committee and reflects their original research and education in Spanish and Language Science. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

The following awards typically have been available to graduate students in this program:

The department awards annually an Edwin Erle Sparks Fellowship in the Humanities. In the past several years, graduate students have received external NSF fellowships and awards such as Doctoral Dissertation Research Improvement grants.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Learning Outcomes

1. Demonstrate competence in Spanish—and when appropriate Portuguese—for written and oral communication for academic research, presentations, and teaching.
2. Develop in-depth scholarly knowledge of the literary, cultural, and intellectual Luso-Hispanic traditions.
3. Articulate competence in a range of approaches to analyze, study, and write about texts and other cultural productions.
4. Establish mastery of the conventions of writing and delivering a paper at a professional conference.
5. Formulate and execute an independent research project that significantly furthers knowledge and theory in a specific field within Luso-Hispanic Studies.
6. Demonstrate ability to uphold standards of academic, professional, and ethical integrity in research and teaching.
7. Demonstrate ability to design course activities and assessments, and deliver instruction appropriate to undergraduate education.

Contact

Graduate Program Head: Paola Dussias
Director of Graduate Studies/Professor-in-Charge: Rena Torres Cacoullos
Primary Program Contact: Carolyn Fry
Email: ckf5024@psu.edu
Mailing Address: 442 Burrowes Building, University Park, PA 16802
Telephone: (814) 865-1016
Program Website: Spanish (http://sip.la.psu.edu)

Special Education

Graduate Program Head Mary Scheeler
Program Code SPLED
Campus(es) University Park (Ph.D., M.S., M.Ed.) World Campus (M.Ed.)
Degrees Conferred Doctor of Philosophy (Ph.D.) Master of Science (M.S.) Master of Education (M.Ed.) Dual-Title Ph.D., M.S., and M.Ed. in Special Education and Comparative and International Education
The Graduate Faculty View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=SPLED)

Exceptional children are those who deviate so far from average in physical, intellectual, emotional, or social characteristics that they require highly specialized instruction and related services. The purpose of the M.Ed. program in Special Education is to prepare educational service providers of exceptional children in advanced training in academic and behavior management strategies. M.Ed. students are trained in behavior management and instructional design, implementation, and evaluation appropriate for effective work with children and youth who qualify for services for intellectual, behavioral, or physical disabilities at all age levels and degrees of severity. The purpose of the M.S. and Ph.D. programs is to prepare researchers and college and university teachers in areas encompassing the education of the children and youth who qualify for services for intellectual, behavioral and/or physical disabilities. The former program is professional in nature; the latter two, academic.
Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Applicants for master’s and doctoral programs must present evidence of superior academic achievement, complete a personal statement, and provide professional references. Applications for the M.S. and Ph.D. programs must also present GRE verbal and quantitative test scores. Minimum GPA for master’s and doctoral applicants are, respectively, 3.00 for M.Ed. and M.S., and 3.50 for Ph.D. Minimum GRE test scores are (verbal and quantitative combined): 290 for M.S., and 300 for Ph.D.

Applicants for doctoral study must have had at least three years of relevant experience with special-needs children or youth. Exceptions to the admissions criteria may be made only for highly qualified students with special backgrounds, abilities, and interests. At the discretion of a graduate program, a student may be admitted provisionally for graduate study in a program without these scores.

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. See GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

Degree Requirements

Master of Education (M.Ed.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

Prerequisites for the M.Ed. program include 10 credits basic to the education of exceptional children (courses comparable to SPLED 400, SPLED 403A, and SPLED 403B, and SPLED 418). M.Ed. candidates are expected to complete the core:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDPSY 400</td>
<td>Introduction to Statistics in Educational Research</td>
<td>3</td>
</tr>
<tr>
<td>SPLED 500</td>
<td>Each semester prior to SPLED 500 each semester prior to Total credits</td>
<td>3</td>
</tr>
<tr>
<td>SPLED 521</td>
<td>Capstone Seminar in Special Education</td>
<td>3</td>
</tr>
<tr>
<td>SPLED 573</td>
<td>Introduction to Research in Special Education</td>
<td>3</td>
</tr>
</tbody>
</table>

Electives

At least 21 credits must be taken in special education and include courses selected by students in conjunction with their adviser.

M.S. candidates are expected to complete the core:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDPSY 400</td>
<td>Introduction to Statistics in Educational Research</td>
<td>3</td>
</tr>
<tr>
<td>SPLED 573</td>
<td>Introduction to Research in Special Education</td>
<td>3</td>
</tr>
</tbody>
</table>

Culminating Experience

M.S. students must submit a master's thesis and pass a comprehensive examination.

Doctor of Philosophy (Ph.D.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

The communication and foreign language requirement for the Ph.D. degree is prescribed by each student's committee. Minimum requirements for the Ph.D. degree include:

- 24 credits of research methods;
- 18 credits in a cognate area such as psychology, sociology, or child development; and
- 36 credits in education.

The student also must enroll in SPLED 500 each semester prior to successful completion of the comprehensive examinations. A qualifying examination is required after the first semester of full-time study; written and oral comprehensive examinations also are required. A student is required to complete the program within seven years from the date of successful completion of the qualifying examination.

Dual-Titles

Dual-Title M.Ed., M.S., and Ph.D. in Special Education and Comparative and International Education

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

Admission Requirements

Students must apply and be admitted to the graduate program in Special Education and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Comparative and International Education dual-title program. Refer to the Admission Requirements section of the Comparative and International Education Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/comparative-international-education). Doctoral students must be admitted into the dual-title degree.
program in Comparative and International Education prior to taking the qualifying examination in their primary graduate program.

**Degree Requirements**

To qualify for the dual-title degree, students must satisfy the degree requirements for the degree they are enrolled in Special Education. In addition, students must complete the degree requirements for the dual-title in Comparative and International Education, listed on the Comparative and International Education Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/comparative-international-education).

The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Special Education and must include at least one Graduate Faculty member from the Comparative and International Education program. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. There will be a single qualifying examination, containing elements of both Special Education and Comparative and International Education. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of a Special Education and Comparative and International Education dual-title Ph.D. student must include at least one member of the Comparative and International Education Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in Comparative and International Education, the member of the committee representing Comparative and International Education must be appointed as co-chair. The Comparative and International Education representative on the student's dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their dissertation committee and reflects their original research and education in Special Education and Comparative and International Education. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

**U.S. Office of Education Assistantships or Traineeships in Special Education**

Open to graduate students being prepared as leadership personnel in special education; stipend varies, depending on conditions of existing grants. Other graduate assistantships also may be available. Apply to the Graduate Admissions Committee, 125D CEDAR Building.

World Campus students in graduate degree programs may be eligible for financial aid. Refer to the Tuition and Financial Aid section (http://www.worldcampus.psu.edu/tuition-and-financial-aid) of the World Campus website for more information.

**Courses**

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**Contact**

Graduate Program Head: Mary Scheeler

Primary Program Contact: Jennifer Farkus

Email: jlf5261@psu.edu

Mailing Address: 125G CEDAR Bldg, University Park, PA 16802

Telephone: (814) 863-4452

Program Website:

Special Education at University Park (http://ed.psu.edu/epcse/special-education/special-education)

Special Education at World Campus (http://ed.psu.edu/epcse/special-education/special-education)

**Student Aid**

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School's website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

The following award typically has been available to graduate students in this program:

- U.S. Office of Education Assistantships or Traineeships in Special Education

  Open to graduate students being prepared as leadership personnel in special education; stipend varies, depending on conditions of existing grants. Other graduate assistantships also may be available. Apply to the Graduate Admissions Committee, 125D CEDAR Building.

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  Courses

  Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

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  Student Aid

  Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School's website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

  The following award typically has been available to graduate students in this program:
Graduate instruction and research opportunities are available in most areas of statistics and probability, including linear models, nonparametric statistics, robustness, statistical computing, analysis of count data, multivariate analysis, experimental design, reliability, stochastic processes and probability (applied and theoretical), distribution theory, statistical ecology, and biometrics.

Graduate students can gain practical experience in the application of statistical methodology through participation in the department's statistical consulting center and collaborative research activities. In addition, collaborative projects with other departments provide longer term experience and support for selected students. Most students gain valuable teaching experience by assisting in the teaching and grading of courses. In addition, Ph.D. students with proper qualifications can receive support for teaching undergraduate courses.

The Master of Applied Statistics (M.A.S.) program is a professional degree designed to provide training in statistics focused on developing data analysis skills, and exploration of all core areas of applied statistics, without going deeply into the mathematical statistics foundations. It aims to provide its graduates with broad knowledge in a wide range of statistical application areas.

The Doctor of Philosophy (Ph.D.) and Master of Science (M.S.) degrees in Statistics are designed for advanced studies in applied and theoretical statistics. Special emphases include biostatistics, statistical ecology, environmental statistics, genometrics, biometrics and statistical computation. The M.S. degree is appropriate preparation for the department's Ph.D. degree.

**Admission Requirements**

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Scores from the Graduate Record Examinations (GRE), or from a comparable substitute examination accepted by the Statistics graduate program, are required for admission.

While applications from all students (including those who already have done graduate work) are reviewed, completion of a standard calculus sequence is regarded as a prerequisite. Students with a 3.00 or better junior/senior average (on a 4.00 scale) and with appropriate course backgrounds will be considered for admission. The best-qualified applicants will be accepted up to the number of spaces that are available for new students. Exceptions to the minimum 3.00 grade-point average may be made for students with special backgrounds, abilities, and interests. Students hoping to earn a Ph.D. in statistics may apply directly to the Ph.D. program without need for a master's degree.

**Degree Requirements**

**Master of Applied Statistics (M.A.S.)**

Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

For the M.A.S. degree, a minimum of 30 credits and a minimum grade-point average of 3.0 are required for graduation. Of the 30 credits, 24 must be courses from the Statistics department and 21 must be at the 500 level. The student must complete:

### Code | Title | Credits
--- | --- | ---
| **Required Courses** | | |
| STAT 501 | Regression Methods | 3 |
| STAT 502 | Analysis of Variance and Design of Experiments | 3 |
| **Mathematical Statistics** | | |
| STAT 414 | Introduction to Probability Theory | 3 |
| STAT 415 | Introduction to Mathematical Statistics | 3 |
| **Statistical Consulting** | | |
| STAT 580 | Statistical Consulting Practicum I | 2 |
| **Electives** | | |
| To complete the remaining credit requirements, a student can select 9-15 credits from the following applied statistics courses: | | |
| STAT 464 | Applied Nonparametric Statistics | |
| STAT 480 | Introduction to SAS | |
| STAT 500 | Applied Statistics | |
| STAT 503 | Design of Experiments | |
| STAT 504 | Analysis of Discrete Data | |
| STAT 505 | Applied Multivariate Statistical Analysis | |
| STAT 506 | Sampling Theory and Methods | |
| STAT 507 | Epidemiologic Research Methods | |
| STAT 509 | Design and Analysis of Clinical Trials | |
| STAT 510 | Applied Time Series Analysis | |
In addition, students with suitable backgrounds may choose up to 6 credits from a departmental list of additional courses with approval from their adviser.

### Culminating Experience

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT 581</td>
<td>Statistical Consulting Practicum II (Capstone Project)</td>
<td>1</td>
</tr>
</tbody>
</table>

Total Credits: 30

For all M.A.S. students, the STAT 581 course will have a comprehensive written project report required as part of the course, which serves as the culminating experience.

## Master of Science (M.S.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

For the M.S. degrees, a student must complete at least 30 credits, including at least 27 at the 500 or 600 level; 21 of the 27 500-level credits must be formal course work from the department of Statistics. A student must complete:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT 511</td>
<td>Regression Analysis and Modeling</td>
<td>3</td>
</tr>
<tr>
<td>STAT 512</td>
<td>Design and Analysis of Experiments</td>
<td>3</td>
</tr>
<tr>
<td>STAT 513</td>
<td>Theory of Statistics I</td>
<td>3</td>
</tr>
<tr>
<td>STAT 514</td>
<td>Theory of Statistics II</td>
<td>3</td>
</tr>
<tr>
<td>STAT 515</td>
<td>Stochastic Processes and Monte Carlo Methods</td>
<td>3</td>
</tr>
<tr>
<td>STAT 516</td>
<td>Applied Statistics</td>
<td>3</td>
</tr>
<tr>
<td>STAT 517</td>
<td>Asymptotic Tools</td>
<td>3</td>
</tr>
</tbody>
</table>

### Applied Statistics

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>STAT 511</td>
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<td>STAT 512</td>
<td>Design and Analysis of Experiments</td>
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</tr>
<tr>
<td>STAT 513</td>
<td>Theory of Statistics I</td>
<td>3</td>
</tr>
<tr>
<td>STAT 514</td>
<td>Theory of Statistics II</td>
<td>3</td>
</tr>
<tr>
<td>STAT 515</td>
<td>Stochastic Processes and Monte Carlo Methods</td>
<td>3</td>
</tr>
</tbody>
</table>

### Mathematical Statistics

<table>
<thead>
<tr>
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<th>Title</th>
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</tr>
</thead>
<tbody>
<tr>
<td>STAT 511</td>
<td>Regression Analysis and Modeling</td>
<td>3</td>
</tr>
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<td>STAT 512</td>
<td>Design and Analysis of Experiments</td>
<td>3</td>
</tr>
<tr>
<td>STAT 513</td>
<td>Theory of Statistics I</td>
<td>3</td>
</tr>
<tr>
<td>STAT 514</td>
<td>Theory of Statistics II</td>
<td>3</td>
</tr>
<tr>
<td>STAT 515</td>
<td>Stochastic Processes and Monte Carlo Methods</td>
<td>3</td>
</tr>
</tbody>
</table>

### Stochastic Processes

<table>
<thead>
<tr>
<th>Code</th>
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<tbody>
<tr>
<td>STAT 511</td>
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</tr>
<tr>
<td>STAT 514</td>
<td>Theory of Statistics II</td>
<td>3</td>
</tr>
<tr>
<td>STAT 515</td>
<td>Stochastic Processes and Monte Carlo Methods</td>
<td>3</td>
</tr>
</tbody>
</table>

### Statistical Consulting

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT 580</td>
<td>Statistical Consulting Practicum I</td>
<td>2</td>
</tr>
<tr>
<td>STAT 581</td>
<td>Statistical Consulting Practicum II</td>
<td>1</td>
</tr>
</tbody>
</table>

### Electives

Select 18 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT 517</td>
<td>Probability Theory</td>
<td>3</td>
</tr>
<tr>
<td>STAT 561</td>
<td>Statistical Inference I</td>
<td>3</td>
</tr>
<tr>
<td>STAT 580</td>
<td>Statistical Consulting Practicum I</td>
<td>2</td>
</tr>
<tr>
<td>STAT 581</td>
<td>Statistical Consulting Practicum II</td>
<td>1</td>
</tr>
<tr>
<td>STAT 590</td>
<td>Colloquium</td>
<td>2</td>
</tr>
<tr>
<td>STAT 592</td>
<td>Teaching Statistics</td>
<td>1</td>
</tr>
</tbody>
</table>

### Other courses approved by the Graduate Studies Committee

Select 18 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT 518</td>
<td>Probability Theory</td>
<td>3</td>
</tr>
<tr>
<td>STAT 544</td>
<td>Categorical Data Analysis I</td>
<td>3</td>
</tr>
<tr>
<td>STAT 552</td>
<td>Linear Models II</td>
<td>3</td>
</tr>
<tr>
<td>STAT 562</td>
<td>Statistical Inference II</td>
<td>3</td>
</tr>
<tr>
<td>STAT 565</td>
<td>Multivariate Analysis</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits: 48

The student must also pass a written master's qualifying examination at the end of the first year, and a comprehensive exam given at the end of the third year. There are two ways for students to complete their comprehensive examination. Typically, both written and oral components of the comprehensive involve the defense of a dissertation proposal evaluated by the dissertation committee. Alternatively, the student may have a written and oral comprehensive exam focusing on at least two key areas in Statistics. The examination focuses on the dissertation prospects and the student's preparation to undertake dissertation research, and is evaluated by the dissertation committee. A written and oral defense of a dissertation proposal would then occur at a later stage as per committee's recommendation. Students must have their dissertation proposal approved as specified in the Department of Statistics Graduate Student Handbook. The student then must submit an acceptable Ph.D. dissertation and pass a final oral examination (the dissertation defense). The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

## Doctor of Philosophy (Ph.D.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

The Department of Statistics requires a minimum total of 48 postbaccalaureate credits for the Ph.D. At least 42 credits, exclusive of the dissertation, must be in Statistics. Course work accepted for the M.S. in Statistics at Penn State will count toward the department’s 48-credit requirement. In the case of students who have earned credits in an advanced degree program at another university or in another department at Penn State, a maximum of 24 credits may count toward the 48-credit departmental requirement, subject to departmental approval.

For the Ph.D. degree, a student in Statistics must complete at least 48 credits, of which at least 42 must be STAT and at most three credits can be at the 400 level.

<table>
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<tr>
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</tbody>
</table>

The student also must pass a written Ph.D. qualifying exam, typically at the end of the first year, and a comprehensive exam given at the end of the third year. There are two ways for students to complete their comprehensive examination. Typically, both written and oral components of the comprehensive involve the defense of a dissertation proposal evaluated by the dissertation committee. Alternatively, the student may have a written and oral comprehensive exam focusing on at least two key areas in Statistics. The examination focuses on the dissertation prospects and the student's preparation to undertake dissertation research, and is evaluated by the dissertation committee. A written and oral defense of a dissertation proposal would then occur at a later stage as per committee's recommendation. Students must have their dissertation proposal approved as specified in the Department of Statistics Graduate Student Handbook. The student then must submit an acceptable Ph.D. dissertation and pass a final oral examination (the dissertation defense). The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

The Ph.D. in Statistics offers concentrations in Biometrics, Biostatistics, Environmental Statistics, and Genometrics. The course and the examination requirements remain the same under these concentrations, however, the student must take 15 credits of electives from a list of courses identified by the concentration.
Doctoral Minor in Statistics

Requirements listed here are in addition to requirements for minors in Graduate Council policies listed under GCAC-600 Research Degree Requirements (http://gradschool.psu.edu/graduate-education-policies) and GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

The Department of Statistics has three possible paths for a Doctoral Minor in Statistics:

- Path 1: STAT 414/MATH 414 and STAT 415/MATH 415 and at least three 500-level courses from the department.
- Path 2: Five or more courses totaling 15 credits at the 500-level from the department. STAT 464 may also count toward the 15 credits.
- Path 3: Four 500-level courses totaling 12 credits from the department and one additional course of 3 credits approved by the department head or graduate studies chair.

Please note: STAT 500 will not be counted toward the Doctoral Minor in Statistics under any path.

For all paths, a 3.5 GPA is required in the courses to be counted toward the minor. Completion of one of the paths listed above, with the specified grade-point average, and the signature on the Graduate Minor Program form (http://stat.psu.edu/education/graduate-minor-application/view) constitutes approval of the Minor in Statistics. Official requests to add a minor to a doctoral student’s academic record must be submitted to Graduate Enrollment Services prior to establishment of the dissertation committee and prior to scheduling the comprehensive examination. At least one Graduate Faculty member from the minor field must be on the student’s dissertation committee.

Integrated Undergraduate-Graduate Programs

Integrated B.A. or B.S. in Mathematics and M.A.S. in Applied Statistics

Requirements listed here are in addition to requirements listed in GCAC-210 Integrated Undergraduate-Graduate (IUG) Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/integrated-undergraduate-graduate-degree-programs).

The Integrated Undergraduate-Graduate (IUG) degree with B.A./B.S. in Mathematics and Master of Applied Statistics (M.A.S.) is designed to be completed in five years. This integrated degree will enable a select number of highly qualified and career-oriented students to obtain training in statistics focused on developing data analysis skills, and exploration of core areas of applied statistics at the graduate levels in addition to an undergraduate degree in Mathematics. The M.A.S. degree is a professional master’s degree that emphasizes applications. The degree prepares students with interests in mathematics, computation, and the quantitative aspects of science for careers in industry and government as statistical analysts. Research divisions in the pharmaceutical industry, quality control, and quality engineering divisions in manufacturing companies, clinical research units, corporate planning and research units, and other data intensive positions require persons with training in mathematics, computation, database management, and statistical analysis, which this program will provide.

Application Process

The number of openings in the integrated B.A./B.S. and M.A.S. program is limited. Students must apply to and meet the admission requirements of the Graduate School, as well as the graduate program in which they intend to receive their master’s degree. Admission will be based on specific criteria and the recommendation of faculty. Students shall be admitted to an IUG program no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree, as specified in the proposed IUG plan of study. Applicants to the integrated program:

- Must be enrolled in the Mathematics B.A./B.S. program.
- Must have completed at least 60 credits of the undergraduate degree program including the two courses: STAT 414 and STAT 415.
- Must submit a transcript and a statement of purpose.
- Must present a departmental approved plan of study in the application process in consultation with the M.A.S. program director. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser as the student advances through the program.
- Must be recommended by the chair of Mathematics Department’s undergraduate program committee. Two additional recommendation letters must be sent to the M.A.S. admissions committee.
- Must be accepted to the M.A.S. program in Statistics.

Degree Requirements

Students in the IUG program must satisfy the requirements for both the B.A./B.S. and M.A.S. degrees; 120 credits are required for the B.A./B.S. and 30 credits for the M.A.S. The following twelve credits (number of credits in parentheses) can apply to both B.A./B.S. and M.A.S. degrees, six of these are at the 500 level:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT 414</td>
<td>Introduction to Probability Theory</td>
<td>3</td>
</tr>
<tr>
<td>STAT 415</td>
<td>Introduction to Mathematical Statistics</td>
<td>3</td>
</tr>
<tr>
<td>STAT 501</td>
<td>Regression Methods</td>
<td>3</td>
</tr>
<tr>
<td>STAT 502</td>
<td>Analysis of Variance and Design of Experiments</td>
<td>3</td>
</tr>
<tr>
<td>Total Credits</td>
<td></td>
<td>12</td>
</tr>
</tbody>
</table>

If students accepted into the IUG program are unable to complete the M.A.S. degree, they are still eligible to receive their undergraduate degree if all the undergraduate degree requirements have been satisfied.

Integrated B.S. in Statistics and M.A.S. in Applied Statistics

Requirements listed here are in addition to requirements listed in GCAC-210 Integrated Undergraduate-Graduate (IUG) Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/integrated-undergraduate-graduate-degree-programs).

The Integrated Undergraduate-Graduate (IUG) degree with B.S. in Statistics and Master of Applied Statistics (M.A.S.) is designed to be completed in five years. This integrated degree will enable a select number of highly qualified and career-oriented students to obtain training in statistics focused on developing data analysis skills and exploration of core areas of applied statistics at the undergraduate and graduate levels. The M.A.S. degree is a professional master’s degree that emphasizes applications and does not provide as much training in the mathematical and statistical theory. The degree prepares students with interests in mathematics, computation, and the quantitative aspects of science for careers in industry and government as statistical analysts. Research
divisions in the pharmaceutical industry, quality control and quality engineering divisions in manufacturing companies, clinical research units, corporate planning and research units, and other data-intensive positions require persons with training in mathematics, computation, database management, and statistical analysis, which this program will provide.

Application Process
The number of openings in the integrated B.S./M.A.S. program is limited. Students must apply to and meet the admission requirements of the Graduate School, as well as the graduate program in which they intend to receive their master’s degree. Admission will be based on specific criteria and the recommendation of faculty. Students shall be admitted to an IUG program no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree, as specified in the proposed IUG plan of study. Applicants to the integrated program:

- Must be enrolled in the Statistics B.S. program.
- Must have completed at least 60 credits of the undergraduate degree program, including the two courses: STAT 414 and STAT 415.
- Must submit a transcript and a statement of purpose.
- Must present a departmental approved plan of study in the application process in consultation with the M.A.S. program director. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser as the student advances through the program.
- Must be recommended by the chair of the department’s undergraduate program committee.
- Must be accepted into the M.A.S. program in Statistics.

Degree Requirements
Students in the IUG program must satisfy the requirements for both the B.S. and M.A.S. degrees; 120 credits are required for the B.S. and 30 credits for the M.A.S. The following twelve credits (number of credits in parentheses) can apply to both B.S. and M.A.S. degrees; six of these are at the 500 level:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT 414</td>
<td>Introduction to Probability Theory</td>
<td>3</td>
</tr>
<tr>
<td>STAT 415</td>
<td>Introduction to Mathematical Statistics</td>
<td>3</td>
</tr>
<tr>
<td>STAT 501</td>
<td>Regression Methods</td>
<td>3</td>
</tr>
<tr>
<td>STAT 502</td>
<td>Analysis of Variance and Design of Experiments</td>
<td>3</td>
</tr>
</tbody>
</table>

If students accepted into the IUG program are unable to complete the M.A.S. degree, they are still eligible to receive their undergraduate degree if all the undergraduate degree requirements have been satisfied.

Student Aid
Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

GRE scores are required for consideration for assistantships.

World Campus students in graduate degree programs may be eligible for financial aid. Refer to the Tuition and Financial Aid section (http://www.worldcampus.psu.edu/tuition-and-financial-aid) of the World Campus website for more information.

Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Learning Outcomes

Master of Applied Statistics (M.A.S.)

1. Graduates shall demonstrate conceptual and practical knowledge of the broad aspects of Statistical analysis techniques. The core areas of Applied Statistics (Regression Analysis, Design of Experiment, Analysis of Variance, Analysis of Discrete Data, MANOVA, and many more) will be explored.
2. Graduates will be able to apply the statistical analysis techniques they learn to real problems. They will demonstrate proficiency in the working with others as a data analyst in a team setting, as well as in broad areas of data processing, data visualization, statistical analysis and interpretation of the statistical results. Students will also demonstrate adequate professional preparation for drawing sound conclusions and creating reports to aid in making decisions as data analysts and applied statisticians.
3. Graduates will demonstrate skills in communicating statistical findings and reports in a group setting and through oral presentations. They will be trained on development of recommendation reports, and discussion of consulting solutions.
4. Graduates will be able to demonstrate critical thinking skills when reviewing scientific papers, literature and numerical reports. They will be trained to have a firm grasp of statistical thinking and sound understanding of statistical conclusions.
5. Graduates will demonstrate knowledge of interpersonal working dynamics, ethical professional conduct and the ability to perform in a team environment. They will participate in professional networking, and engagement in professional activities and organizations serving the discipline and the industry.

Master of Science (M.S.) and Doctor of Philosophy (Ph.D.)

1. Graduates shall demonstrate in-depth and advanced knowledge and understanding in statistics core areas of probability, statistical inference, modeling and computing. The core demonstration will include the application of these principles to problems in various contexts such as genetics, medicine, biology, environmental studies, and social and behavioral sciences, that are crucial for the practice of modern statistics.
2. Graduates shall demonstrate, at a level appropriate to a departmental colloquium, (i) knowledge of several outstanding problems or questions in diverse sub-fields of statistics, (ii) the experimental and theoretical origins of these problems, and (iii) the principle efforts proposed or underway to address them, including demonstrating
critical thinking skills when reviewing scientific papers, literature and numerical reports.

3. Graduates shall demonstrate the ability to communicate professionally, in written and oral form, research work and conclusions of statistical findings to statistical experts and non-expert audiences.

4. Graduates shall demonstrate (i) knowledge and understanding of professional standards of ethics and conduct, (ii) the ability to analyze situations to identify the standards that should apply including performing in a team environment, and (iii) describe how they may be appropriately acted upon. They will participate in professional networking, and engagement in professional activities and organizations serving the discipline and the broader scientific community and the industry.

5. Graduates shall have a specialty area within the broad domain of statistics, within which they shall demonstrate (i) advanced knowledge and understanding of the primary literature, (ii) the ability to analyze and judge new contributions to the primary literature, (iii) the ability to pose complex research problem(s) and identify the knowledge and methodologies required to address them, and (iv) the ability to apply that knowledge and those methodologies to create new knowledge and/or develop new theories and methods that advance (or show the potential to advance) knowledge and understanding within the specialty area, and to another discipline where their findings are applicable.

Contact

Graduate Program Head: Murali Haran

Director of Graduate Studies/Professor-in-Charge: Ephraim Hanks

Primary Program Contact: Jessica Brown

Email: jsb44@psu.edu

Mailing Address: 326 Thomas Bldg., University Park, PA 16802

Telephone: (814) 863-3886

Program Websites:

Statistics (http://stat.psu.edu/education/graduate-programs)

Applied Statistics (http://stat.psu.edu/education/graduate-programs/master-of-applied-statistics)

Strategic Communications

Graduate Program Head: Frank E. Dardis

Program Code: STCOM

Campus(es): World Campus (M.P.S.)

Degrees Conferred: Master of Professional Studies (MPS)

The Graduate Faculty

View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=STCOM)

The MPS degree in Strategic Communications is a program of study for individuals who are in the early and middle stages of their strategic communications careers, currently in or aspiring to managerial positions. The content of the program will be appropriate for such individuals employed in a wide range of functional specialties and industry sectors, including advertising, public relations, and strategic communications.

The MPS degree in Strategic Communications examines the process and application of purposive mass communication that is delivered to specific target audiences through varied mass media and other communications channels. Program content exposes the student to a broad range of strategic communications theory, research, and practical application related to developing and implementing effective communications plans for companies and organizations of all types.

Courses examine:

- how persuasive communication functions through mass media and other communication channels;
- how specific communications goals are developed based on theory and rationale;
- how strategic communications plans and campaigns are created and executed; and
- how the effectiveness of communications plans is measured and evaluated.

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Educational Background

A minimum 3.00 junior/senior grade-point average (on a 4.00 scale) is recommended. Students also are expected to have some industry work experience prior to admission.

Language of Instruction

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. See GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

Core Application Packet

- Completed official online Graduate School application (http://gradschool.psu.edu/prospective-students/how-to-apply) and payment of nonrefundable application fee.
- Statement of purpose: a 2-3 page essay articulating career and educational goals that demonstrates the student’s written communication skills.
- A current vita or résumé.
- Three letters of recommendation that attest to the student's readiness for graduate study and document the requisite industry experience. Letters must be submitted through the online application. Within the online application you will be asked to enter the names and email addresses of three individuals who will be providing your recommendation. Those individuals will receive a note via email asking them to complete a brief form that will serve as your recommendation. Please inform all recommenders they must submit the form in order for your application to be complete.
Degree Requirements

Master of Professional Studies (M.P.S.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

Total required credits for the MPS: at least 30 credits at the 400, 500, or 800 level; at least 27 must be at the 500 or 800 level, with at least 6 at the 500 level.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMM 530</td>
<td>Research Methods in Strategic Communications</td>
<td>3</td>
</tr>
<tr>
<td>COMM 531</td>
<td>Strategic Communications: Theory and Implementation</td>
<td>3</td>
</tr>
<tr>
<td>COMM 830</td>
<td>Strategic Communications Industry</td>
<td>3</td>
</tr>
<tr>
<td>COMM 831</td>
<td>Digital Media Analytics I</td>
<td>3</td>
</tr>
<tr>
<td>COMM 832</td>
<td>Multimedia Content Development and Delivery</td>
<td>3</td>
</tr>
<tr>
<td>COMM 833</td>
<td>Ethics and Decision Making in Strategic Communications</td>
<td>3</td>
</tr>
<tr>
<td>COMM 834</td>
<td>Strategic Communications Campaigns</td>
<td>3</td>
</tr>
</tbody>
</table>

Electives

Select 6 credits of the following:

Select 3 credits from any World Campus course(s), including the elective courses listed above.  

Culminating Experience

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMM 834</td>
<td>Strategic Communications Campaigns (Capstone Course)</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits 33

Course Substitutions

Substitutions for the above prescribed courses, either with resident-education courses, alternate online courses, or courses from other institutions, will be considered on a case-by-case basis subject to restrictions outlined in GCAC-309 Transfer Credit (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/transfer-credit), and must be petitioned and approved in advance by the program administrator, with input from the student's adviser.

Student Aid

World Campus students in graduate degree programs may be eligible for financial aid. Refer to the Tuition and Financial Aid section (http://www.worldcampus.psu.edu/tuition-and-financial-aid) of the World Campus website for more information.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact

Graduate Program Head: Francis Dardis

Email: fed3@psu.edu

Mailing Address: 212 Carnegie Building, University Park, 16802

Telephone: (814) 863-7993

Program Website: Strategic Communications (https://www.worldcampus.psu.edu/degrees-and-certificates/penn-state-online-strategic-communications-masters/overview)

Supply Chain Management

Graduate Program Head: Nicholas Petruzzi

Program Code: SCM

Campus(es): World Campus (M.P.S.)

Degrees Conferred: Master of Professional Studies (M.P.S.)

The Graduate Faculty: View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=SCM)

The Master of Professional Studies in Supply Chain Management (MPS/SCM) is awarded to students who demonstrate mastery of the knowledge, problem-solving competencies, and leadership skills that are critical to leading business transformation through integrated supply chain planning and execution. The program emphasizes problem-based learning coupled with integrative, collaborative learning experiences to develop the requisite knowledge, skills, and abilities for effective supply chain management. Instruction is delivered online and in a short residency course at an on- or off-campus location, so that working professionals can complete the degree as part-time students working largely or entirely, off campus.
Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Students applying to the professional MPS/SCM degree program must be admitted by both the MPS/SCM program and the Graduate School at The Pennsylvania State University.

Admission to the graduate program in Supply Chain Management requires:

- A completed Graduate School application (http://gradschool.psu.edu/prospective-students/how-to-apply) for graduate study, including nonrefundable application fee
- A current resume, along with a statement of professional experience and goals. This statement of approximately two pages must describe the applicant’s professional goals, experience, and responsibilities. The statement must also indicate why the applicant is applying to the professional MPS/SCM program at Penn State
- One letter of recommendation relevant to the applicant’s professional capabilities, preferably from the employee’s immediate supervisor, which should address the applicant’s readiness for graduate study
- Official transcripts from all post-secondary institutions attended (http://www.gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission)
- An undergraduate GPA of at least 3.0 on a 4.0 scale, or grade average of “B” or better in graduate courses completed since the first bachelor’s degree, with at least 6 credits of graduate courses completed to qualify under this option. Applicants with an undergraduate GPA below 3.0 may be admitted in limited circumstances at the discretion of the program, where the applicant demonstrates an exceptional record of professional achievement. In such circumstances, the program may require, as a condition of admission, completion of course work to make up deficiencies or fill in gaps in prior education.
- Official Graduate Management Admission Test scores reported directly from the testing center to Penn State

A committee of SC&IS Department faculty meet periodically to review applications and identify applicants qualified for admission. Admissions decisions are based on a review of a complete admission portfolio, including:

- the application,
- the statement of professional experience and goals,
- the current resume,
- official transcripts from all post-secondary institutions attended,
- the letter of recommendation, and
- the GMAT scores.

Degree Requirements

Master of Professional Studies (M.P.S.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

Students earn the professional MPS/SCM degree by successfully completing a minimum of 30 credits including 26 credits of required courses and 4 credits of approved electives.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCM 530</td>
<td>Supply Chain Analysis</td>
<td>3</td>
</tr>
<tr>
<td>SCM 800</td>
<td>Supply Chain Management</td>
<td>4</td>
</tr>
<tr>
<td>SCM 801</td>
<td>Supply Chain Performance Metrics and Financial Analysis</td>
<td>1</td>
</tr>
<tr>
<td>SCM 812</td>
<td>Demand Fulfillment</td>
<td>2</td>
</tr>
<tr>
<td>SCM 822</td>
<td>Supply Management</td>
<td>2</td>
</tr>
<tr>
<td>SCM 842</td>
<td>Manufacturing and Service Operations Planning</td>
<td>2</td>
</tr>
<tr>
<td>SCM 850</td>
<td>Supply Chain Design and Strategy</td>
<td>4</td>
</tr>
<tr>
<td>SCM 860</td>
<td>Supply Chain Transformation and Innovation</td>
<td>4</td>
</tr>
<tr>
<td>BA 803</td>
<td>BUSINESS ETHICS</td>
<td>1</td>
</tr>
</tbody>
</table>

Electives

Elective credits will be chosen from a list of approved courses maintained by the program office.

Culminating Experience

SCM 594 | Research Topics (Capstone Project)  

Students must complete a high-quality research project as the culminating experience for the degree, while enrolled in SCM 594. The research project demonstrates the student’s ability to apply advanced supply chain management knowledge to a supply chain-related problem or situation in a way that makes a substantial contribution to the student’s professional development.

The program requires a cumulative grade point average of at least 3.00 and no course grade below a C. All requirements for the professional MPS/SCM degree, including acceptance of the research project must be met within eight years of admission to degree status. Students are expected to make continuous progress toward the degree. Leaves of absence, however, may be granted under exceptional circumstances on a case-by-case basis, at the discretion of the program.

Credits earned at other institutions but not used to earn a degree may be applied toward the requirements for a graduate degree, subject to restrictions outlined in GCAC-309 Transfer Credit (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-309/transfer-credit).

Student Aid

World Campus students in graduate degree programs may be eligible for financial aid. Refer to the Tuition and Financial Aid section (http://www.worldcampus.psu.edu/tuition-and-financial-aid) of the World Campus website for more information.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.
Systems Engineering

Graduate Program Head: Colin Neill
Program Code: SYSEN
Campus(es): Great Valley (M.Eng.), World Campus (M.Eng.)

This professional master's degree program, available at Penn State Great Valley, deals with the various aspects of systems engineering. The primary goal of the program is to prepare engineers to develop the next generation of engineering products, systems, and services for industry and government.

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

The M.Eng. in Systems Engineering program is designed for students with backgrounds in science or engineering. Admission will be granted if the applicant has the necessary program prerequisites and a faculty member in the student's interest area agrees to serve as adviser. Normal admission requirements include mathematics through differential equations. Scores from the Graduate Record Examinations (GRE) are not an entrance requirement unless the junior/senior grade-point average is below 3.00 (on a 4.00 scale). There is no foreign language requirement.

Students with a 3.00 junior/senior GPA in an appropriate technical degree program will be considered for admission. The best-qualified applicants will be accepted. Exceptions to the minimum 3.00 GPA may be made for students with special backgrounds, abilities, and interests.

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants.

The language of instruction at Penn State is English. English proficiency students with special backgrounds, abilities, and interests.

The best-qualified applicants will be accepted. Exceptions to the minimum 3.00 GPA may be made for students with special backgrounds, abilities, and interests.

Degree Requirements

Master of Engineering (M.Eng.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

The curriculum integrates the traditional engineering disciplines in a synergistic manner. Course work includes four 9-credit modules of study with each module designed for in-depth coverage of a specific area of study (e.g., systems and control, robotics). Two of the four modules, the Skill-Based module and the Systems Engineering module, are required and constitute an 18-credit core. To complete the program, students choose an additional 18 credits of electives in two modules of professional interest. As part of the 18-credit core curriculum, students who are nearing the end of their program complete a capstone research experience. Graduate instruction is under the direction of an interdisciplinary faculty committee and the departments participating in the program. The Graduate Faculty consists of members who have teaching and research interests in the area of systems engineering. Maximum flexibility is maintained by the program in an effort to meet both the professional needs of the individual students and academic quality standards.

All candidates must take two required 9-credit core modules for a total core curriculum of 18 credits and two other 9-credit elective modules. At least 15 credits of selected courses must be at the 500 level.

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School's website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

World Campus students in graduate degree programs may be eligible for financial aid. Refer to the Tuition and Financial Aid section (http://www.worldcampus.psu.edu/tuition-and-financial-aid) of the World Campus website for more information.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Learning Outcomes

1. KNOW. Develop heterogeneous engineered solutions to complex problems using contemporary methods, processes, and tools.
2. CRITICAL THINKING. Understand system interdependencies to analyze the associated tradespaces these generate to identify optimal solution alternatives.
3. PROBLEM SOLVING. Use integrated models and simulations for multi-level system analysis and practices.
4. APPLY. Manage the budgets and schedules of large-scale projects and programs while delivering.
5. **TEAMWORK.** Work effectively and collaboratively within interdisciplinary teams.

## Contact
**Graduate Program Head:** Colin Neill  
**Director of Graduate Studies/Professor-in-Charge:** Nil Ergin  
**Primary Program Contact:** Justine Chavez  
**Email:** jrc460@psu.edu  
**Mailing Address:** Penn State Great Valley, 30 East Swedesford Road, Malvern, PA 19355  
**Telephone:** (610) 648-3277  
**Program Website:**  
[Systems Engineering at Great Valley](http://greatvalley.psu.edu/academics/masters-degrees/systems-engineering)  
[Systems Engineering at World Campus](http://www.worldcampus.psu.edu/degrees-and-certificates/systems-engineering-masters/overview)

## Teaching and Curriculum
**Graduate Program Head**  
Holly Angelique

**Program Code**  
TC

**Campus(es)**  
Harrisburg (M.Ed.)

**Degrees Conferred**  
Master of Education (M.Ed.)

**The Graduate Faculty**  
[View](https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=TC)

The Master of Education in Teaching and Curriculum is designed to enhance the skills of teachers for public and private schools. The program focuses on three essential components — curriculum, instruction, and assessment — that contribute to the organization's philosophy of learning. The Teaching and Curriculum program is unified by its vision of critical thinking, democracy, diversity, lifelong learning, nurturance, and scholarship. Courses are designed to reflect the standards of the National Council for Accreditation of Teacher Education (NCATE) and the National Board for Professional Teaching Standards (NBPTS). The program is offered at Penn State Harrisburg and other selected Penn State campuses.

Specifically, the goals of the program are to develop in students:

1. the ability to communicate effectively either with school-age students and their parents or with co-workers and/or clients;
2. the ability to conduct an instructional program that provides a sound intellectual and emotional climate for learning;
3. competence in a variety of teaching methods and in the utilization of materials and content appropriate for an effective instructional program;
4. the ability to interpret and to evaluate educational literature and research; and
5. the ability to describe and to evaluate major issues and current trends in instructional curriculum practice and development.

Certification programs are also available in the areas of early childhood education, English as a second language, and principalship.

## Admission Requirements
Applicants apply for admission to the program via the Graduate School application for admission ([http://gradschool.psu.edu/prospective-students/how-to-apply](http://gradschool.psu.edu/prospective-students/how-to-apply)). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards ([http://gradschool.psu.edu/graduate-education-policies](http://gradschool.psu.edu/graduate-education-policies)).

The M.Ed. Program in Teaching and Curriculum has four important admission requirements.

First, applicants must have achieved an overall junior/senior grade point average of 3.00 or higher. For applicants applying for admission who have completed credits beyond the baccalaureate degree, we will evaluate the last (approximately) 60 credits completed.

Second, applicants must submit two letters of recommendation. These letters must be from former professors or professionals who can attest to the academic ability and potential of the applicant.

Third, applicants must submit a 200-300 word personal statement that addresses their career goals and reasons for pursuing a graduate degree.

Fourth, applicants must submit test scores from one of the following: Graduate Record Examination, Miller Analogies Test, or Praxis examinations completed for certification.

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. See GCAC-305 Admission Requirements for International Students ([http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students](http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students)) for more information.

## Degree Requirements
**Master of Education (M.Ed.)**

Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements ([http://gradschool.psu.edu/graduate-education-policies](http://gradschool.psu.edu/graduate-education-policies)).

Students must maintain a minimum 3.00 grade point average in courses approved by the program, satisfactorily complete all required key assessments, attain a grade “C” or better in all required core courses. Students who do not make satisfactory progress will be notified in writing noting the specific deficiencies and requesting that they meet with the program coordinator to develop a remediation plan. Failure to meet or to satisfactorily complete the remediation plan will result in termination from the program.

In compliance with the National Council for the Accreditation of Teacher Education (NCATE) requirements, all persons enrolled in Teacher Education Programs at Penn State Harrisburg are expected to demonstrate the professional dispositions that are aligned with the unit’s vision statement. The faculty shall evaluate the approved dispositions demonstrated by the students in class and during field experiences. Students may be rated as exemplary, acceptable, or unacceptable. Students are expected to attain acceptable or exemplary ratings in order to graduate.
The Master of Education degree in Teaching and Curriculum provides students with two alternatives to meet the required culminating or capstone experience:

1. course work with a master's project (EDUC 587) or
2. course work that includes a capstone course (EDUC 591).

Students may complete the degree requirements for either of the two alternatives with the approval of their adviser.

A total of 30 credits must be completed: 18 credits in core courses and 12 credits in electives. At least 18 credits must be at the 500 or 800 level. A minimum grade-point average of 3.00 for work done at the University and acceptable or higher ratings on the professional dispositions are required for graduation.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDUC 520</td>
<td>Learning Theory for the Classroom</td>
<td>3</td>
</tr>
<tr>
<td>EDUC 506</td>
<td>Curriculum Development and Instructional Design (early childhood only)</td>
<td>3</td>
</tr>
<tr>
<td>or EDUC 403</td>
<td>Curriculum for Early Childhood</td>
<td></td>
</tr>
<tr>
<td>EDUC 539</td>
<td>Educational Assessment (early childhood only)</td>
<td>3</td>
</tr>
<tr>
<td>or EDUC 404</td>
<td>Young Children's Behavior: Observation and Evaluation</td>
<td></td>
</tr>
<tr>
<td>EDUC 505</td>
<td>Curriculum Foundations</td>
<td>3</td>
</tr>
<tr>
<td>EDUC 586</td>
<td>Educational Research Designs</td>
<td>3</td>
</tr>
</tbody>
</table>

### Electives

Students are required to take up to 12-15 credits of elective course 12-15 work. Students may take all of those credits in education or, with the approval of their adviser, select up to 9 credits of electives in a field other than education.

### Culminating Experience

Select one of the following two alternatives for the culminating experience:

- Master's Project (EDUC 587)
- Capstone Course (EDUC 591)

Total Credits 30

Credits earned at other institutions but not used to earn a degree and credits earned as a non-degree student prior to admission to the graduate program may be applied toward the requirements for a graduate degree, subject to restrictions outlined in GCAC-309 Transfer Credit (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/transfer-credit).

### Language Arts Option

The goal of the language arts option is to provide students an in depth understanding of:

- how research in theory in the language arts are related to language acquisition and growth;
- the knowledge and skills necessary for conducting informal assessments in the language arts and required to implement a variety of instructional procedures for the language arts;
- and an awareness of the role that literature can have in an effective language arts program at any level.

### Mathematics Education Option

The objective of the mathematics education option is to provide courses that will emphasize current research and curriculum shifts related to the teaching of mathematics in K-12 classrooms. This option requires completion of four EDMTH courses (a total of 12 credits) in addition to the other program requirements:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDMTH 441</td>
<td>Geometry and Measurement Across the K-12 Curriculum</td>
<td>3</td>
</tr>
<tr>
<td>EDMTH 442</td>
<td>Algebra and Functions Across the K-12 Curriculum</td>
<td>3</td>
</tr>
<tr>
<td>EDMTH 443</td>
<td>Data Analysis and Probability Across the K-12 Curriculum</td>
<td>3</td>
</tr>
<tr>
<td>EDMTH 444</td>
<td>Numbers and Operations Across the Curriculum</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits 12

### Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

### Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

### Contact

**Graduate Program Head:** Holly Angelique

**Director of Graduate Studies/Professor-in-Charge:** Deborah Scott

**Primary Program Contact:** Janet Althouse

**Email:** jla25@psu.edu

**Mailing Address:** Olmsted Building, Room W331, 777 W. Harrisburg Pike, Middletown, PA 17057

**Telephone:** (717) 948-6213

**Program Website:** Teaching and Curriculum (https://harrisburg.psu.edu/behavioral-sciences-and-education/teacher-education/master-education-teaching-and-curriculum)
Teaching English as a Second Language

Graduate Program Head
Robert W. Schrauf

Program Code
TESL

Campus(es)
University Park (M.A.)

Degrees Conferred
Master of Arts (M.A.)

The Graduate Faculty
View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=TESL)

The M.A. program in Teaching English as a Second Language is designed to provide professional development for teachers and administrators in English as a second or foreign language. The program is problem focused, integrating theory and practice from the fields of applied linguistics and teaching English as a second language to address issues of second language acquisition/teaching and program development, with special focus on English in a wide range of both domestic and international contexts.

Completion of this degree program does not automatically provide teacher certification in the Commonwealth of Pennsylvania. Further information on teaching certification is available from the College of Education. Students who desire to continue their studies in ESL at Penn State may apply to the Ph.D. program in Applied Linguistics through the Department of Applied Linguistics.

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-ed-policies).

Scores from the Graduate Record Examinations (GRE) are required for admission.

All applicants are also required to arrange for three letters of reference to be submitted along with a one- to two-page statement written by the applicant describing the applicant’s goals and professional objectives.

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. See GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-ed-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

Applicants to the Teaching English as a Second Language graduate program must have a minimum TOEFL score of 100 with a 23 on the speaking section for the Internet-based test (iBT), or 600 for the paper-based test. The minimum acceptable composite score for the IELTS for applicants is 7.0.

Degree Requirements

Master of Arts (M.A.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-ed-policies)

The department offers two paths to the MA/TESL. Students may complete the entire program in residence at University Park, or their may pursue a hybrid path to the degree, including 12 credits of 800-level online courses, followed by 24 credits (plus M.A. paper and teaching e-portfolio) in residence at University Park. Students pursuing the residential path to the degree may also take the department’s 800-level online offerings, and these count as electives in their program of study.

The M.A. in TESL requires 36 credits, of which 18 credits must consist of 500-level courses. In lieu of a thesis, students must prepare a M.A. paper and compile a teaching e-portfolio.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>APLNG 484</td>
<td>Discourse-Functional Grammar</td>
<td>3</td>
</tr>
<tr>
<td>APLNG 491</td>
<td>Theory: Second Language Acquisition</td>
<td>3</td>
</tr>
<tr>
<td>APLNG 493</td>
<td>Teaching English as a Second Language</td>
<td>3</td>
</tr>
</tbody>
</table>

Professional Core

6 credits from among the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>APLNG 410</td>
<td>Teaching American English Pronunciation</td>
<td>3</td>
</tr>
<tr>
<td>APLNG 412</td>
<td>Teaching Second Language Writing</td>
<td></td>
</tr>
<tr>
<td>APLNG 482</td>
<td>Methods of Language Assessment (required in the Hybrid Path)</td>
<td></td>
</tr>
</tbody>
</table>

Field Experience

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>APLNG 500</td>
<td>Practice Teaching in ESL</td>
<td>3</td>
</tr>
<tr>
<td>APLNG 595</td>
<td>Internship</td>
<td>3</td>
</tr>
</tbody>
</table>

Research Methods

3 credits from among the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>APLNG 577</td>
<td>Language Analysis</td>
<td>3</td>
</tr>
<tr>
<td>APLNG 581</td>
<td>Discourse Analysis</td>
<td></td>
</tr>
<tr>
<td>APLNG 582</td>
<td>Seminar in Approaches to Language Use</td>
<td></td>
</tr>
<tr>
<td>APLNG 586</td>
<td>Analyzing Classroom Discourse</td>
<td></td>
</tr>
<tr>
<td>APLNG 592</td>
<td>Qualitative Research in Applied Linguistics</td>
<td></td>
</tr>
<tr>
<td>APLNG 593</td>
<td>Experimental Research on Language</td>
<td></td>
</tr>
</tbody>
</table>

Electives

12 credits from among the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>APLNG 510</td>
<td>Health and Aging in Multilingual Contexts</td>
<td></td>
</tr>
<tr>
<td>APLNG 512</td>
<td>Language and Adult Lifespan Development</td>
<td></td>
</tr>
<tr>
<td>APLNG 570</td>
<td>Second Language Reading</td>
<td></td>
</tr>
<tr>
<td>APLNG 572</td>
<td>Communication in Second Language Classrooms</td>
<td></td>
</tr>
<tr>
<td>APLNG 575</td>
<td>Language Ideology</td>
<td></td>
</tr>
<tr>
<td>APLNG 576</td>
<td>Language Socialization across Home, School, and Community Contexts</td>
<td></td>
</tr>
<tr>
<td>APLNG 584</td>
<td>Sociocultural Theory and Second Language Learning</td>
<td></td>
</tr>
<tr>
<td>APLNG 587</td>
<td>Theory &amp; Research in L2 Teacher Education</td>
<td></td>
</tr>
<tr>
<td>APLNG 588</td>
<td>Design and Research of Technology-Mediated Language Learning</td>
<td></td>
</tr>
<tr>
<td>APLNG 589</td>
<td>Technology in Foreign Language Education: An Overview</td>
<td></td>
</tr>
<tr>
<td>APLNG 591</td>
<td>Seminar in Second Language Acquisition</td>
<td></td>
</tr>
</tbody>
</table>

Other courses with approval of the adviser

Culminating Experience
All students must also complete an M.A. paper and teaching e-portfolio.

Total Credits 36

Residential Path
With guidance from their advisers, students who are enrolled in the Residential Path take 12 credits in electives. Any 500-level 3-credit course not taken as a requirement of Research Methods can be counted as an elective in the resident MA/TESL program.

Resident Path students are allowed to take any or all of the APLNG 800-level courses as electives in any sequence during the MA/TESL program. If 12 credits of APLNG 800-level courses are taken, resident path students are required to take APLNG 583 and, in consultation with their academic adviser, substitute two 500-level electives (6 credits) for appropriate courses listed under Foundations and/or Professional Core.

Hybrid Path
Students who choose to take the hybrid path to the degree will have already taken APLNG 802, APLNG 804, APLNG 806, and APLNG 808 online, and these online courses take the place of the 12 credits of elective courses. Hybrid path students are required to take APLNG 583 and, in consultation with their academic advisers, substitute two 500-level electives (6 credits) for appropriate courses listed under Foundations and/or Professional Core.

Student Aid
Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School's website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Learning Outcomes
1. Graduates will be able to design and evaluate instructional materials, technology, media, and other resources that meet the specific instructional and language related needs and abilities of students.
2. Graduates will be able to reflect on, critically analyze, and evaluate their teaching practices.
3. Graduates will be able to articulate a philosophy of language teaching grounded in current language and learning theories.
4. Graduates will be able to critically evaluate the complex social, cultural, political, and institutional factors that affect language teaching and students’ language learning.
5. Graduates will be able to articulate an understanding of the research and research methods for studying language teaching and learning.
6. Graduates will be able to demonstrate knowledge of the teaching field (English as a Second Language).
7. Graduates will be able to participate effectively in collaborative projects with others.

Contact
Graduate Program Head: Robert Schrauf
Director of Graduate Studies/Professor-in-Charge: Xiaofei Lu
Primary Program Contact: Claudia Horner
Email: cgh12@psu.edu
Mailing Address: 234 Sparks Building, University Park, PA 16802
Telephone: (814) 865-4485
Program Website: Teaching English as a Second Language (http://aplng.la.psu.edu/programs/m-a-tesl-degree)

Theatre
Graduate Program Head: William Doan
Program Code: THEA
Campus(es): University Park (M.F.A.)
Degrees Conferred: Master of Fine Arts (M.F.A.)
The Graduate Faculty
View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=THEA)

The master of fine arts degree program in Theatre pursues the following objectives:
1. to assist each student in acquiring discriminating taste and critical judgment in theatre;
2. to help each student attain skills and proficiencies in theatre;
3. to provide the training, discipline, and opportunities essential to the development of a professional ability in at least one area of theatre; and
4. to prepare each student for an active career in academic and/or professional theatre or other areas within the entertainment industry.

Facilities include the Playhouse, a 450-seat proscenium theatre; the Pavilion, a 249-seat thrust theatre; a 150-seat proscenium theatre in the heart of downtown State College; theatre production studios for scenic, property, and costume preparation; two computer-assisted design laboratories; a lighting laboratory; a sound and media studio; and rehearsal and dance studios.

Admission Requirements
Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Graduate Record Examination (GRE) scores, or comparable examination scores, are not required for admission to the School of Theatre.

Requirements for admission to the M.F.A. program are:
1. a broad undergraduate preparation in theatre, including 3 credits each in acting, directing, stagecraft, and theatre history; and 6 credits of dramatic literature;
2. 12 credits in related subject areas such as communications, oral interpretation, art, business, music, and dance; and
3. submission of a vita and at least three letters of recommendation.

Additional requirements for M.F.A. applicants are:

1. submission of evidence of professional potential in the proposed area of specialization—auditions, prompt books, portfolios, manuscripts, and other appropriate presentations to the applicable study program(s) by arrangement with the department; and
2. a personal interview to be arranged by the student.

**Degree Requirements**

**Master of Fine Arts (M.F.A.)**

Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements [link](http://gradschool.psu.edu/graduate-education-policies).

The program entails specialized professional training in one of the following areas:

- acting,
- directing,
- scene design,
- costume design,
- costuming,
- lighting design, and
- technical direction.

Six semesters in residence are normally required to complete the minimum 60-credit degree.

Students are evaluated on a semester-by-semester basis on academic progress, creative achievement, and professional potential. The M.F.A. is a professional degree and is granted by the Graduate Faculty on the basis of academic and creative excellence over and above the fulfillment of requirements. Satisfactory academic progress does not guarantee continuance in the program, nor does continuance in the program imply the automatic granting of a degree. M.F.A. students are required to participate in the School of Theatre productions in positions of responsibility. Additionally, each student must complete a committee-approved monograph project in the area of specialization. An international residency is required and is funded by the school.

**Student Aid**

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding [link](http://gradschool.psu.edu/graduate-funding) section of The Graduate School's website. Students on graduate assistantships must adhere to the course load limits [link](http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

**Courses**

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not.

A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**Contact**

**Graduate Program Head:** William Doan

**Director of Graduate Studies/Professor-in-Charge:** Elisha Halpin

**Primary Program Contact:** Judy King

**Email:** jqk5@psu.edu

**Mailing Address:** 116 Theatre Building, University Park, PA 16802

**Telephone:** (814) 865-7587

**Program Website:** [Theatre](http://www.theatre.psu.edu)

**Turfgrass Management**

**Graduate Program Head**

Andrew S. McNitt

**Program Code**

TURFM

**Campus(es)**

World Campus (M.P.S.)

**Degrees Conferred**

Master of Professional Studies (M.P.S.)

**The Graduate Faculty**

View [link](https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=TURFM)

The Master of Professional Studies in Turfgrass Management (MPS-TM) is a terminal master's degree program that emphasizes a systems approach to turfgrass management. The program balances theory and practice. Courses taught in MPS-TM use web-based lessons, quizzes, exams, and team projects and exercises to provide a balance between individualized study and interactive learning. Individuals who currently work as managers of turfgrass facilities, including golf courses and professional sports complexes, would benefit from this program.

**Admission Requirements**

Applicants apply for admission to the program via the Graduate School application for admission [link](http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards [link](http://gradschool.psu.edu/graduate-education-policies).

Applicants must submit a letter of professional introduction in which they describe their professional experiences and education, delineate their career goals, and discuss how the MPS-TM program will enable them to meet their objectives. Applicants must also provide three letters of reference and recommendation. The best-qualified applicants will be accepted up to the number of spaces that are available for new students. Scores from Graduate Record Examination (GRE), or from a comparable substitute examination accepted by a graduate program are required for admission; however, exceptions may be considered on a case-by-case basis.

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. See GCAC-305 Admission Requirements for International Students.
Degree Requirements
Master of Professional Studies

Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

The MPS-TM program requires the completion of four core courses in which students learn to apply scientific concepts to fundamental problems encountered in the management of complex turfgrass ecosystems. Additionally, a capstone individual studies in turfgrass management course is a project that integrates theory and practice in addressing real problems encountered in turfgrass facility management.

The professional master's degree requires 30 credits including a final integrative project. All students complete the required MPS-TM core program of turfgrass courses.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>TURF 850</td>
<td>Turfgrass Physiology</td>
<td>3</td>
</tr>
<tr>
<td>AGRO 851</td>
<td>Applied Plant Population Biology</td>
<td>3</td>
</tr>
<tr>
<td>TURF 852</td>
<td>Turfgrass Health Management</td>
<td>3</td>
</tr>
<tr>
<td>TURF/PPATH 853</td>
<td>Interpreting Turfgrass Science Literature</td>
<td>3</td>
</tr>
</tbody>
</table>

Electives
In consultation with their adviser, students also take an additional 15 credits of elective coursework to focus on their particular interest within turfgrass facility management

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGRO 596</td>
<td>Individual Studies (Capstone Project)</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits 30

An integrative project is required in which the student demonstrates the capability to integrate and apply concepts, principles, analytical techniques, and interpretation skills learned in the program to a real problem faced in turfgrass facility management. A total of 18 credits must be 500 or 800 level, with at least 6 credits of 500-level course work; this Graduate Council requirement is met through the required courses, the project, and at least one 500-level elective course.

Flexibility is a key principle of the design of this program. Each course will be offered once each academic year. Sequencing of courses is determined by the semester the student begins the program. Students and their adviser will develop a plan of study upon completion of the second course taken in the program or the end of the first year, whichever occurs sooner. Many students may take three or four courses per year while others may only take one or two. Because of this, the time to degree will average three years and one semester.

Transfer Credits
If students have successfully completed courses from another institution that are equivalent to the elective turfgrass courses (TURF 425, TURF 434, TURF 435, and TURF 436) with grades of B or better, these can be applied toward satisfying the MPS-TM degree requirements, subject to restrictions outlined in GCAC-309 Transfer Credit (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/transfer-credit).

Student Aid
World Campus students in graduate degree programs may be eligible for financial aid. Refer to the Tuition and Financial Aid section (http://www.worldcampus.psu.edu/tuition-and-financial-aid) of the World Campus website for more information.

Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Learning Outcomes
1. KNOW: Graduates will demonstrate a working knowledge of the core concepts and major scientific issues related to turfgrass science. Graduates will exhibit breadth and depth of understanding in their discipline via courses completed in the MPS program and through their final project.

2. APPLY/CREATE: Graduates will demonstrate the ability to apply scientific concepts and significant research findings to real-world problems. They will be able to integrate research findings and practical knowledge of turfgrass science and design appropriate methodologies to address problems in the field. The demonstration of these skills will include frequent essay exams where newly acquired concepts must be applied to a unique set of circumstances. This set of skills will also be demonstrated in the student’s final project which requires a broad analysis of a particular issue facing the industry.

3. COMMUNICATE: Graduates will able to inform the decision-making process by effectively communicating the application of particular scientific concepts, technical knowledge, and research findings. Graduates will be able to effectively convey this information to lay persons and peers in the discipline.

4. THINK: Graduates will be able to define, conceptualize and critically analyze a turfgrass management problem and possible solutions considering the scientific, economic, and political circumstances using knowledge and practice gained in the program.

5. PROFESSIONAL PRACTICE: Graduates of the program will demonstrate the ability to collaborate in a collegial manner and demonstrate high ethical standards, values, and best practices. This will be demonstrated through varying group projects and open discussions surrounding controversial issues in turfgrass science.

Contact
Graduate Program Head: Andrew McNitt
Primary Program Contact: Dianne Petrunak
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Telephone: (814) 863-0139
The dual-title Ph.D. in Visual Studies fosters an interdisciplinary approach to humanistic study, which, spurred by technological dynamics that increasingly integrate text and image, engages analysis of specific images, physical and virtual environments, and visual sign systems; histories of visual modes of communication, apprehension, and aesthetic pleasure; and conceptions of the nature of visuality itself. Students in this program analyze and assess visual media that, integrated with texts, are integral to humanistic scholarship and pedagogy today. Dual-title degree programs increase the intellectual rigor and breadth of graduate work and provide a context in which students learn to synthesize knowledge within and across disciplinary boundaries in both scholarship and teaching. Drawing from knowledge and practices produced across the humanistic disciplines while responding to ongoing challenges to conventional disciplinary boundaries, this degree highlights existing strengths of graduate training in the humanities at Penn State, structures the continuing development of these programs, and credentials our graduates’ training and work with visual forms, environments, and media.

Admission Requirements
Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

Students must apply and be admitted to their primary graduate program and The Graduate School before they can apply for admission to the Visual Studies dual-title degree program. Applicants interested in the dual-title degree program may make their interest known on their applications to their primary graduate program, and should ensure their personal statements reflect their interest in the Visual Studies dual-title graduate program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Visual Studies dual-title program. Doctoral students must be admitted into the dual-title degree program in Visual Studies prior to taking the qualifying examination in their primary graduate program.

With the approval of the Director of Graduate Studies in their primary graduate program, students already enrolled in a co-operating graduate program at Penn State may apply to the Visual Studies program after they are admitted as graduate students in their primary graduate programs. Applicants must submit the following materials to the Visual Studies Academic Advisory Committee, which will determine admission to the program:

- A letter of approval from the Director of Graduate Studies in your primary graduate program
- A copy of your Graduate School Application which was originally submitted to your primary graduate program
- Official transcripts from previous coursework, including transcripts that accompanied application to the Graduate School and transcripts of coursework completed at Penn State (Photocopies of transcripts sent from the home department are acceptable)
- Official GRE scores (Photocopies of GRE scores sent from the home department are acceptable)
- A writing sample
- A personal statement that describes how the dual degree program fits with your scholarly interests
- 1 letter of recommendation from a Visual Studies faculty member at Penn State

Degree Requirements
Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

To qualify for the dual-title degree, students must satisfy the requirements of their primary graduate program. In addition, they must satisfy the requirements described below, as established by the Visual Studies dual-title degree program.

The minimum course requirements for this dual-title Ph.D. degree are as follows:

- 15 credits of course work related to Visual Studies, all at the 500- or 800-level. In certain circumstances, a 400-level course may be substituted with the approval of the Director of the Visual Studies graduate program and the student’s adviser. Such approval must be granted in writing before the course is taken and will require work supplementing the syllabus, such as a culminating research paper. Of the 15 credits required for the Visual Studies dual-title, 6 must come from the two required core courses in the Visual Studies program: VSTUD 501 and VSTUD 502.
- Students must also take 9 elective credits from courses approved by the Visual Studies Academic Advisory Committee. In order to promote interdisciplinarity, at least 3 of these credits must be from a college, department, or program outside the student’s home department or program. Students may complete the courses contributing to the Visual Studies degree in any sequence.

A list of courses approved to count towards the Visual Studies dual-title degree requirements will be maintained by the program office.

Qualifying Examination
The dual-title field will be fully integrated into the qualifying exam for the doctoral program. The qualifying examination committee for the dual-title Ph.D. degree must include at least one Graduate Faculty member from the Visual Studies program. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. In addition, students in the dual-title Ph.D. degree program in Visual Studies will be required to present to their qualifying examination committee a portfolio of work in Visual Studies, including:

- a statement of the student’s interdisciplinary research interests,
- a program plan, and
- samples of writing that indicate the student’s interest in questions related to the Visual Studies.
Because students must first be admitted to a graduate major program of study before they may apply to and be considered for admission into a dual-title graduate degree program, dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

**Dissertation Committee Composition**

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of a Visual Studies dual-title doctoral degree student must include at least one member of the Visual Studies Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. If the committee chair does not represent Visual Studies, the committee member representing Visual Studies must be appointed as co-chair.

**Comprehensive Exam**

After completion of required course work, doctoral students in the dual-title doctoral degree program must pass a comprehensive examination. The Visual Studies Graduate Faculty member on the candidate's committee is responsible for developing and administering the Visual Studies portion of the student's comprehensive exam. The exam must incorporate written and oral components addressing Visual Studies based on the student's areas of interest and specialization in Visual Studies.

**Dissertation and Final Oral Examination**

The candidate must complete a dissertation on a topic that reflects his or her original research and education in both the primary graduate program and Visual Studies. In order to earn the dual-title Ph.D. degree, the dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School, and the student must pass a final oral examination (the dissertation defense).

**Student Aid**

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

**Courses**

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**Contact**

**Graduate Program Head:** Christopher Reed  
**Email:** cgr11@psu.edu  
**Telephone:** (814) 865-4242  
**Program Website:** Visual Studies (http://www.visualstudies.psu.edu)

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**Wildlife and Fisheries Science**

**Graduate Program Head:** Michael G. Messina  
**Program Code:** WFS  
**Campus(es):** University Park (Ph.D., M.S.)  
**Degrees Conferred:** Doctor of Philosophy (Ph.D.)  
**Master of Science (M.S.)**

**The Graduate Faculty**

Programs are designed to give students an understanding of the biology and management of terrestrial or aquatic wildlife species and their environments, and include training in fish and wildlife ecology, nutrition, physiology, behavior, and pathology of wildlife species; study of successional stages, land use, and management of various habitats and their impact on fish and wildlife populations; population dynamics and manipulation of animal numbers; and studies of recreational, aesthetic, and socioeconomic values of fish and wildlife. Most programs of study are strengthened by including appropriate courses offered by related departments.

**Admission Requirements**

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Scores from the Graduate Record Examinations (GRE) are required for admission. A student may be admitted provisionally without GRE scores.

Application materials should be submitted before February by those who want to begin in summer or fall. For admission, an applicant should have at least a 2.75 grade-point average, a 3.00 junior/senior average, and courses that are basic to the individual's field of specialization. Ordinarily these include:

- 12 credits in communication,
- 12 credits in social sciences and humanities,
- 10 credits in quantification including calculus and statistics,
- 8 credits in chemistry and/or physics,
- 8 credits in biological sciences, and
- 18 credits in fish, wildlife, forestry, or related courses.

Three reference reports (forms supplied on request), and a brief statement describing the applicant's academic goals, career interests, and special qualifications are required. The best-qualified applicants will be accepted up to the number of spaces available. Exceptions to admission requirements may be made for students with special backgrounds, abilities, and interests.

Admission to the Ph.D. program in Wildlife and Fisheries Science requires a master's degree in wildlife and fisheries science or a closely related field, or a bachelor's degree with a minimum grade-point average of 3.30 and demonstrated research ability.
Degree Requirements

Master of Science (m.S.)
Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

In addition to Graduate Council requirements, 6 credits of statistics and 2 credits of colloquium are required.

Each entering student receives individual guidance from an adviser, and later from his or her committee, in designing a program of studies and research based on his or her own interests. The student is responsible for conforming to all requirements summarized in the “Graduate Studies Handbook” of the School of Forest Resources, and for completing the degree program within a reasonable time, i.e., two years for a master’s degree.

Doctor of Philosophy (Ph.D.)
Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

Doctoral students would normally emphasize either wildlife or fisheries in their course selection. Course work shall include at least 15 graduate credits beyond those required for an M.S. in Wildlife and Fisheries Science. At least 9 of these credits must include courses at the 500 level with a Wildlife and Fisheries Science designation.

An international communications or cultural requirement is required for the Ph.D. degree. This requirement may be satisfied by demonstrating competence in one foreign language equivalent to passing two or three college-level courses. It also may be met by two courses in one or two contemporary foreign cultures. With approval of the dissertation committee, a student may petition the Graduate Faculty of the school for waiver of the international communications or culture requirement.

Students must pass the qualifying examination during their first year of residence and a comprehensive examination which is given after all course requirements have been completed. The final examination is oral; all doctoral students are required to present a public seminar on their dissertation prior to the final examination.

Each entering student receives individual guidance from an adviser, and later from his or her committee, in designing a program of studies and research based on his or her own interests. The student is responsible for conforming to all requirements summarized in the “Graduate Studies Handbook” of the School of Forest Resources, and for completing the degree program within a reasonable time, i.e., three years for a Ph.D.

Watershed Stewardship Option
The Graduate Option in Watershed Stewardship is intended to provide enhanced educational opportunities for students with an interest in water resources management who are enrolled in a graduate degree program within Wildlife and Fisheries Science. The objective of the Graduate Option in Watershed Stewardship is to educate students to facilitate team-oriented, community-based watershed management planning directed at water resources problems encountered in Pennsylvania communities, especially nonpoint source water pollution. The Graduate Option in Watershed Stewardship requires 22 credits of graduate course work:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>FOR 591A</td>
<td>Seminar in Watershed Stewardship Issues &amp; Seminar in Watershed Stewardship Planning</td>
<td>2</td>
</tr>
<tr>
<td>FOR 591B</td>
<td>or LARCH 510 Graduate Seminar in Landscape Architecture</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Select one of the following sequences:</td>
<td>8</td>
</tr>
<tr>
<td>FOR 570</td>
<td>Watershed Stewardship Practicum I &amp; Watershed Stewardship Practicum II</td>
<td></td>
</tr>
<tr>
<td>FOR 571</td>
<td>&amp; LARCH 817 Grad Studio III &amp; LARCH 550 and Master of Landscape Architecture Project Studio</td>
<td></td>
</tr>
</tbody>
</table>

Total Credits: 22

1 Breadth courses will consist of three graduate credits of course work from each of four subject matter areas:
   1. water resources science
   2. social science, public policy and economics
   3. humanities
   4. communications and design

2 One credit of FOR 591 would count as a colloquium course toward degree requirements, but at least 1 additional credit of FOR 590 is required.

In the watershed stewardship practicum courses students work in teams with community, government and business leaders to analyze and understand natural resources problems and creatively synthesize appropriate solutions in the form of a written watershed management plan.

A list of acceptable breadth courses from each discipline is provided in the Graduate Option in Watershed Stewardship Handbook. Students will be allowed to petition to the Center for Watershed Stewardship to substitute higher level or equivalent courses in a major field to suit their specific backgrounds and goals. Courses taken for the Graduate Option in Watershed Stewardship may be used to satisfy other equivalent (400- or 500-level) degree requirements with concurrence of their adviser and graduate committee. The graduate committee for a student enrolled in the Option in Watershed Stewardship must include a faculty representative from the Center for Watershed Stewardship.

Students enrolled in M.S. or Ph.D. degree programs within Wildlife and Fisheries Sciences may apply to participate in the Graduate Option in Watershed Stewardship.

Student Aid
Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

The following awards typically have been available to graduate students in this program:
Forest Resources: Jesse Rossiter Rapp Memorial Scholarship

Available to graduate students in the School of Forest Resources who are not holding assistantships as graduate students. Apply to the School of Forest Resources' Scholarships, Loans, and Awards Committee.

Roger M. Latham Memorial Award

Awarded to outstanding graduate students specializing in wildlife or fisheries after at least one semester in residence.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Learning Outcomes

Master of Science (m.S.)

1. **KNOW:** Graduates in these three masters programs will have obtained knowledge of core theories and methods as demonstrated by courses completed and grades earned at the bachelor’s level. Graduates will exhibit breadth and depth of understanding in their respective disciplines in courses completed at the master’s level.

2. **APPLY/CREEATE:** Graduates in these three masters programs will be able to clearly synthesize literature and theories in their disciplinary areas and/or in their specialized thesis topics. Such synthesis will help generate new ideas or methods to develop unique solutions to the problems in the three disciplinary programs.

3. **COMMUNICATE:** Graduates in these three masters programs will effectively communicate ideas, arguments, and rationales in clear, concise, well-organized publications (abstracts, papers, proposals) and presentations (conferences, seminars, and research meetings).

4. **THINK:** Graduates in these three masters programs will be able to critically analyze the work of others in their field of specialty. Such analyses will help graduate students to demonstrate proficiency in designing a research strategy to answer important questions and to improve their own work.

5. **PROF. PRACTICE:** Graduates in these three masters programs will demonstrate the highest ethical standards and core values (including Penn State Core Values) within their discipline and other diverse scientific backgrounds.

Doctor of Philosophy (Ph.d.)

1. **KNOW:** Graduates in these three doctoral programs will have obtained the knowledge of the core theories and methods at the bachelors and/or master’s levels. Graduates will exhibit breadth and depth of understanding in their respective disciplines in courses completed at the doctoral level.

2. **APPLY/CREEATE:** Graduates in these three doctoral programs will be able to clearly synthesize literature and theories in their disciplinary areas and/or in their specialized thesis/dissertation topics. Such synthesis will help generate new ideas or methods to develop unique solutions to the problems in the three disciplinary doctoral programs.

3. **COMMUNICATE:** Graduates in these three doctoral programs will effectively communicate ideas, arguments, and rationales in clear, concise, well-organized publications (abstracts, papers, proposals) and presentations (conferences, seminars, and research meetings).

4. **THINK:** Graduates in these three doctoral programs will be able to critically analyze the work of others in their field of specialty. Such analyses will help graduate students to demonstrate proficiency in designing a research strategy to answer important questions and to improve their own work.

5. **PROF. PRACTICE:** Graduates in these three doctoral programs will demonstrate the highest ethical standards and core values (including Penn State Core Values) within their discipline and other diverse scientific backgrounds.

Contact

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Primary Program Contact: Diane Monteith
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Telephone: (814) 863-7221
Program Website: Wildlife and Fisheries Science (http://ecosystems.psu.edu/graduateprograms/wfs)

Women's Studies

Graduate Program Head
Melissa Wright
Program Code
WMNST
Campus(es)
University Park
Degrees Conferred
Dual-Title
The Graduate Faculty
View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=WMNST)

Students electing this program through participating departments will earn a degree with a dual-title at both the Ph.D. and M.A./M.S. levels, i.e., Ph.D. in (graduate program name) and Women's Studies, or M.A./M.S. in (graduate program name) and Women's Studies.

The following graduate programs offer dual-title degrees in Women's Studies:

- Art Education
- Comparative Literature
- Curriculum and Instruction
- English
- French
- Geography
- History
- Philosophy
- Political Science
- Psychology
- Rural Sociology

Dual-title degrees grounded both in Women's Studies and a given discipline will acknowledge and foster scholarly work across disciplines.
A dual-title degree program will increase the intellectual rigor and breadth of graduate work through immersion of students in Women's Studies and their discipline. The dual-title degree will also provide a context in which students can learn to synthesize knowledge within and across disciplinary boundaries. In addition, a dual-title degree program provides students with an opportunity for increased work within a pedagogical framework that also encourages an interdisciplinary approach to teaching.

The primary advantages of dual-title degrees include the intellectual and academic advantages of interdisciplinary, strengthening the reputation of individual programs/departments through innovative degree programs, increased recruitment of quality graduate students, and improved placement of doctoral graduates.

Admission Requirements

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

Students must apply and be admitted to their primary graduate program and The Graduate School before they can apply for admission to the Women's Studies dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Women's Studies dual-title program. Doctoral students must be admitted into the dual-title degree program in Women's Studies prior to taking the qualifying examination in their primary graduate program.

In addition to the admission requirements set forth by the Graduate School and the cooperating department, students will be admitted to graduate study in Women's Studies by an admissions committee of Women's Studies-affiliated faculty. The Women's Studies program will follow the timetable and admission requirements of the cooperating department. Applicants should have a junior/senior cumulative average of at least 3.00 (on a 4.00 scale) and appropriate course background should be considered for study. It is required that prospective students seeking admission to a dual-title degree program will write a statement of purpose that addresses the ways in which their research and professional goals will reflect an interest in interdisciplinary and feminist research.

Degree Requirements

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

To qualify for a dual-title degree, students must satisfy the requirements of the primary graduate program in which they are enrolled. In addition, they must satisfy the degree requirements for the dual-title in Women's Studies, listed below.

The dual-title degree will have requirements above those for the graduate minor, which currently requires 9 credit hours for the M.A./M.S. and 15 credit hours for the Ph.D. The requirements for the dual-title degree include increased course work, additional components to the comprehensive exams at the doctoral level, and the completion of women's studies related theses at the master's and dissertations at the doctoral level.

Degree Requirements for the Dual-Title Master's Degree

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>WMNST 501</td>
<td>Feminist Perspectives on Research and Teaching Across the Disciplines</td>
<td>3</td>
</tr>
<tr>
<td>WMNST 502</td>
<td>Global Perspectives on Feminism</td>
<td>3</td>
</tr>
<tr>
<td>WMNST 507</td>
<td>Feminist Theory</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>3 additional credits of Women's Studies course work</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Thesis on a Women's Studies-related topic, or another 3 additional credits of Women's Studies course work and a master's essay will be approved by the student's committee</td>
<td>3</td>
</tr>
<tr>
<td>Total Credits</td>
<td></td>
<td>15</td>
</tr>
</tbody>
</table>

For a dual-title M.A./M.S., the recommended student's committee will include at least one Women's Studies-affiliated faculty member.

Degree Requirements for the Dual-Title Ph.D.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>WMNST 501</td>
<td>Feminist Perspectives on Research and Teaching Across the Disciplines</td>
<td>3</td>
</tr>
<tr>
<td>WMNST 502</td>
<td>Global Perspectives on Feminism</td>
<td>3</td>
</tr>
<tr>
<td>WMNST 507</td>
<td>Feminist Theory</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>9 additional credits of Women's Studies course work (at least 6 of these should be at the 500 level)</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>Comprehensive examination in Women's Studies and the disciplinary field</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dissertation on a Women's Studies-related topic will be approved by the student's committee</td>
<td></td>
</tr>
<tr>
<td>Total Credits</td>
<td></td>
<td>18</td>
</tr>
</tbody>
</table>

Foreign Language and English Competency Requirements

The student will fulfill the language requirement specified by the cooperating department through which the student is admitted to the dual-title degree program.

Qualifying Examination

The qualifying examination committee for the dual-title Ph.D. degree must include at least one Graduate Faculty member from the Women's Studies program. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. There will be a single qualifying examination, containing elements of both the primary graduate degree program and Women's Studies. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

Students must meet the Ph.D. qualifying examination requirements specified by the cooperating department. In addition, the student will be required to present a portfolio of work in Women's Studies to their committee. Such a portfolio would include:

- a statement of the student's interdisciplinary research interests,
- a program plan,
- and samples of writing that indicate the student's work in Women's Studies.
Committee Composition
In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of a Women's Studies dual-title doctoral degree student must include at least two members of the Women's Studies Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in Women's Studies, the member of the committee representing Women's Studies must be appointed as co-chair.

Comprehensive Exams
The Women's Studies affiliated faculty members on the student’s committee are responsible for administering a comprehensive examination in Women’s Studies that constitutes a portion of the student’s comprehensive exams. The women’s studies portion of the exam will focus on the following areas:

1. feminist theory,
2. feminist methodology,
3. global feminism,
4. and feminist studies in the student’s discipline.

Dissertation
A dissertation on a women's studies topic is required of students in the dual-title degree program. The women's studies-related topic of the dissertation will be approved by the student's committee.

Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

Minor
Requirements listed here are in addition to requirements for minors in Graduate Council policies listed under GCAC-600 Research Degree Requirements (http://gradschool.psu.edu/graduate-education-policies) and GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

An interdisciplinary graduate minor is available, administered by the Women’s Studies program. Each student’s major and minor is planned by the student and the Women's Studies graduate adviser in consultation with the student’s graduate adviser in his or her major field.

Master's Minor
Master’s Minor Requirements: Master’s-level dual-title degree students are required to take 9 credits of course work in Women’s Studies: WMNST 501 Feminist Perspectives on Research and Teaching (3 credits); WMNST 502 Global Feminism (3 credits); and WMNST 507 Feminist Theory (3 credits). Students also must complete 3 additional credits in Women’s Studies, chosen in consultation with the Women’s Studies graduate adviser.

Doctoral Minor
Doctoral-level dual-title degree students are required to take 9 credits of course work in Women’s Studies: WMNST 501 Feminist Perspectives on Research and Teaching (3 credits); WMNST 502 Global Feminism (3 credits); and WMNST 507 Feminist Theory (3 credits). Students also must complete 9 additional credits of Women’s Studies course work (at least 6 of which should be at the 500 level), chosen in consultation with the Women's Studies graduate adviser.

The above credits are in addition to the requirements for the student’s major. Six credits consist of required courses in feminist theory (3) and feminist methodology (3). The remaining credits may include a combination of WMNST 400- and 500-level courses, as well as special topics courses (numbered 497 and 597) and independent/individual studies (496 and 596).

Official requests to add the minor to a doctoral student's academic record must be submitted to Graduate Enrollment Services prior to establishment of the dissertation committee and prior to scheduling the comprehensive examination. At least one Graduate Faculty member from the minor field must serve on the candidate's dissertation committee.

Student Aid
Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School’s website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Learning Outcomes
1. Demonstrate deep conceptual and historical understanding of intersectional feminist theory and methods.
2. Apply current feminist literature from their partner discipline to their own research agenda.
3. Comprehend the conceptual and practical dimensions of feminist pedagogy.
4. Formulate and execute an independent research project that significantly furthers knowledge and theory within interdisciplinary feminist scholarship.
5. Communicate effectively conceptual and methodological arguments in both written and oral formats to interdisciplinary audiences.
6. Exhibit a commitment to professional standards and ethics in teaching, research, and service.

Contact
Graduate Program Head: Melissa Wright
Director of Graduate Studies/Professor-in-Charge: Lise Nelson
Primary Program Contact: Jamie Whitehead
Email: jle1@psu.edu
Mailing Address: 133 Willard Building, University Park, PA 16802
Telephone: (814) 867-3549
Program Website: Women’s Studies (http://womenstudies.psu.edu)

Workforce Education and Development

Graduate Program Head: Roy Clariana
Program Code: WFED
Campus(es): University Park (Ph.D., M.S., M.Ed.)

Degrees Conferred:
- Doctor of Philosophy (Ph.D.)
- Master of Science (M.S.)
- Master of Education (M.Ed.)
- Dual-Title Ph.D., M.S., and M.Ed. in Workforce Education and Development and Comparative and International Education
- Dual-Title Ph.D. and M.S. in Workforce Education and Development and Operations Research

The Graduate Faculty:
View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=WFED)

The general focus of the program is preparation for entry into professional positions within the broadly conceived field of workforce education and development, including human resource development in industry, secondary and postsecondary technical education, and employability programs for special populations. Emphases within the program include: training and development/human resources, leadership/administration, school-to-work, and postsecondary technical and community college leadership.

Admission Requirements
Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Admission to graduate degree programs in Workforce Education and Development (WF ED) is based on the faculty's evaluation of an applicant's prior undergraduate and graduate work, relevant prior work experience including military service, and career goals. A minimum undergraduate GPA of 2.50 is required for admission to the master's degree program.

A GPA of 3.00 in prior graduate course work is required for admission to the doctoral program. Two or more years of prior full-time work experience that is relevant to WFED is an important consideration in evaluating applications for the doctoral program. Students are admitted only for the fall semester.

Degree Requirements

Master of Education (M.Ed.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

An M.Ed. degree is offered in Workforce Education and Development, which requires a minimum of 30 credits beyond the baccalaureate degree. Students in the M.Ed. degree program must complete a written comprehensive examination.

Master of Science (M.S.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

An M.S. degree is offered in Workforce Education and Development, which requires a minimum of 30 credits beyond the baccalaureate degree. M.S. students must complete a master's thesis or paper.

Doctor of Philosophy (Ph.D.)

Requirements listed here are in addition to Graduate Council policies listed under GCAC-600 Research Degree Requirements. (http://gradschool.psu.edu/graduate-education-policies)

The Ph.D. degree is offered in Workforce Education and Development. Students are not formally granted candidate status for a doctoral degree until successfully completing the comprehensive examination.

Dual-Titles

Dual-Title M.Ed., M.S., and Ph.D. in Workforce Education and Development and Comparative and International Education
Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

Admission Requirements
Students must apply and be admitted to the graduate program in Workforce Education and Development and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Comparative and International Education dual-title program. Refer to the Admission Requirements section of the Comparative and International Education Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/comparative-international-education). Doctoral students must be admitted into the dual-title degree program in Comparative and International Education prior to taking the qualifying examination in their primary graduate program.

Degree Requirements
To qualify for the dual-title degree, students must satisfy the degree requirements for the degree they are enrolled in Workforce Education and Development. In addition, students must complete the degree requirements for the dual-title in Comparative and International Education, listed on the Comparative and International Education Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/comparative-international-education).

The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Workforce Education and Development and must include at least one Graduate Faculty member from the Comparative and International Education program. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. There will be a single qualifying examination, containing elements of both Workforce Education and Development.
Development and Comparative and International Education. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of a Workforce Education and Development and Comparative and International Education dual-title Ph.D. student must include at least one member of the Comparative and International Education Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in Comparative and International Education, the member of the committee representing Comparative and International Education must be appointed as co-chair. The Comparative and International Education representative on the student's dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their dissertation committee and reflects their original research and education in Workforce Education and Development and Comparative and International Education. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

**Dual-Title M.S. and Ph.D. in Workforce Education and Development and Operations Research**

Requirements listed here are in addition to requirements listed in GCAC-208 Dual-Title Graduate Degree Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/dual-title-graduate-degree-programs).

**Admission Requirements**

Students must apply and be admitted to the graduate program in Workforce Education and Development and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Operations Research dual-title program. Refer to the Admission Requirements section of the Operations Research Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/operations-research), Doctoral students must be admitted into the dual-title degree program in Operations Research prior to taking the qualifying examination in their primary graduate program.

**Degree Requirements**

To qualify for the dual-title degree, students must satisfy the degree requirements for the degree they are enrolled in Workforce Education and Development. In addition, students must complete the degree requirements for the dual-title in Operations Research, listed on the Operations Research Bulletin page (http://bulletins.psu.edu/graduate/programs/majors/operations-research).

The qualifying examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Workforce Education and Development and must include at least one Graduate Faculty member from the Operations Research program. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. There will be a single qualifying examination, containing elements of both Workforce Education and Development and Operations Research. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the qualifying examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for dissertation committees (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-600/phd-dissertation-committee-formation), the dissertation committee of a Workforce Education and Development and Operations Research dual-title Ph.D. student must include at least one member of the Operations Research Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. If the chair of the dissertation committee is not also a member of the Graduate Faculty in Operations Research, the member of the committee representing Operations Research must be appointed as co-chair. The Operations Research representative on the student’s dissertation committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their dissertation committee and reflects their original research and education in Workforce Education and Development and Operations Research. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the dissertation committee, the head of the graduate program, and the Graduate School.

**Student Aid**

Graduate assistantships available to students in this program and other forms of student aid are described in the Tuition & Funding (http://gradschool.psu.edu/graduate-funding) section of The Graduate School's website. Students on graduate assistantships must adhere to the course load limits (http://gradschool.psu.edu/graduate-education-policies/gsad/credit-loads-graduate-assistants) set by The Graduate School.

**Courses**

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**Learning Outcomes**

**Master of Education (M.Ed.) and Master of Science (M.S.)**

1. KNOW. Graduates will be able to demonstrate deep conceptual understanding and proficiency in Workforce Education and Development theory and applied education at the level required to contribute to the discipline (such as Career and Technical Education or Training and Development/Organization Development).

2. CRITICAL THINKING. Graduates will be able to critically conceptualize and define the educational aspects of a problem as part of research in Workforce Education and Development.

3. RESEARCH. Graduates will demonstrate proficiency in designing and executing a research strategy to answer significant questions having real-world applications in the field of Workforce Education and
Computational Materials Graduate Minor

Minor Graduate Program Head: Susan Sinnott

Program Code: CMPMT

Campus(es): University Park

The Graduate Faculty: View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=CMPMT)

The use of computational modeling tools is ubiquitous in materials research. The Computational Materials minor provides a fundamental graduate education in materials simulation techniques. The course work:

1. provides foundational courses in materials modeling, offered at various length scales,
2. integrates both broad foundational courses for students interested in a wide range of modeling techniques and/or specialized courses allowing students to develop depth in a specific modeling technique/scale,
3. provides a flexible set of electives that will assure students are exposed to materials-related phenomena in their area of expertise.

The minor provides students the recognition of having built a background in Computational Materials, as well as the access and oversight of faculty in the minor to help them integrate these concepts with their doctoral research.

Admission Requirements

Admission to the minor will require completion of a first core course in the minor, approval from the student's major Graduate Program Head/Graduate Program Chair/Professor-in-Charge, and submission of a minor plan of study (listing intended courses by semester and approved by the student's intended minor faculty dissertation committee member) submitted to the MATSE department graduate program coordinator. A form for the minor plan of study and its approval is available from the graduate minor program. Graduate students in good standing (with current graduate GPA at or above 3.0) who have approval and who have completed a minor core course with a grade of B or higher will be admitted to the minor.
Minor Requirements

Requirements listed here are in addition to requirements for minors in Graduate Council policies listed under GCAC-600 Research Degree Requirements (http://gradschool.psu.edu/graduate-education-policies) and GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

The doctoral minor consists of no fewer than 15 credits, 9 credits of which must be from a list of core minor courses, and 6 credits of which are elective courses. A minimum of 6 credits must be at the 500 level.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td></td>
<td><strong>Core Minor Courses</strong></td>
<td><strong>9</strong></td>
</tr>
<tr>
<td>CHEM 565</td>
<td>Quantum Chemistry I</td>
<td></td>
</tr>
<tr>
<td>CHEM 566</td>
<td>Quantum Chemistry II</td>
<td></td>
</tr>
<tr>
<td>PHYS 561</td>
<td>Quantum Mechanics I</td>
<td></td>
</tr>
<tr>
<td>PHYS 512</td>
<td>Quantum Theory of Solids I</td>
<td></td>
</tr>
<tr>
<td>MATSE 419</td>
<td>Computational Materials Science and Engineering</td>
<td></td>
</tr>
<tr>
<td>MATSE 544</td>
<td>Computational Materials Science of Soft Materials</td>
<td></td>
</tr>
<tr>
<td>MATSE 580</td>
<td>Computational Thermodynamics</td>
<td></td>
</tr>
<tr>
<td>MATSE 581</td>
<td>Computational Materials Science II: Continuum, Mesocale Simulations</td>
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</tbody>
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<th>Code</th>
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<tbody>
<tr>
<td></td>
<td><strong>Electives</strong></td>
<td><strong>6</strong></td>
</tr>
<tr>
<td></td>
<td>Select 6 credits from list of electives</td>
<td></td>
</tr>
</tbody>
</table>

**Total Credits:** 15

A list of elective courses is maintained by the Department of Materials Science and Engineering. The Department also maintains a list of faculty who may represent the minor on dissertation committees. The minor is only available to doctoral students. Official requests to add a minor to a doctoral student's academic record must be submitted to Graduate Enrollment Services prior to establishment of the dissertation committee and prior to scheduling the comprehensive examination. At least one Graduate Faculty member from the minor field must serve on the candidate's dissertation committee.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**Minor Program Head:** Susan Sinnott

**Primary Program Contact:** Hayley Colyer

**Email:** hjc24@psu.edu

**Telephone:** (814) 865-0498

**Program Website:** Computational Materials (https://www.matse.psu.edu/degree-programs/graduate/computational-materials-doctoral-minor)

Computational Science Graduate Minor

**Minor Graduate Program Head** | Lyle Long
**Program Code** | CSCI
**Campus(es)** | University Park

The Department of Aerospace Engineering administers this interdisciplinary minor. Each student’s program is planned by the student and a designated computational science adviser, in consultation with the graduate adviser in the student’s major field.

**Minor Requirements**

Requirements listed here are in addition to requirements for minors in Graduate Council policies listed under GCAC-600 Research Degree Requirements (http://gradschool.psu.edu/graduate-education-policies) and GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

The minor offers an opportunity for students in all colleges and majors to pursue a focused set of courses that emphasize computational science. The minor requires 9 credits in computational science courses for a master’s degree and 15 credits for a doctoral minor.

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<thead>
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<tbody>
<tr>
<td></td>
<td><strong>Required Courses</strong></td>
<td><strong>3</strong></td>
</tr>
<tr>
<td>AERSP 424</td>
<td>Advanced Computer Programming</td>
<td></td>
</tr>
<tr>
<td>CMPSC 450</td>
<td>Concurrent Scientific Programming</td>
<td></td>
</tr>
<tr>
<td>NUCE 530</td>
<td>Parallel/Vector Algorithms for Scientific Applications</td>
<td></td>
</tr>
<tr>
<td>CSE 557</td>
<td>Concurrent Matrix Computation</td>
<td></td>
</tr>
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<tr>
<td></td>
<td>Select at least one of the following courses:</td>
<td><strong>3</strong></td>
</tr>
<tr>
<td>MATH 523</td>
<td>Numerical Analysis I</td>
<td></td>
</tr>
<tr>
<td>MATH/CSE 550</td>
<td>Numerical Linear Algebra</td>
<td></td>
</tr>
<tr>
<td>STAT 500</td>
<td>Applied Statistics</td>
<td></td>
</tr>
<tr>
<td>STAT/IST 557</td>
<td>Data Mining I</td>
<td></td>
</tr>
</tbody>
</table>

| Code   | Title                                                      | Credits |
|        | Select additional credits from a list of approved courses |         |

**Total Credits:** 9-15

The additional credits will be chosen from a list of approved courses maintained by the graduate minor program.

In addition, for the Master’s Minor and Ph.D. Minor the students can use at most 6 and 9 credits, respectively, from (or cross-listed with) their home department.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

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<td></td>
</tr>
<tr>
<td>CSE 557</td>
<td>Concurrent Matrix Computation</td>
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<td>Data Mining I</td>
<td></td>
</tr>
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</table>

| Code   | Title                                                      | Credits |
|        | Select additional credits from a list of approved courses |         |

**Total Credits:** 9-15

The additional credits will be chosen from a list of approved courses maintained by the graduate minor program.

In addition, for the Master’s Minor and Ph.D. Minor the students can use at most 6 and 9 credits, respectively, from (or cross-listed with) their home department.
Electrochemical Science and Engineering Graduate Minor

Minor Graduate Program Head: Luis Ayala H
Program Code: ECSE
Campus(es): University Park

This graduate minor is highly relevant to numerous graduate degree programs associated with energy, materials, and environmental sciences offering a unique set of skills that will benefit graduate students to develop expertise in electrochemical systems that complements their primary focus in batteries, fuel cells, or structural design. The minor will also help expand the students' knowledge and capabilities in important topics relating to electrochemical and renewable energy fundamentals, devices and systems.

Admission Requirements

Any graduate student enrolled at Penn State in a related field of study may be admitted to the Electrochemical Science and Engineering graduate minor.

Minor Requirements

Requirements listed here are in addition to requirements for minors in Graduate Council policies listed under GCAC-600 Research Degree Requirements (http://gradschool.psu.edu/graduate-education-policies) and GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

The doctoral minor will consist of no fewer than five 3-credit courses (15 credits) of integrated or articulated work in electrochemical science and engineering, related to but different from, that of the major, drawn from the two lists (500-level courses and 400-level courses) below, with a preponderance of courses at the 500 level. A minimum of 6 credits must be at the 500 level for the doctoral minor.

<table>
<thead>
<tr>
<th>Code</th>
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<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>CHE 528</td>
<td>Colloidal Forces and Thermodynamics</td>
<td>3</td>
</tr>
<tr>
<td>MATSE 560/MNPR 507</td>
<td>Hydrometallurgical Processing</td>
<td>3</td>
</tr>
<tr>
<td>MATSE 501</td>
<td>Thermodynamics of Materials</td>
<td>3</td>
</tr>
<tr>
<td>MATSE 503</td>
<td>Kinetics of Materials Processes</td>
<td>3</td>
</tr>
</tbody>
</table>

400-level Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EGEE 420</td>
<td>Hydrogen and Fuel Cells</td>
<td>3</td>
</tr>
<tr>
<td>EGEE 437</td>
<td>Design of Solar Energy Conversion Systems</td>
<td>3</td>
</tr>
<tr>
<td>EGEE 441</td>
<td>Electrochemical Engineering Fundamentals</td>
<td>3</td>
</tr>
<tr>
<td>EME 407</td>
<td>Electrochemical Energy Storage</td>
<td>3</td>
</tr>
<tr>
<td>ESC 455</td>
<td>Electrochemical Methods Engineering and Corrosion Science</td>
<td>3</td>
</tr>
<tr>
<td>MATSE 421</td>
<td>Corrosion Engineering</td>
<td>3</td>
</tr>
<tr>
<td>ME 403</td>
<td>Polymer Electrolyte Fuel Cell Engines</td>
<td>3</td>
</tr>
</tbody>
</table>

The master's minor will consist of no fewer than two 3-credit courses (6 credits) of integrated or articulated work in electrochemical science and engineering, related to but different from, that of the major, drawn from the two lists above. A minimum of 3 credits must be at the 500 level for the master's minor.

A student enrolled in this graduate minor must receive a grade of B- or better in all minor courses.

A representative from the Graduate Faculty in the graduate minor (i.e., a "Minor Field Member") must be appointed to the dissertation committee of each student enrolled in the doctoral minor in Electrochemical Science and Engineering.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Gerontology Graduate Minor

Program Code: GERON
Campus(es): University Park

The Gerontology Graduate Minor is offered to provide students with a foundation in the aging process, allowing them to pursue an interdisciplinary approach to the study of aging.

Program Website: Department of Gerontology (http://www.eme.psu.edu/gerontology)

Code | Title                                               | Credits |
-----|-----------------------------------------------------|---------|
CHE 528 | Colloidal Forces and Thermodynamics                 | 3       |
MATSE 560/MNPR 507 | Hydrometallurgical Processing                  | 3       |
MATSE 501 | Thermodynamics of Materials                         | 3       |
MATSE 503 | Kinetics of Materials Processes                    | 3       |
400-level Courses

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</tbody>
</table>

The master's minor will consist of no fewer than two 3-credit courses (6 credits) of integrated or articulated work in electrochemical science and engineering, related to but different from, that of the major, drawn from the two lists above. A minimum of 3 credits must be at the 500 level for the master's minor.

A student enrolled in this graduate minor must receive a grade of B- or better in all minor courses.

A representative from the Graduate Faculty in the graduate minor (i.e., a "Minor Field Member") must be appointed to the dissertation committee of each student enrolled in the doctoral minor in Electrochemical Science and Engineering.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.
The interdisciplinary graduate minor in Gerontology is administered by a committee of faculty appointed by the Gerontology Center Advisory Board. The committee members represent diverse programs within the University.

**Minor Requirements**

Requirements listed here are in addition to requirements for minors in Graduate Council policies listed under GCAC-600 Research Degree Requirements (http://gradschool.psu.edu/graduate-education-policies) and GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

Students admitted to the minor will develop a course of study that includes both prescribed course work and additional course work suited to the student's interests. The minor course of study will be developed jointly by the student, the student's academic adviser, and one member of the graduate minor gerontology committee. Contact the Gerontology Center (S-105 Henderson) for information regarding the committee membership.

The minor requires a minimum of 10 credits of the master's level and 15 credits at the doctoral level, 10 of which are prescribed.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Required Courses</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BIOL 409</td>
<td>Biology of Aging</td>
<td>3</td>
</tr>
<tr>
<td>HDFS/PSYCH 445</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HDFS 590</td>
<td>Colloquium</td>
<td>1</td>
</tr>
<tr>
<td>SOC 435/ HDFS 434</td>
<td></td>
<td></td>
</tr>
<tr>
<td>or SOC 535</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Credits</td>
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</tr>
</tbody>
</table>

Doctoral students must select a minimum of 5 additional credits from among the following courses:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADTED 460</td>
<td>Introduction to Lifelong Learning and Adult Education</td>
<td>3</td>
</tr>
<tr>
<td>ADTED 505</td>
<td>The Teaching of Adults</td>
<td>3</td>
</tr>
<tr>
<td>EDPSY 527</td>
<td>Psychology of Adults as Learners</td>
<td>3</td>
</tr>
<tr>
<td>HDFS 446</td>
<td>Programs and Services in Gerontology</td>
<td>3</td>
</tr>
<tr>
<td>HDFS 447</td>
<td>Issues in Gerontology</td>
<td>3</td>
</tr>
<tr>
<td>HDFS 579</td>
<td>Seminar in Adult Development and Aging</td>
<td>1-9</td>
</tr>
<tr>
<td>HPA 442</td>
<td>Long-Term Care Management</td>
<td>3</td>
</tr>
<tr>
<td>KINES 481</td>
<td></td>
<td></td>
</tr>
<tr>
<td>KINES 482</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NURS 464</td>
<td>Dying and Death</td>
<td>3</td>
</tr>
<tr>
<td>SOC 535</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gerontology-related special topics courses (497, 597) or independent studies (496, 596)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Courses**

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**Contact**

Program Website: Gerontology Minor (http://healthyaging.psu.edu/gerontology_minor)

**Information and Communication Technologies for Development Graduate Minor**

Minor Graduate Program Head: Krishna Jayakar

Program Code: ICT4D

Campus(es): University Park

The Graduate Faculty

The inter-college graduate minor in ICT4D provides doctoral and master's students with exposure to the multidisciplinary theoretical and methodological foundations of ICT4D and opportunities for scholarly engagement with communities of practice in the discipline. It will challenge students to simultaneously develop new concepts, theories, and methods for the study of ICT4D, and to apply this knowledge to socially relevant projects and programs.

The ICT4D Consortium will provide organizational support for the proposed graduate minor. The Consortium currently includes faculty from the Colleges of Agriculture, Business, Communication, and Information Sciences and Technology. Courses for the minor are drawn from these colleges, the College of Engineering and the School of International Affairs.

**Admission Requirements**

Students in any doctoral and master's degree program at Penn State may enroll in the doctoral or master's minor respectively with the consent of the student's major adviser, the faculty coordinator of the ICT4D Consortium, and the Graduate School.

**Minor Requirements**

Requirements listed here are in addition to requirements for minors in Graduate Council policies listed under GCAC-600 Research Degree Requirements (http://gradschool.psu.edu/graduate-education-policies) and GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

The doctoral minor will require the completion of a minimum of 15 credits of integrated or articulated course work in information and communication technologies for development, related to but different from that of the student's major, chosen from the list maintained by the Bellisario College of Communications, with a preponderance of courses at the 500 level. A minimum of 6 credits must be at the 500 level for the doctoral minor. At least 3 credits must be from information and communications technologies and at least 3 from development, as identified in the list of courses maintained by the Bellisario College of Communications. Official requests to add the minor to a doctoral candidate's academic record must be submitted to Graduate Enrollment Services.
Services prior to establishment of the dissertation committee and prior to scheduling the comprehensive examination. At least one Graduate Faculty member from the minor field must serve on the candidate's dissertation committee.

The master's minor requires a minimum of 6 credits of integrated or articulated course work in information and communications technologies for development, related to but different from, that of the student's major, chosen from the list maintained by the Bellisario College of Communications, with a preponderance of courses at the 500 level. A minimum of 3 credits must be at the 500 level for the master's minor. At least 3 credits must be from information and communications technologies and at least 3 from development, as identified in the list of courses maintained by the Bellisario College of Communications.

A list of courses approved to count towards this minor is maintained by the Bellisario College of Communications. Note: A competitive enrollment process might be instituted for any course or sequence of courses for which there is significant enrollment demand from the ICT4D minor, beyond the capacity of the offering College/School to fulfill.

Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact
Minor Graduate Program Head: Krishna Jayakar
Email: kpj1@psu.edu
Telephone: (814) 863-6416

Latin American Studies Graduate Minor
Minor Graduate Program Head
Program Code
Campus(es)
The Graduate Faculty
Matthew Restall
LATAM
University Park
View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=LATAM)

The Latin American Studies graduate minor is administered by the Latin American Studies Committee. The minor offers students the ability to study the region of Latin America from an interdisciplinary perspective and is open to students from across the University. It is housed in three departments: History; Comparative Literature; and Spanish, Italian and Portuguese. Graduate students from across the University are encouraged to participate. Students who are admitted to the minor will develop courses of study suited to their special interests.

Minor Requirements
Requirements listed here are in addition to requirements for minors in Graduate Council policies listed under GCAC-600 Research Degree Requirements (http://gradschool.psu.edu/graduate-education-policies) and GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

The minor for each student will be planned jointly by the student, the student’s doctoral adviser, and an adviser designated by the Latin American Studies Committee. Any change in the plan must be approved by both advisers. A minimum of 15 credits must be completed, with a minimum of 6 credits at the 500-level. Graduate Council regulations for the minor, a representative of the minor will participate on the student’s dissertation committee.

Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact
Minor Graduate Program Head: Matthew Restall
Email: mxr40@psu.edu
Mailing Address: 108 Weaver Building, University Park, PA 16870
Telephone: (814) 865-1121
Program Website: Latin American Studies (http://www.latinamericanstudies.la.psu.edu)

Latina and Latino Studies Graduate Minor
Program Code
Campus(es)
The Graduate Faculty
LTNST
University Park
View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=LTNST)

The Latina and Latino Studies graduate minor is an interdisciplinary minor that will be administered by a faculty committee appointed by the dean of Liberal Arts and made up of faculty in English, Comparative Literature, Spanish, and other appropriate disciplines. Graduate students from across the university are encouraged to participate. Students who are admitted to the minor will develop courses of study suited to their special interests.

Minor Requirements
Requirements listed here are in addition to requirements for minors in Graduate Council policies listed under GCAC-600 Research Degree Requirements (http://gradschool.psu.edu/graduate-education-policies) and GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

The minor for each student will be planned jointly by the student, the student’s doctoral adviser, and an adviser designated by the Latina and Latino Studies committee. Any change in the plan must be approved by
both advisers. A minimum of 15 credits must be completed. Per Graduate Council regulations for the minor, a representative of the minor will participate on the student's dissertation committee. This representative may be a member of the Latina and Latino Studies committee or any other faculty member approved by that committee.

Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact
Primary Program Contact: Melissa Wright
Email: mww11@psu.edu
Mailing Address: 302 Walker Building, University Park, PA 16802
Telephone: (814) 865-9133
Program Website: Latina and Latino Studies (http://www.latino.psu.edu)

Linguistics Graduate Minor
Minor Graduate Program Head: Adriana Van Hell
Program Code: LING
Campus(es): University Park
The Graduate Faculty
View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=LING)

The graduate minor provides interested students with an opportunity to complete a program of scientific study focused on the nature, structure, and use of human language. The minor is designed to cover the foundations of the discipline of linguistics by reviewing fundamental core areas such as phonology and syntax. Course work is also available in many additional areas of linguistics such as semantics, morphology, language variation, historical linguistics, and discourse analysis.

Minor Requirements
Requirements listed here are in addition to requirements for minors in Graduate Council policies listed under GCAC-600 Research Degree Requirements (http://gradschool.psu.edu/graduate-education-policies) and GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

The minor requires a minimum of 15 credits, 6 of which must be at the 500 level. Nine credits are prescribed in syntax (LING 402), phonology (LING 404), and a general introduction to linguistics (LING 401), although a linguistics course at the 500 level may be substituted for LING 401 with the approval of the director of the program in Linguistics.

Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact
Graduate Program Head: Adriana Van Hell
Primary Program Contact: Sharon Elder
Email: sle9@psu.edu
Mailing Address: 110 Moore, University Park, PA 16802
Telephone: (814) 863-1242
Program Website: Linguistics (http://linguistics.la.psu.edu)

Literary Theory, Criticism, and Aesthetics Graduate Minor
Minor Graduate Program Head: Thomas Beebee
Program Code: LITTH
Campus(es): University Park
The Graduate Faculty
View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=LITTH)

This is an interdisciplinary doctoral minor that is administered by two designated advisers, one from the Department of Comparative Literature and one from the Department of Philosophy. Students who are admitted to the minor will develop courses of study suited to their special interests.

Minor Requirements
Requirements listed here are in addition to requirements for minors in Graduate Council policies listed under GCAC-600 Research Degree Requirements (http://gradschool.psu.edu/graduate-education-policies) and GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

The minor for each student will be planned jointly by the student and the two advisers, in consultation with the student's doctoral adviser in his or her major field. Any change in the plan must be approved by all of the advisers. A minimum of 15 credits must be selected from among the following courses (including at least 3 credits each in comparative literature and philosophy, chosen from the asterisked courses):

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARTH 410</td>
<td>Taste and Criticism in Art</td>
<td>3</td>
</tr>
<tr>
<td>CAS 503</td>
<td>Rhetorical Criticism</td>
<td>3</td>
</tr>
<tr>
<td>CAS 505</td>
<td>Historical Development of Rhetorical Theory</td>
<td>3</td>
</tr>
<tr>
<td>CAS 507</td>
<td>Issues in Rhetorical Theory</td>
<td>3</td>
</tr>
<tr>
<td>CMLIT 502</td>
<td>Comparative Criticism I: Classical to Neoclassical*</td>
<td>1-3</td>
</tr>
<tr>
<td>CMLIT 503</td>
<td>Comparative Criticism II: Romantic to Contemporary*</td>
<td>1-3</td>
</tr>
<tr>
<td>CMLIT 580</td>
<td>Contemporary Literary Theory</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 582</td>
<td>Survey of Contemporary Literary Theory</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 583</td>
<td>Studies in Critical Theory</td>
<td>1-3</td>
</tr>
</tbody>
</table>
Science, Technology, and Society Graduate Minor

**FR 571**  French Literary Theory and Criticism  3
**GER 591**  German Literary Theory and Criticism  3-6
**PHIL 413**  Philosophy of Literature  3
**PHIL 414**  *  
**PHIL 502**  European Philosophy Seminar  3 *
**PHIL 516**  Aesthetic Seminar  3 *
**SPAN 587**  Stylistic and Literary Criticism  3

3 credits of SUBJ 596 in one of the nine subject areas indicated may be substituted for one of the non-asterisked 3-credit courses.

A student majoring in one of the nine subject areas may not include any courses in that field as part of the minor. Appropriate courses may be substituted.

**Courses**

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**Contact**

Minor Graduate Program Head: Thomas Beebee

Email: tob@psu.edu

Mailing Address: 311 Burrowes, University Park, PA 16802

Telephone: (814) 863-4935

Program Website: Literary Theory, Criticism and Aesthetics (http://www.personal.psu.edu/faculty/t/o/tob/minor)

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**Minor Requirements**

Requirements listed here are in addition to requirements for minors in Graduate Council policies listed under GCAC-600 Research Degree Requirements (http://gradschool.psu.edu/graduate-education-policies) and GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

The minor requires 9 credits in S T S courses for a master’s and 15 credits for a doctoral minor.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>STS 589</td>
<td>Ethics and Values in Science and Technology</td>
<td>3</td>
</tr>
<tr>
<td>STS 591</td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>

The remaining credits may include 400- and 500-level courses, including Special Topics and Individual Studies, 3-9

Total Credits 9-15

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**Courses**

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

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**Second Language Acquisition Graduate Minor**

**Minor Graduate Program Head**  Robert Schrauf

**Program Code**  SLA

**Campus(es)**  University Park

**The Graduate Faculty**

Visit: https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=SLA

This interdepartmental graduate minor draws upon the opportunities that various departments offer to study the processes of language acquisition and pedagogy, and to conduct research in these fields. Developments in the theories of language acquisition, the practices in language instruction, and the technical innovations provide a wide range of resources for secondary specializations in second language acquisition theory. The minor provides an official credential for doctoral students who complete an organized program of study.

In general, students whose major field of study in the Ph.D. is a concentration in foreign language acquisition or ESL are not eligible for this minor, as their field of specialization already includes this area. However, students in English as a Second Language may do the minor with a focus on foreign language acquisition or a student with a specialty in forced language acquisition may complete the minor with a specialty area in English as a Second Language.

**Minor Requirements**

Requirements listed here are in addition to requirements for minors in Graduate Council policies listed under GCAC-600 Research Degree Requirements (http://gradschool.psu.edu/graduate-education-
The purpose of the Social Thought minor is to enable graduate students in a variety of fields to study theories of society across conventional disciplinary boundaries. The minor enables qualified students to enrich their own chosen fields of study with readings and discoveries from other, contiguous fields.

Minor Requirements

Requirements listed here are in addition to requirements for minors in Graduate Council policies listed under GCAC-600 Research Degree Requirements (http://gradschool.psu.edu/graduate-education-policies) and GCAC-700 Professional Degree Requirements (http://gradschool.psu.edu/graduate-education-policies).

The minor requires at least 15 credits of courses with social thought content. These are courses taught by STP Affiliated Faculty or those approved by the STP Advisory Committee. Those 15 credits must include the following: at least 9 credits of courses from outside the student’s major discipline and SOCTH 501. In addition, at least one member of the student’s dissertation committee must be an STP Affiliated Faculty and preferably be from outside the student’s major discipline.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact

Minor Graduate Program Head: Robert Schrauf
Primary Program Contact: Xiaofei Lu
Email: xxl13@psu.edu
Telephone: (814) 865-7365

Social Thought Graduate Minor

Minor Graduate Program Head: Alan Sica
Program Code: SOCTH
Campus(es): University Park
The Graduate Faculty View (https://secure.gradsch.psu.edu/gpms/index.cfm?searchType=fac&prog=SOCTH)

Graduate Certificates

Postbaccalaureate and Graduate Credit Certificate Programs

A graduate or postbaccalaureate credit certificate program is a group of courses that focuses upon an area of specialized knowledge or information and is developed, supervised, and evaluated by the faculty members of the academic unit offering the program. Postbaccalaureate credit certificate programs reflect emerging academic areas, and may supplement or enhance existing degree programs. Postbaccalaureate certificates and graduate certificates differ in the number of graduate credits required; see the Postbaccalaureate Credit Certificate Programs policy (http://gradschool.psu.edu/graduate-education-policies/gcac-gcac-200/postbaccalaureate-credit-certificate-programs) for more details.

- Accounting Graduate Credit Certificate Program
- Adult Basic Education Post-baccalaureate Credit Certificate Program
- Adult Education in the Health and Medical Professions Graduate Credit Certificate Program
- Adult Gerontology Acute Care Nurse Practitioner Graduate Credit Certificate Program
- Adult Gerontology Primary Care Nurse Practitioner Graduate Credit Certificate Program
- Agricultural Biosecurity and Food Defense Graduate Credit Certificate Program
- Ancient Languages Postbaccalaureate Credit Certificate Program
- Applied Behavior Analysis Graduate Credit Certificate Program
- Applied Bioinformatics Graduate Credit Certificate Program
- Applied Demography Graduate Credit Certificate Program
- Applied Statistics Graduate Credit Certificate Program
• Bioenergy Graduate Credit Certificate Program
• Business Analytics Graduate Credit Certificate Program
• Children's Literature Graduate Credit Certificate Program
• Clinical Research Graduate Credit Certificate Program
• Community and Economic Development Graduate Credit Certificate Program
• Corporate Accounting Foundations Graduate Credit Certificate Program
• Corporate Finance Graduate Credit Certificate Program
• Corporate Innovation and Entrepreneurship Graduate Credit Certificate Program
• Counterterrorism Graduate Credit Certificate Program
• Cyber Threat Analytics and Prevention Graduate Credit Certificate Program
• Data Analytics Graduate Credit Certificate Program
• Dietetic Internship Postbaccalaureate Credit Certificate Program
• Distance Education Postbaccalaureate Credit Certificate Program
• Distributed Energy and Grid Modernization Graduate Credit Certificate
• e-Learning Design Graduate Credit Certificate Program
• Educating Individuals with Autism Postbaccalaureate Credit Certificate Program
• Educational Technology Integration Postbaccalaureate Credit Certificate Program
• Engineering Leadership and Innovation Management Graduate Credit Certificate Program
• English as a Second Language (ESL) Program Specialist and Leadership Postbaccalaureate Credit Certificate Program
• English as a Second Language Program Specialist Postbaccalaureate Credit Certificate Program
• Enterprise Architecture Graduate Credit Certificate Program
• Enterprise Information and Security Technology Architecture Graduate Credit Certificate Program
• Family Literacy Postbaccalaureate Credit Certificate Program
• Family Nurse Practitioner Graduate Credit Certificate Program
• Financial Risk Management Graduate Credit Certificate Program
• Folklore and Ethnography Graduate Credit Certificate Program
• Fundraising Leadership Graduate Credit Certificate Program
• Geodesign Graduate Credit Certificate Program
• Geographic Information Systems Postbaccalaureate Credit Certificate Program
• Geospatial Intelligence Analytics Graduate Credit Certificate Program
• Geospatial Intelligence Applications Postbaccalaureate Credit Certificate Program
• Geospatial Programming and Web Map Development Graduate Credit Certificate Program
• Geriatric Nursing Education Graduate Credit Certificate Program
• Gerontology, Postbaccalaureate Credit Certificate Program
• Global Health, Graduate Credit Certificate Program
• Health Sector Management Graduate Credit Certificate Program
• Heritage and Museum Practice Graduate Credit Certificate Program
• Homeland Security Graduate Credit Certificate Program
• Hospital and Health System Preparedness Graduate Credit Certificate Program
• Human Factors Engineering and Ergonomics Graduate Credit Certificate Program
• Human Resource Management Graduate Credit Certificate Program
• Human Resources and Employment Relations Graduate Credit Certificate Program
• Information Systems Cybersecurity Postbaccalaureate Credit Certificate Program
• Institutional Research Graduate Credit Certificate Program
• Interdisciplinary Educational Intervention Research Postbaccalaureate Credit Certificate Program
• International Affairs Graduate Credit Certificate Program
• International Development Policy Graduate Credit Certificate Program
• International Human Resources and Employment Relations Graduate Credit Certificate Program
• International Public Policy Graduate Credit Certificate Program
• International Security Studies Graduate Credit Certificate Program
• Laser-Materials Processing and Laser-Based Manufacturing Graduate Credit Certificate Program
• Literacy Leadership Postbaccalaureate Credit Certificate Program
• Long-Term Care Administration and Policy Graduate Credit Certificate Program
• Marketing Analytics Graduate Credit Certificate Program
• Nanotechnology Systems and Device Development Graduate Credit Certificate Program
• New Ventures and Entrepreneurs Graduate Credit Certificate Program
• Nonprofit Administration Graduate Credit Certificate Program
• Nurse Administrator Graduate Credit Certificate Program
• Nurse Educator Graduate Credit Certificate Program
• Operations and Supply Chain Management Graduate Credit Certificate Program
• Organization Development and Change: Analytics Graduate Credit Certificate Program
• Organization Development and Change: Consulting Skills Graduate Credit Certificate Program
• Organization Development and Change: Essentials Graduate Credit Certificate Program
• Organization Development and Change: Occupational Safety and Health Graduate Credit Certificate Program
• Organization Development and Change: Operational Excellence Graduate Credit Certificate Program
• Primary Palliative Care Graduate Credit Certificate Program
• Principalship Graduate Credit Certificate Program
• Project Management Graduate Credit Certificate Program
• Psychology: Applications in Clinical Psychology Graduate Credit Certificate Program
• Public Budgeting and Financial Management Graduate Credit Certificate Program
• Public Health Graduate Credit Certificate Program
• Public Health Preparedness Graduate Credit Certificate Program
• Public Sector Human Resources Management Graduate Credit Certificate Program
• Remote Sensing and Earth Observation Graduate Credit Certificate Program
• Solar Energy Graduate Credit Certificate Program
• Supply Chain Management Graduate Credit Certificate Program
Accounting Graduate Credit Certificate Program

Person-in-Charge: Dr. Thomas Amlie
Program Code: ACCT
Campus(es): Harrisburg, World Campus

This graduate certificate program supplements the body of knowledge and educational credit requirements necessary for licensure as a Certified Public Accountant (CPA) in most states.

Effective Semester: Summer 2016
Expiration Semester: Spring 2021

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies). International applicants may be required to satisfy an English proficiency requirement; see GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

Ordinarily, an entering student will have successfully completed a baccalaureate degree in accounting or comparable accounting coursework. If the undergraduate major was not accounting, an applicant should have completed the following minimum core of accounting coursework (or equivalent):

- financial and managerial accounting principles
- intermediate financial accounting I and II
- cost accounting
- federal taxation
- auditing

With program approval, all four courses in the certificate may be applied to the online Master of Professional Accounting degree, subject to restrictions outlined in GCAC-309 Transfer Credit (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/transfer-credit). Certificate program students who wish to have the certificate courses applied to the master’s degree program must formally be admitted to the master’s degree program. Admission into the master’s degree program is a separate step and is not guaranteed. Upon admittance to the master’s degree program, certificate courses completed with a grade of B or better may be transferred into the program.

Certificate Requirements

Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/postbaccalaureate-credit-certificate-programs).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 504</td>
<td>Auditing Theory and Practice</td>
<td>3</td>
</tr>
<tr>
<td>Electives</td>
<td></td>
<td>9</td>
</tr>
<tr>
<td>ACCT 510</td>
<td>Business Tax Planning Theory and Practice</td>
<td></td>
</tr>
<tr>
<td>ACCT 532</td>
<td>Accounting Information and Decision Systems</td>
<td></td>
</tr>
<tr>
<td>ACCT 545</td>
<td>Strategic Cost Management</td>
<td></td>
</tr>
<tr>
<td>ACCT 550</td>
<td>Professional Responsibilities and Ethics in Accounting</td>
<td></td>
</tr>
<tr>
<td>ACCT 561</td>
<td>Financial Statement Analysis II</td>
<td></td>
</tr>
<tr>
<td>ACCT 572</td>
<td>Financial Reporting I</td>
<td></td>
</tr>
<tr>
<td>PADM 523</td>
<td>Governmental and Nonprofit Accounting</td>
<td></td>
</tr>
</tbody>
</table>

Total Credits: 12

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact

Certificate Program Head: Thomas Amlie
Primary Program Contact: Sherri Harkins
Email: sxh749@psu.edu
Mailing Address: Graduate Admissions, 777 W Harrisburg Pike, Harrisburg, PA 17057
Telephone: (717) 948-6142
Program Website: Accounting Graduate Certificate (https://harrisburg.psu.edu/business-administration/accounting/graduate-certificate-accounting)
Adult Basic Education Post-baccalaureate Credit Certificate Program

Person-in-Charge: Esther Prins  
Program Code: ABE  
Campus(es): World Campus

The goal of the program is to build educators’ capacity to provide high-quality, research-based instruction in adult basic education (ABE), especially literacy and numeracy. The program is intended for people who are working, or wish to work, with adults who struggle with reading, writing, math, and/or English language proficiency. ABE instruction typically occurs in adult literacy, family literacy, GED, English as a second language (ESL), or developmental education classes offered by community-based organizations, community colleges, school districts, libraries, and alternative schools, among others. Delivered online through the World Campus, the 12-credit certificate includes three required courses and one elective, which allows students to tailor the program to their specific interests, such as ESL, program planning and administration, distance education, educational technology, adult learning, or other topics.

Effective Semester: Fall 2015  
Expiration Semester: Fall 2020

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies). International applicants may be required to satisfy an English proficiency requirement; see GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

Certificate Requirements

Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/postbaccalaureate-credit-certificate-programs).

<table>
<thead>
<tr>
<th>Code</th>
<th>Required Courses</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADTED 460</td>
<td>Introduction to Lifelong Learning and Adult Education</td>
<td>3</td>
</tr>
<tr>
<td>ADTED 560</td>
<td>Teaching Reading to College Students and Adults</td>
<td>3</td>
</tr>
<tr>
<td>ADTED 480</td>
<td>Teaching Math and Numeracy to Adults</td>
<td>3</td>
</tr>
<tr>
<td>Electives</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Select one of the following:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ADTED 470</td>
<td>Introduction to Distance Education</td>
<td>3</td>
</tr>
<tr>
<td>ADTED 505</td>
<td>The Teaching of Adults</td>
<td></td>
</tr>
<tr>
<td>ADTED 506</td>
<td>Program Planning in Adult Education</td>
<td></td>
</tr>
<tr>
<td>ADTED 507</td>
<td>Research and Evaluation in Adult Education</td>
<td></td>
</tr>
</tbody>
</table>

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact

Certificate Program Head: Esther Prins  
Primary Program Contact: Elisabeth McLean  
Email: elg6@psu.edu  
Mailing Address: 501A Walker Building, University Park, PA 16802  
Telephone: (814) 863-3777  
Program Website: Adult Basic Education (http://www.worldcampus.psu.edu/degrees-and-certificates/penn-state-online-adult-basic-education-certificate/overview)

Adult Education in the Health and Medical Professions Graduate Credit Certificate Program

Person-in-Charge: Elizabeth Tisdell  
Program Code: MEDADT  
Campus(es): Harrisburg

The primary goal of the Graduate Certificate in Adult Education in the Health and Medical Professions is to assist medical/health professionals in increasing their knowledge and competence in educating adult learners in medical education/health science settings.

The objectives are to promote: awareness of how learning theory informs practice; effective methods for teaching adults; development of a reflective practice; understanding of program/instructional design.

Effective Date: Summer Session 2010  
Expiration Date: Spring Semester 2020
Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies). International applicants may be required to satisfy an English proficiency requirement; see GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

Applicants must submit the following materials:

- A one-page resume
- A statement describing professional goals, experience, and responsibilities (2 pages maximum)
- One letter of recommendation
- Official transcripts from all post-secondary institutions attended (http://www.gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission).

Certificate Requirements

Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/postbaccalaureate-credit-certificate-programs).

Candidates are required to take 12 graduate credits, including the 9-credit core of three required classes and one other advisor-approved 3-credit graduate course related to the candidate’s specific area of interest. The required classes, in which assignments will relate to health/medical education issues, are:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADTED 460</td>
<td>Introduction to Lifelong Learning and Adult Education</td>
<td>3</td>
</tr>
<tr>
<td>ADTED 501</td>
<td>Foundations of Medical Education</td>
<td>3</td>
</tr>
<tr>
<td>ADTED 505</td>
<td>The Teaching of Adults</td>
<td>3</td>
</tr>
</tbody>
</table>

Electives

3-credit graduate elective related to the candidate’s particular interest related to health or medical education, and could include other graduate courses in the Adult Education Program or another related area

Total Credits 12

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Certificate Requirements

Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/postbaccalaureate-credit-certificate-programs).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>NURS 860</td>
<td>Adult Gerontology Acute Care Nurse Practitioner Role I</td>
<td>3</td>
</tr>
</tbody>
</table>

Contact

Certificate Program Head: Elizabeth Tisdell

Email: ejt11@psu.edu

Mailing Address: 442 Burrowes Bldg., University Park, PA 16802

Telephone: (717) 948-6640

Program Website: Adult Education in the Health and Medical Professions (http://harrisburg.psu.edu/programs/graduate-certificate-in-adult-education-in-the-health-and-medical-professions)
The purpose of the Adult Gerontology Primary Care Nurse Practitioner certificate is to prepare individuals with a Master's degree or higher in nursing seeking additional certification as an Adult Gerontology Primary Care Nurse Practitioner. The curriculum includes the didactic and clinical courses required for application of the NP role and required for certification.

Effective Semester: Summer 2016
Expiration Semester: Summer 2020

Admission Requirements
Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies). International applicants may be required to satisfy an English proficiency requirement; see GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac-gcac-300/admission-requirements-international-students) for more information.

Applicants are required to have a master's degree in nursing from an ACEN or CCNE accredited institution. In addition, undergraduate chemistry and statistics are required. Students need to submit two recommendations, a goal statement, and official transcripts from all post-secondary institutions attended (http://www.gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission).

Certificate Requirements
Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac-gcac-200/postbaccalaureate-credit-certificate-programs).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>NURS 870</td>
<td>Nurse Practitioner Role with Healthy Individuals and Families</td>
<td>3</td>
</tr>
<tr>
<td>NURS 871</td>
<td>Nurse Practitioner Role with Individuals and Families with Complex and/or Chronic Health Problems</td>
<td>3</td>
</tr>
<tr>
<td>NURS 872A</td>
<td>Adult Gerontology Primary Care Nurse Practitioner Practicum I</td>
<td>4</td>
</tr>
<tr>
<td>NURS 873A</td>
<td>Adult Gerontology Primary Care Nurse Practitioner Practicum II</td>
<td>4</td>
</tr>
<tr>
<td>NURS 874A</td>
<td>Adult Gerontology Primary Care Nurse Practitioner Integrative Practicum</td>
<td>6</td>
</tr>
</tbody>
</table>

1 Any or all of these courses may be waived based on the certificate program chair's evaluation of transcripts and prior courses completed.
Advanced Practice Core

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td>NURS 802</td>
<td>Advanced Health Assessment of Adult Populations</td>
</tr>
<tr>
<td>NURS 803</td>
<td>Pathophysiology</td>
</tr>
<tr>
<td>NURS 804</td>
<td>Pharmacologic Therapy</td>
</tr>
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</table>

Master's Core

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>NURS 501</td>
<td>Issues in Nursing and Health Care</td>
</tr>
<tr>
<td>NURS 510</td>
<td>Theoretical and Scientific Foundations of Advanced Nursing Practice</td>
</tr>
</tbody>
</table>

Total Credits 20

1 Any or all of these courses may be waived based on the certificate program chair’s evaluation of transcripts and prior courses completed.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact

Certificate Program Head: Judith Hupcey

Director of Graduate Studies/Professor-in-Charge: Madeline Mattern

Primary Program Contact: Xiaohong Sheng

Email: xus1@psu.edu

Mailing Address: 203 Nursing Sciences Building, University Park, PA 16802

Telephone: (814) 863-2211

Program Website: Adult Gerontology Primary Care Nurse Practitioner (http://www.nursing.psu.edu/graduate/certificates)

Agricultural Biosecurity and Food Defense Graduate Credit Certificate Program

Person-in-Charge: Carolee Bull

Program Code: AGBIO

Campus(es): World Campus

This 12-credit graduate certificate program is designed to provide students with broad training in the field of agricultural biosecurity. Courses cover animal and plant health, and food defense aspects of agricultural biosecurity and food defense. Content is both theoretical and applied but with an emphasis on practical application of knowledge gained. A distance education format is used to accommodate the needs of professionals already active in this area.

The certificate program is an attractive option for those who desire advanced graduate training but do not require the full Master’s degree program. It is also ideal for students who wish to move into the degree program once all admissions requirements are fulfilled (e.g., GRE); however, successful completion of a certificate program neither implies nor guarantees admission to a graduate degree program at Penn State. Certificate students who wish to have certificate courses applied towards a graduate degree must apply and be admitted to that degree program. Courses taken in the certificate program may be applied toward a graduate degree, subject to restrictions outlined in GCAC-309 Transfer Credit (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-309/transfer-credit).

Effective Date: Fall Semester 2017
Expiration Date: Fall Semester 2022

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies). International applicants may be required to satisfy an English proficiency requirement; see GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

Applicants must have a 3.0 or higher undergraduate grade-point average.

Certificate Requirements

Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/postbaccalaureate-credit-certificate-programs).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGBIO 520</td>
<td>Agricultural Biosecurity: Protecting a Key Infrastructure</td>
<td>3</td>
</tr>
<tr>
<td>AGBIO 521</td>
<td>Food Defense: Prevention Planning for Food Processors</td>
<td>3</td>
</tr>
<tr>
<td>AGBIO 801</td>
<td>Veterinary Infectious Disease Diagnostic and Surveillance Systems</td>
<td>3</td>
</tr>
<tr>
<td>AGBIO 802</td>
<td>Plant Protection: Responding to Introductions of Threatening Pests and Pathogens</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits 12

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact

Certificate Program Head: Carolee Bull
**Ancient Languages Postbaccalaureate Credit Certificate Program**

**Person-in-Charge**: Mark Munn  
**Program Code**: ANCLNG  
**Campus(es)**: University Park

Advanced study in classical studies, ancient history, ancient philosophy, biblical studies, Egyptology, or ancient Near Eastern studies requires demonstrable proficiency in one or more ancient languages. The certificate in Ancient Languages, comprising 12 credits, is designed to provide proficiency in at least one ancient language for students who have completed an appropriate undergraduate degree and are planning to pursue graduate work in one of these fields. Training in a second ancient language is offered, and a writing-intensive course in a subject relevant to the student's interest will strengthen preparation for graduate-level research and writing.

**Effective Semester**: Fall 2014  
**Expiration Semester**: Summer 2019

**Admission Requirements**

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies). International applicants may be required to satisfy an English proficiency requirement; see GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

The applicant's baccalaureate degree must be in any humanities field that includes at least one year of study in an ancient language.

**Certificate Requirements**

Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/postbaccalaureate-credit-certificate-programs).

A grade of B or better must be earned in each course to satisfy the certificate.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAMS 420</td>
<td>Introductory Targumic Aramaic</td>
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<tr>
<td>CAMS 471</td>
<td>Sumerian</td>
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<tr>
<td>CAMS 472</td>
<td>Akkadian</td>
<td></td>
</tr>
<tr>
<td>CAMS 481</td>
<td>Introduction to Middle Egyptian &amp; Hieroglyphics</td>
<td></td>
</tr>
<tr>
<td>CAMS 490</td>
<td>Ancient Mediterranean Languages</td>
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<tr>
<td>CAMS 520</td>
<td>Advanced Sumerian</td>
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<td>CAMS 521</td>
<td>Advanced Akkadian</td>
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<tr>
<td>CAMS 522</td>
<td>Comparative Semitics</td>
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</tr>
<tr>
<td>GREEK 401</td>
<td></td>
<td></td>
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<tr>
<td>GREEK 420</td>
<td>Greek Prose Authors</td>
<td></td>
</tr>
<tr>
<td>GREEK 425</td>
<td>Greek Historians</td>
<td></td>
</tr>
<tr>
<td>GREEK 430</td>
<td>Greek Poetry</td>
<td></td>
</tr>
<tr>
<td>GREEK 440</td>
<td>Greek Drama</td>
<td></td>
</tr>
<tr>
<td>GREEK 496</td>
<td>Independent Studies</td>
<td></td>
</tr>
<tr>
<td>GREEK 520</td>
<td>Greek Mythography</td>
<td></td>
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<tr>
<td>GREEK 596</td>
<td>Individual Studies</td>
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<tr>
<td>HEBR 451</td>
<td>Advanced Biblical Hebrew</td>
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<tr>
<td>HEBR 452</td>
<td>Readings in Biblical Hebrew</td>
<td></td>
</tr>
<tr>
<td>HEBR 496</td>
<td>Independent Studies</td>
<td></td>
</tr>
<tr>
<td>LATIN 402</td>
<td>Republican Literature</td>
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<tr>
<td>LATIN 403</td>
<td>Augustan Age Literature</td>
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<tr>
<td>LATIN 404</td>
<td>Silver Age Literature</td>
<td></td>
</tr>
<tr>
<td>LATIN 450</td>
<td>History of Latin</td>
<td></td>
</tr>
<tr>
<td>LATIN 496</td>
<td>Independent Studies</td>
<td></td>
</tr>
<tr>
<td>LATIN 510</td>
<td>Latin Seminar</td>
<td></td>
</tr>
<tr>
<td>LATIN 596</td>
<td>Individual Studies</td>
<td></td>
</tr>
<tr>
<td>CAMS 400</td>
<td>Comparative Study of the Ancient Mediterranean World</td>
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</tr>
<tr>
<td>CAMS 405</td>
<td>Law &amp; Economy in the Ancient Near East (when taught as a writing intensive section)</td>
<td></td>
</tr>
<tr>
<td>CAMS 410</td>
<td>Classical Epic (when taught as a writing intensive section)</td>
<td></td>
</tr>
<tr>
<td>CAMS 411</td>
<td>Classical Drama</td>
<td></td>
</tr>
<tr>
<td>CAMS 440</td>
<td>Studies in Classical and Ancient Mediterranean Archaeology</td>
<td></td>
</tr>
<tr>
<td>CAMS 470</td>
<td>Languages and Cultures of the Ancient Near East (when taught as a writing intensive section)</td>
<td></td>
</tr>
<tr>
<td>CAMS/JST 480</td>
<td>Greeks and Persians (when taught as a writing intensive section)</td>
<td></td>
</tr>
<tr>
<td>CAMS 501</td>
<td>Comparative Greek and Latin Grammar</td>
<td></td>
</tr>
<tr>
<td>CAMS 503</td>
<td>Seminar on Ancient Mediterranean Languages</td>
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</tr>
<tr>
<td>CAMS 592</td>
<td>Proseminar</td>
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<tr>
<td>CAMS 593</td>
<td>Research Seminar</td>
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<tr>
<td>CAMS 596</td>
<td>Individual Studies</td>
<td></td>
</tr>
</tbody>
</table>

Total Credits: 12
Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact
Certificate Program Head: Mark Munn
Email: mxm20@psu.edu
Mailing Address: 801 Ford Building, University Park, PA 16802
Telephone: (814) 863-0052

Applied Behavior Analysis Graduate Credit Certificate Program
Person-in-Charge: David Lee
Program Code: APPBA
Campus(es): World Campus

This program is intended for those who seek advanced knowledge in the field of applied behavior analysis. The 18-credit curriculum is specifically designed to prepare students to sit for the BCBA certification examination sponsored by the Behavior Analyst Certification Board. After completing the program, students will be able to:

1. Describe the basic principles of behavior and how those principles relate to community/classroom situations with clients.
2. Develop procedures to determine the purpose of aberrant behavior for an individual, determine if targeted behaviors warrant intervention, and monitor the effects of interventions.
3. Develop interventions based on the purpose of aberrant behavior.
4. Develop instructional programs to teach new behaviors that are functional in school and community settings.

Effective: Spring Semester 2017
Expiration: Spring Semester 2022

Admission Requirements
Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies). International applicants may be required to satisfy an English proficiency requirement; see GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac-gcac-300/admission-requirements-international-students) for more information.

Certificate Requirements
Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac-gcac-200/postbaccalaureate-credit-certificate-programs).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>SPLED 503A</td>
<td>Applied Behavior Analysis for Special Education: Basic Principles I</td>
<td>4</td>
</tr>
<tr>
<td>SPLED 503B</td>
<td>Applied Behavior Analysis for Special Education: Basic Principles II</td>
<td>4</td>
</tr>
<tr>
<td>SPLED 503C</td>
<td>Applied Behavior Analysis for Special Education: Extended Applications I</td>
<td>4</td>
</tr>
<tr>
<td>SPLED 503D</td>
<td>Applied Behavior Analysis for Special Education: Extended Applications II</td>
<td>3</td>
</tr>
<tr>
<td>SPLED 811</td>
<td>Ethical Considerations for Special Education Populations</td>
<td>3</td>
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</tbody>
</table>

Total Credits: 18

Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact
Certificate Program Head: David Lee
Primary Program Contact: Erin Garthe
Email: emb189@psu.edu
Mailing Address: 304A CEDAR Building, University Park, PA 16802
Telephone: (814) 865-7307

Program Website: Applied Behavior Analysis Graduate Certificate (http://www.worldcampus.psu.edu/degrees-and-certificates/applied-behavior-analysis-for-special-education-certificates/overview)

Applied Bioinformatics Graduate Credit Certificate Program
Person-in-Charge: Scott Selleck
Program Code: BIOINC
Campus(es): World Campus

Students will gain an understanding of genomic sequencing and learn how to analyze and interpret genomic data in the context of cellular behavior and activity. Genomic sequencing has an impact on all of the sciences, and access to this new type of information has fundamentally altered biology and it now demands that life scientists become familiar with computational and statistical concepts.

Effective Semester: Spring 2015
Expiration Semester: Fall 2019
Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies). International applicants may be required to satisfy an English proficiency requirement; see GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac-gcac-300/admission-requirements-international-students) for more information.

Applied Bioinformatics is a computationally heavy science that requires both computer and internet access to understand and practice the concepts presented in the coursework. Applicants must have a bachelor’s degree and an eagerness to learn about the latest scientific developments of the genomic era.

Certificate Requirements

Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac-gcac-200/postbaccalaureate-credit-certificate-programs).

The 11-credit curriculum includes 9 credits of core BMMB courses plus 3 credits of STAT. To earn the certificate, students must have achieved a B (3.0) average in all courses, receiving no grade lower than a C in any course.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMMB/IBIOS 551</td>
<td>Genomics</td>
<td>3</td>
</tr>
<tr>
<td>BMMB/IBIOS 554</td>
<td>Foundations in Data Driven Life Sciences</td>
<td>3</td>
</tr>
<tr>
<td>BMMB 852</td>
<td>Applied Bioinformatics</td>
<td>2</td>
</tr>
<tr>
<td>STAT/BIOL/MCIBS 555</td>
<td>Statistical Analysis of Genomics Data</td>
<td>3</td>
</tr>
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<td>Total Credits</td>
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</tr>
</tbody>
</table>

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact

Certificate Program Head: Scott Selleck

Primary Program Contact: Istvan Albert

Email: iua1@psu.edu

Mailing Address: 314 Keller Building, University Park, PA 16802

Telephone: (814) 865-2281

Program Website: Applied Bioinformatics (http://www.worldcampus.psu.edu/degrees-and-certificates/applied-bioinformatics-certificate/overview)

Applied Demography Graduate Credit Certificate Program

Person-in-Charge: Eric Baumer

Program Code: APDEM

Campus(es): World Campus

The primary goal of the program is to provide an introduction to concepts, measures, data, software, and methods used in applied demography with an emphasis on applications in the public and private sectors. Professionals who complete this 12-credit program will be able to apply demographic analysis in their careers. This certificate will allow them to support organizations and better understand and anticipate the effects of population change. This program is ideal for those interested in careers as applied demographers, data analysts, market research analysts, marketing specialists, and local, state, and regional planners.

Effective Semester: Fall 2016

Expiration Semester: Summer 2021

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies). International applicants may be required to satisfy an English proficiency requirement; see GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac-gcac-300/admission-requirements-international-students) for more information.

Applicants must have successfully completed at least an undergraduate-level statistics course with a grade of C or better.

Applicants must submit the following:

1. Completed official online Graduate School application (http://gradschool.psu.edu/prospective-students/how-to-apply) and payment of a nonrefundable application fee.

2. Statement of purpose: a 2-3 pages essay articulating career and educational goals that demonstrate the student’s written communication skills and basic statistical knowledge.

3. A current curriculum vitae ( vita) or résumé.

4. Three letters of recommendation that attest to the student’s readiness for graduate study and document the requisite minimum of two years of work experience. Letters must be submitted through the online application system. Within the online application you will be asked to enter the names and e-mail addresses of three individuals who will be providing your recommendation. Those individuals will receive a note via e-mail asking them to complete a brief form that will serve as your recommendation. Please inform all recommenders they must submit the form in order for your application to be complete.
Certificate Requirements

Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac-gcac-200/postbaccalaureate-credit-certificate-programs).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>APDEM 801</td>
<td>Principles of Demography</td>
<td>3</td>
</tr>
<tr>
<td>SOC 573</td>
<td>Demographic Techniques</td>
<td>3</td>
</tr>
<tr>
<td>APDEM 802</td>
<td>Data, GIS, and Applied Demography</td>
<td>3</td>
</tr>
<tr>
<td>APDEM 803</td>
<td>Applications in Applied Demography</td>
<td>3</td>
</tr>
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<td>Total Credits</td>
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</tr>
</tbody>
</table>

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact

Certificate Program Head: Eric Baumer
Director of Graduate Studies/Professor-in-Charge: Stephen Matthews

Applied Statistics Graduate Credit Certificate Program

Person-in-Charge: Mosuk Chow
Program Code: STATC_GCT
Campus(es): World Campus

The graduate certificate in Applied Statistics helps quantitative professionals in a variety of fields become knowledgeable and skillful in applied statistics. The certificate was designed specifically for researchers working with statistical data who wish to advance their careers, and for those who seek career changes.

Effective Date: Fall Semester 2011
Expiration Date: Summer 2021

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies). International applicants may be required to satisfy an English proficiency requirement; see GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac-gcac-300/admission-requirements-international-students) for more information.

Certificate Requirements

Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac-gcac-200/postbaccalaureate-credit-certificate-programs).

Students earn the certificate by completing 12 credits of instructor-led online course work. Two 3-credit courses are required, and the remaining 6 credits are selected from a list of electives. Students who successfully complete the certificate earn 12 academic credits and receive the graduate certificate in Applied Statistics. Students subsequently admitted to the Department of Statistics’s professional Master of Applied Statistics degree program may count up to 15 credits of certificate courses toward the M.A.S. degree, subject to restrictions outlined in GCAC-309 Transfer Credit (http://gradschool.psu.edu/graduate-education-policies/gcac-gcac-300/transfer-credit). Certificate students who wish to have certificate courses applied towards the Master of Applied Statistics must apply and be admitted to that degree program. Admission to the Applied Statistics graduate degree program is a separate step and is not guaranteed.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT 500</td>
<td>Applied Statistics</td>
<td>3</td>
</tr>
<tr>
<td>STAT 501</td>
<td>Regression Methods</td>
<td>3</td>
</tr>
</tbody>
</table>

Electives

Select at least 6 credits of the following:

- STAT 414 Introduction to Probability Theory
- STAT 415 Introduction to Mathematical Statistics
- STAT 480 Introduction to SAS
- STAT 481 Intermediate SAS for Data Management
- STAT 482 Advanced Topics in SAS
- STAT 483 Statistical Programming in SAS
- STAT 502 Analysis of Variance and Design of Experiments
- STAT 503 Design of Experiments
- STAT 504 Analysis of Discrete Data
- STAT 505 Applied Multivariate Statistical Analysis
- STAT 506 Sampling Theory and Methods
- STAT 507 Epidemiologic Research Methods
- STAT 509 Design and Analysis of Clinical Trials
- STAT 510 Applied Time Series Analysis
- GEOG 483 Problem-Solving with GIS

Total Credits 12

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.
Bioenergy Graduate Credit Certificate Program

Person-in-Charge: Ali Demirci
Program Code: BIOERG
Campus(es): World Campus

The graduate certificate in Bioenergy is designed specifically for current and aspiring practitioners who seek advanced skills for growing the bioenergy industry. To accommodate participation by working professionals the program is offered through Penn State's World Campus by Renewable Energy and Sustainability Systems (RESS) graduate program.

Effective Semester: FA 2017
Expiration Semester: SU 2022

Admission Requirements
Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies). International applicants may be required to satisfy an English proficiency requirement; see GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

A background in chemistry and thermodynamics is recommended.

Certificate Requirements
Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/postbaccalaureate-credit-certificate-programs).

Bioenergy certificate students earn the certificate and 12 graduate credits by earning a grade of "C" or better in four prescribed online courses (note that grade requirements for using these courses in other graduate programs may be different). Students who are subsequently admitted to the Renewable Energy and Sustainability Systems (RESS) degree program may count credits earned in the certificate program toward the RESS degree, subject to restrictions outlined in GCAC-309 Transfer Credit (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/transfer-credit). Certificate students who wish to have certificate courses applied towards a graduate degree in RESS must apply and be admitted to that degree program. Admission into the RESS degree program is a separate step and is not guaranteed.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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<tr>
<td>ABE 884</td>
<td>Biomass Energy Systems</td>
<td>3</td>
</tr>
<tr>
<td>ABE 885</td>
<td>Biomass Harvesting and Logistics</td>
<td>3</td>
</tr>
<tr>
<td>ABE 888</td>
<td>Conversion Technologies for Bioenergy Production</td>
<td>3</td>
</tr>
<tr>
<td>FOR 880</td>
<td>Bioenergy Feedstocks</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Total Credits</td>
<td>12</td>
</tr>
</tbody>
</table>

Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact
Certificate Program Head: Ali Demirci
Primary Program Contact: Noelle Capparelle
Email: nlfs@psu.edu
Mailing Address: John A Dutton e-Education Institute, 2217 Earth & Engineering Sciences Bldg., University Park, PA 16802
Telephone: (814) 867-5401
Program Website: Bioenergy (https://www.ress.psu.edu/certificates)

Business Analytics Graduate Credit Certificate Program

Graduate Program Head: Chris Solo
Program Code: BAN
Campus(es): World Campus

The nine-credit graduate certificate program in Business Analytics (BAN) prepares business professionals to explore and analyze large data sets to support data-driven business decisions. The program covers the entire life cycle of a data analytics project using the descriptive/prescriptive/predictive framework for business analytics:

- descriptive (What happened?),
- predictive (What will happen?) and
- prescriptive (What should happen?).

Target audiences include business analysts, analytic systems designers and the data scientists who have a focus on problems arising in the contexts of business decision-making. The certificate program builds on basic analytic concepts that professionals are expected to have and provides a practical approach to expanding these analytic skills to perform tasks in various areas of business such as marketing, supply chains, operations, forensics, and risk.

Effective Semester: Fall 2017
Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies). International applicants may be required to satisfy an English proficiency requirement; see GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

Applicants are generally expected by have a minimum combined junior/senior grade-point average of 3.00 (B) on a 4.00 scale.

Admissions Prerequisite Requirement

Qualified applicants should have successfully completed an undergraduate or graduate-level course in statistics or be able to show significant experience using statistics in a professional capacity. In lieu of an appropriate statistics course or adequate professional experience, the admissions committee will consider exceptional GMAT/GRE test scores on a case-by-case basis. Students that do not have prior statistics coursework, significant experience using statistics in a professional capacity, or GRE/GMAT scores deemed sufficient by the admissions committee may complete (with a grade of B+ or better) STAT 500 online, through Penn State World Campus to satisfy the statistics prerequisite requirement.

Additional Requirements

Applications must include a statement of professional goals, a curriculum vita or resume, and two letters of recommendation. Applicants should have knowledge or experience in quantitative work such as science, engineering, or business. The objective is to establish a baseline knowledge and to prepare the student for the advanced coursework in this program. Applicants from other disciplines will be considered based on prior academic and professional experience.

Certificate Requirements

Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/postbaccalaureate-credit-certificate-programs).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAN 530</td>
<td>Business Strategies for Data Analytics</td>
<td>3</td>
</tr>
<tr>
<td>BAN 540</td>
<td>Marketing Analytics</td>
<td>3</td>
</tr>
<tr>
<td>BAN 550</td>
<td>Prescriptive Analytics for Business</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Total Credits</td>
<td>9</td>
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</tbody>
</table>

Courses

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Contact

Certificate Program Head: Chris Solo
Primary Program Contact: Michelle Rockower (mkk114@psu.edu)
Program Email: banhelponline@psu.edu (BAN@smeal.psu.edu)
Mailing Address: 220 Business Building, University Park, PA 16802
Telephone: (814) 863-0474
Program Website: Business Analytics (http://www.worldcampus.psu.edu/degrees-and-certificates/business-analytics-certificate/overview)

Children's Literature Graduate Credit Certificate Program

Person-in-Charge: Elisa Shaw Hopkins
Program Code: CHDLIT
Campus(es): World Campus

The goal of the program is to provide students with an in-depth background in the theories and genres of literature for children and youth while also considering pedagogical (broadly construed) and cultural implications.

The program does not lead to any initial teacher certification, but may assist students with recertification. Students should check with their specific state departments of education for regulations regarding recertification.

Effective: Summer 2017
Expiration: Summer 2022

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies). International applicants may be required to satisfy an English proficiency requirement; see GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

Certificate Requirements

Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/postbaccalaureate-credit-certificate-programs).

Students are required to take LLED 502 as a foundation to the various orientations to the study of children’s literature. Students may choose a minimum of four additional courses in areas such as picture books, nonfiction literature, fantasy literature, myth and folklore, cultural and
social issues, writing for children, theories of childhood, and research approaches for a total of 15 credits.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>LLED 502</td>
<td>Studies in Literature for Children</td>
<td>3</td>
</tr>
</tbody>
</table>

Electives

Choose a minimum of 12 elective credits from the following: 12 credits

- CI 560  Theories of Childhood
- LLED 462  The Art of the Picturebook
- LLED 464  Nonfiction Literature for Children and Adolescents
- LLED 465  Fantasy Literature for Children
- LLED 520  Literature for Adolescents
- LLED 561  Cultural Pluralism in Children’s and Adolescent Literature
- LLED 563  Myths and Folktales in Children’s Literature
- LLED 564  Writing for Children
- LLED 568  Doing Research in Children's Literature

Total Credits 15

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Certificate Requirements

Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/postbaccalaureate-credit-certificate-programs).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHS 520</td>
<td>Principles of Biostatistics</td>
<td>3</td>
</tr>
<tr>
<td>PHS 550</td>
<td>Principles of Epidemiology</td>
<td>3</td>
</tr>
</tbody>
</table>

Electives

Select 9 credits of the following: 9 credits

- PHS 500  Research Ethics for Clinical Investigators
- PHS 511  Methods Used in Translational Research
- PHS 518  Scientific Communication
- PHS 519  Patient Centered Research
- PHS 535  Quality of Care Measurement
- PHS 536  Health Survey Research Methods
- PHS 551  Advanced Epidemiological Methods
- PHS 580  Clinical Trials: Design and Analysis
- PHS 581  Clinical Trials: Case Studies
- PHS 801  Data Management

Total Credits 15

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by
graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact
Certificate Program Head: Vernon Chinchilli
Director of Graduate Studies/Professor-in-Charge: Li Wang
Primary Program Contact: Marjorie Sawyer
Email: mds21@psu.edu
Mailing Address: 90 Hope Drive, Public Health Sciences, Hershey, PA 17033
Telephone: (717) 531-7178
Program Website: Clinical Research (http://med.psu.edu/clinical-research-certificate)

Community and Economic Development Graduate Credit Certificate Program
Person-in-Charge: John Shingler
Program Code: CEDEV
Campus(es): World Campus

The CEDEV Graduate Certificate is designed to build a basic level of knowledge and skills required for practitioners to address the important issues in community and economic development. The Graduate Certificate in Community and Economic Development (CEDEV) provides needed skills and knowledge to practitioners in community and economic development through the flexible learning environment of the World Campus. The program introduces key concepts and practical strategies useful to individuals new to the field of community development and to those with experience working with communities and development organizations. The program also meets the needs of those who are considering a career in community and economic development and want to find out if this profession is right for them. The CEDEV Graduate Certificate is designed to build a basic level of knowledge and skills required for practitioners to address the important issues in community and economic development.

Effective Semester: Spring 2017
Ending Semester: Spring 2022

Admission Requirements
Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies). International applicants may be required to satisfy an English proficiency requirement; see GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac-gcac-305/admission-requirements-international-students) for more information.

Certificate Requirements
Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac-gcac-200/postbaccalaureate-credit-certificate-programs).

The Graduate Certificate in Community and Economic Development (CEDEV Certificate) requires 15 credits, consisting of five 3-credit courses.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>CEDEV 430</td>
<td>Principles of Local Economic Development</td>
<td>3</td>
</tr>
<tr>
<td>CEDEV 452</td>
<td>Community Structure, Processes and Capacity</td>
<td>3</td>
</tr>
<tr>
<td>CEDEV 500</td>
<td>Community and Economic Development: Theory and Practice</td>
<td>3</td>
</tr>
<tr>
<td>CEDEV 509</td>
<td>Population, Land Use, and Municipal Finance</td>
<td>3</td>
</tr>
<tr>
<td>CEDEV 575</td>
<td>Methods and Techniques for Community and Economic Development</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits: 15

Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact
Certificate Program Head: John Shingler
Primary Program Contact: Julie Stringfellow
Email: jls1007@psu.edu
Mailing Address: 305 Armsby, University Park, PA 16802
Telephone: (814) 865-6223
Program Website: Community and Economic Development Graduate Certificate (http://aese.psu.edu/graduateprograms/cedev/graduate-certificate-program)

Corporate Accounting Foundations Graduate Credit Certificate Program
Person-in-Charge: Steven Huddart
Program Code: CORAC
Campus(es): World Campus
The Graduate Certificate in Corporate Accounting Foundations (CORAC-GCT) is a twelve-credit program for those seeking a solid foundation in accounting. Accounting systems collect and organize data about business transactions and activities. These systems also measure performance, communicate business plans and outcomes, and support decision-making. Topics covered include:

1. structure and content of financial reports, tax returns, and regulatory filings,
2. use of internal controls to protect an organization’s resources and the integrity of its records,
3. purposes and procedures of auditing,
4. assembly and use of accounting information to plan and coordinate operations, and to make decisions.

Prior knowledge of accounting is not required. Because the program covers the core topics of a baccalaureate accounting program and is delivered at a pace and depth appropriate to graduate students, the program is intensive. The program is not suitable for those having accounting as their baccalaureate major.

**Effective Semester:** Fall 2018  
**Expiration Semester:** Fall 2023  

### Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies). International applicants may be required to satisfy an English proficiency requirement; see GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

Applicants are generally expected to have a minimum combined junior/senior grade-point average of 3.00 (B) on a 4.00 scale. Official transcripts from all post-secondary institutions attended (http://www.gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission) must accompany the application.

The following are also required:

- a resume of work experience and skills acquired since the baccalaureate degree, and
- two professional or academic letters of reference.

A GMAT score is encouraged, but not required.

### Certificate Requirements

Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/postbaccalaureate-credit-certificate-programs).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>MBADM 811</td>
<td>Financial Accounting</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 812</td>
<td>TAXATION</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 813</td>
<td>Auditing</td>
<td>3</td>
</tr>
<tr>
<td>ACCTG 814</td>
<td>Managerial Accounting</td>
<td>3</td>
</tr>
</tbody>
</table>

**Total Credits**: 12

### Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

### Contact

**Certificate Program Head:** Steven Huddart  
**Primary Program Contact:** Michelle Rockower  
**Email:** CORAC@psu.edu  
**Telephone:** (814) 863-0474  
**Program Website:** Corporate Accounting Foundations (https://www.smeal.psu.edu/corac)

### Corporate Finance Graduate Credit Certificate Program

**Person-in-Charge:** James Nemes  
**Program Code:** CORFIN  
**Campus(es):** Great Valley

The Finance faculty in the Master of Finance program at the School of Graduate Professional Studies at Penn State Great Valley offers a four-course (12-credit) graduate certificate program in corporate finance.

The program is designed to provide preparation for individuals who work or aspire to work in the corporate finance field as financial analysts, credit managers, investor relations officers, treasurers, controllers, or in related positions in the treasury department or controller’s office of an organization, investment banking firms, and commercial lending, or in the area of mergers and acquisitions.

The curriculum focuses on a set of knowledge and skills in financial analysis and reporting, financial modeling and valuation, and capital structure. Course work emphasizes the development of competencies in building pro forma financial statements, company valuation, advanced capital budgeting based on a real options approach, and understanding of 10K reports, as well as mergers and acquisitions, internal control and planning, and decision making under uncertainty. Content is both theoretical and applied, with an emphasis on practical application of knowledge gained.

This certificate program is an attractive option for individuals who desire advanced education but who do not wish to pursue a master’s degree at this time. It is valuable for recent college graduates and others who wish to enroll in courses to determine if they are interested in a complete master’s degree program, as well as for professionals who already hold a master’s degree and wish to update or expand their knowledge and skills. With program approval, the courses in this graduate certificate program may be applied to the Master of Finance degree program or the Master of
Business Administration program at Great Valley, subject to restrictions outlined in GCAC-309 Transfer Credit (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-309/transfer-credit). Certificate students who wish to have certificate courses applied towards the M.B.A. must apply and be admitted to that degree program. Admission to the M.B.A. degree program is a separate step and is not guaranteed.

**Effective Date:** Fall Semester 2011  
**Expiration Date:** Summer Session 2020

## Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies). International applicants may be required to satisfy an English proficiency requirement; see GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-305/admission-requirements-international-students) for more information.

Applicants are expected to have achieved a 3.0 (B) or higher undergraduate grade point average and should have satisfactorily completed some course work in Business Statistics, Financial Management/Corporate Finance, and Microeconomics.

Applicants holding a master's degree should have attained at least a cumulative grade point average of 3.0 in previous graduate work. Professional experience will be taken into consideration for admission. Applicants must submit an online Graduate School application (http://gradschool.psu.edu/prospective-students/how-to-apply) and the nonrefundable application fee, along with supporting credentials. Supporting credentials include:

- **official transcripts from all post-secondary institutions attended** (http://www.gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission),
- a current résumé, and
- a statement of intent or career objective.

Admission decisions are made by a faculty committee and are based on the quality of the applicant’s credentials in relation to those of other applicants. Evaluation criteria include professional and academic accomplishments. Note that admission as a nondegree graduate student neither guarantees nor implies subsequent admission to a degree program.

## Certificate Requirements

Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-212/postbaccalaureate-credit-certificate-programs).

Upon approval, certificate program students will enroll in course work on a nondegree basis. Students must complete each course with a grade of B or better in order to receive the certificate. Nondegree students are not eligible to receive fellowships or graduate assistantships.

With program adviser approval, all four courses in the certificate program may be applied to the master’s degree program in Finance or the Master of Business Administration program at Great Valley.

subject to restrictions outlined in GCAC-309 Transfer Credit (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-309/transfer-credit). Certificate program students who wish to have the certificate courses applied to M.B.A. degree program must formally be admitted to the M.B.A. degree program. Admission into the M.B.A. degree program is a separate step and is not guaranteed, and credit toward a graduate degree for specific courses taken on a nondegree basis, is up to the graduate program.

The graduate certificate program in corporate finance requires a total of four courses (12 graduate credits). Students completing each of the four courses with a grade of B or better will be eligible to receive a graduate certificate.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCTG 512</td>
<td>Financial Accounting Theory and Reporting Problems</td>
<td>3</td>
</tr>
<tr>
<td>BUSAD 826</td>
<td>Current Issues in Corporate Finance</td>
<td>3</td>
</tr>
<tr>
<td>FIN 531</td>
<td>Financial Management</td>
<td>3</td>
</tr>
</tbody>
</table>

### Electives

Choose 1 from the following 3 courses:

- ACCTG 524 Managerial Accounting
- BUSAD 828 Mergers and Acquisitions
- FIN 532 Financial Decision Processes

**Total Credits:** 12

## Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

## Contact

**Certificate Program Head:** James Nemes  
**Director of Graduate Studies/Professor-in-Charge:** Qiang Qiang  
**Primary Program Contact:** Leanne Wallace  
**Email:** lxw31@psu.edu  
**Mailing Address:** 30 East Swedesford Road, Malvern, PA 19355  
**Telephone:** (610) 648-3336  
**Program Website:** Corporate Finance Graduate Certificate (http://greatvalley.psu.edu/academics/graduate-certificates/finance)
Corporate Innovation and Entrepreneurship Graduate Credit Certificate Program

**Person-in-Charge:** Shawn M. Clark  
**Program Code:** CIENT  
**Campus(es):** World Campus

The Smeal College of Business offers a graduate certificate in Corporate Innovation and Entrepreneurship. This certificate is designed to meet the needs of individuals in industry who have at least a bachelor's degree, but lack awareness, understanding, and competency in the areas of corporate innovation, new venture creation, and entrepreneurship. The knowledge and skills associated with innovation and entrepreneurship are of tremendous value in many different contexts and industries, including the areas of leadership, strategic planning, business model development, managing or launching new ventures, developing new products, improving services and business processes, technology commercialization and technology transfer initiatives, customer development, and starting a business. This certificate specifically targets individuals in the corporate sector where product/service innovation and continuous improvement are imperative, however, students interested in launching startup companies will also find this program beneficial. In general, those students who have a science or engineering background, are in management roles involving innovation, desire to launch new venture in or outside a given organization, or have job responsibilities involving innovation and creativity, will find this certificate helpful.

This 12 credit certificate program will provide students a solid foundation in innovation and entrepreneurship necessary to advance in their chosen career fields, but may also be extended to a master's degree, the Master of Professional Studies degree program in Corporate Innovation and Entrepreneurship. Courses taken in the certificate program may be applied toward the M.P.S. in Corporate Innovation and Entrepreneurship, subject to restrictions outlined in GCAC-309 Transfer Credit (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-309/transfer-credit). Certificate students who wish to have certificate courses applied towards the M.P.S. must apply and be admitted to that degree program. Admission to the M.P.S. graduate degree program is a separate step and is not guaranteed.

**Effective Semester:** Spring 2018  
**Expiration Semester:** Spring 2023

### Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies). International applicants may be required to satisfy an English proficiency requirement, see GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-305/admission-requirements-international-students) for more information.

Along with the submission of the online application and the nonrefundable application fee, the following is required:

- Official Transcripts and Grade Point Average (GPA) — Applicants must submit official transcripts from all post-secondary institutions attended (http://www.gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission). A Grade Point Average (GPA) of 3.00 on a 4.00 scale in the final two years of undergraduate studies, or in your most recent graduate degree, is required.
- Statement of Purpose - Applicants must upload a 1–2 page (double-spaced) statement of purpose describing how professional experience and goals potentially align with the certificate.

**Certificate Requirements**

Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-212/postbaccalaureate-credit-certificate-programs).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MBADM 531</td>
<td>Corporate Innovation and Entrepreneurship</td>
<td>3</td>
</tr>
<tr>
<td>ENTR 810</td>
<td>Emerging Trends, Technology, and Corporate Innovation</td>
<td>3</td>
</tr>
<tr>
<td>ENTR 502</td>
<td>Business Modeling and New Venture Creation</td>
<td>3</td>
</tr>
<tr>
<td>ENTR 820</td>
<td>Corporate Innovation Strategies and Entrepreneurial Methods</td>
<td>3</td>
</tr>
</tbody>
</table>

**Total Credits**  
**12**

### Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

### Contact

**Certificate Program Head:** Shawn Clark  
**Primary Program Contact:** Michelle Rockower

**Email:** CIENT@psu.edu  
**Mailing Address:** 220 Business Building, University Park, PA 16802  
**Telephone:** (814) 863-0474

**Program Website:** Corporate Innovation and Entrepreneurship Graduate Certificate (http://www.worldcampus.psu.edu/degrees-and-certificates/penn-state-online-corporate-innovation-and-entrepreneurship-certificate-overview)
Counterterrorism Graduate Credit Certificate Program

Graduate Program Head: James Piazza
Program Code: CNTRTM
Campus(es): World Campus

The Graduate Credit Certificate in Counterterrorism provides working professionals and others with social science based training to understand and address terrorism and other threats to U.S. homeland security. The Certificate emphasizes the development of core skills such as threat analysis, management, and reporting; basic data usage and presentation; the preparation of counterterrorism briefings and reports; and the assessment of anti-terrorism strategies. Through the Certificate course work, students learn about the motives, threats, recruitment strategies, and operational tactics of terrorist organizations. The courses focus on key elements within counterterrorism, such as diagnosing the root causes of terrorism, identifying and using sources of data, critical data gathering and analysis skills, and radicalization processes. Certificate recipients will develop the capacity to identify conditions likely to encourage terrorism; define, evaluate, and assess counterterrorism techniques and operations; and turn collected data into actionable information. In this way, they will be prepared for leadership and supporting roles in the homeland security professional workforce. The Certificate is based around four courses that in turn form the core requirements for the Counterterrorism option within the online Intercollege Master of Professional Studies in Homeland Security.

Effective Semester: Summer 2018
Expiration Semester: Summer 2023

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies). International applicants may be required to satisfy an English proficiency requirement; see GCAC-212 Postbaccalaureate Credit Certificate Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/postbaccalaureate-credit-certificate-programs).

Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Program.

Applicants must submit the following items with their application for admission to the Counterterrorism certificate program:

- official transcripts from all post-secondary institutions attended (http://gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission);
- resume/CV; and
- one-page statement of purpose or rationale for seeking a Graduate Certificate in Counterterrorism.

Applicants are expected to have a 3.0 or higher GPA in their undergraduate work.

Certificate Requirements

Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Program.

Program Website: Counterterrorism Graduate Certificate (https://www.worldcampus.psu.edu/degrees-and-certificates/penn-state-online-counterterrorism-certificate/overview)

Cyber Threat Analytics and Prevention Graduate Credit Certificate Program

Person-in-Charge: Robin Qiu
Program Code: CTAP
Campus(es): Great Valley World Campus

This 12-credit certificate helps students understand the core of diverse and global cyberattacks, cyber laws and regulations, vulnerabilities, threats, and surveillance systems, while gaining certain fundamental skills to plan, prevent, protect, detect, analyse, respond, mitigate, and recover from threats and attacks in a sophisticated and large-scale basis.

Effective Semester: Summer 2018
Expiration Semester: Summer 2023

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies). International applicants may be required to satisfy an English proficiency requirement; see GCAC-212 Postbaccalaureate Credit Certificate Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Program. 

Program Website: Cyber Threat Analytics and Prevention Graduate Certificate

Program Code: CTAP
Campus(es): Great Valley World Campus

This 12-credit certificate helps students understand the core of diverse and global cyberattacks, cyber laws and regulations, vulnerabilities, threats, and surveillance systems, while gaining certain fundamental skills to plan, prevent, protect, detect, analyse, respond, mitigate, and recover from threats and attacks in a sophisticated and large-scale basis.

Effective Semester: Summer 2018
Expiration Semester: Summer 2023

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies). International applicants may be required to satisfy an English proficiency requirement; see GCAC-212 Postbaccalaureate Credit Certificate Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Program.

Certificate Requirements

Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Program.

Program Website: Cyber Threat Analytics and Prevention Graduate Certificate

Program Code: CTAP
Campus(es): Great Valley World Campus

This 12-credit certificate helps students understand the core of diverse and global cyberattacks, cyber laws and regulations, vulnerabilities, threats, and surveillance systems, while gaining certain fundamental skills to plan, prevent, protect, detect, analyse, respond, mitigate, and recover from threats and attacks in a sophisticated and large-scale basis.

Effective Semester: Summer 2018
Expiration Semester: Summer 2023

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies). International applicants may be required to satisfy an English proficiency requirement; see GCAC-212 Postbaccalaureate Credit Certificate Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Program.

Certificate Requirements

Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Program.

Program Website: Cyber Threat Analytics and Prevention Graduate Certificate

Program Code: CTAP
Campus(es): Great Valley World Campus

This 12-credit certificate helps students understand the core of diverse and global cyberattacks, cyber laws and regulations, vulnerabilities, threats, and surveillance systems, while gaining certain fundamental skills to plan, prevent, protect, detect, analyse, respond, mitigate, and recover from threats and attacks in a sophisticated and large-scale basis.

Effective Semester: Summer 2018
Expiration Semester: Summer 2023

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies). International applicants may be required to satisfy an English proficiency requirement; see GCAC-212 Postbaccalaureate Credit Certificate Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Program.

Certificate Requirements

Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Program.
Data Analytics Graduate Credit Certificate Program

Certificate Requirements
Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/postbaccalaureate-credit-certificate-programs).

Students must maintain a minimum grade point average of 3.0 (B) throughout the program.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Required Courses</td>
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</tr>
<tr>
<td>INSC 561</td>
<td>Web Security and Privacy</td>
<td>3</td>
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<tr>
<td>IST 554</td>
<td>Network Management and Security</td>
<td>3</td>
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<tr>
<td></td>
<td>Electives</td>
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<tr>
<td>Select at least two of the following:</td>
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<tr>
<td>IST 454</td>
<td>Computer and Cyber Forensics</td>
<td></td>
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<tr>
<td>DAAN 871</td>
<td>Data Visualization</td>
<td></td>
</tr>
<tr>
<td>INSC 846</td>
<td>Network and Predictive Analytics for Socio-Technical Systems</td>
<td></td>
</tr>
<tr>
<td>IST 820</td>
<td>Cybersecurity Analytics</td>
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<tr>
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<td>Total Credits</td>
<td>12</td>
</tr>
</tbody>
</table>

The goal of this graduate certificate program is to prepare students to apply data analytics techniques to large data sets to support data-driven decisions across application domains.

Effective Semester: Spring 2015
Expiration Semester: Fall 2019

Admission Requirements
Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-300 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

Applicants with an undergraduate degree in a quantitative discipline such as science, engineering, or business may apply. Students from other disciplines will be considered based on prior course work. Applicants are generally expected to have a minimum combined junior/senior grade-point average of 3.0 (B) on a 4.0 scale.

Certificate Requirements
Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/postbaccalaureate-credit-certificate-programs).

To be awarded the Graduate Certificate in Data Analytics, students must successfully complete 15 credits of course work. All courses must be completed with a grade of C or better and a grade-point average of 3.0 to be awarded the certificate.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Required Courses</td>
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</tr>
<tr>
<td>STAT 500</td>
<td>Applied Statistics</td>
<td>3</td>
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<tr>
<td>or BUSAD 501</td>
<td>Statistical Analysis for Managerial Decision Making</td>
<td></td>
</tr>
<tr>
<td>DAAN 871</td>
<td>Data Visualization</td>
<td>3</td>
</tr>
<tr>
<td>BAN 530</td>
<td>Business Strategies for Data Analytics</td>
<td>3</td>
</tr>
<tr>
<td>INSC 525</td>
<td>Applied Data Mining</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Electives</td>
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<tr>
<td>Select one of the following:</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>DAAN 881</td>
<td>Data-Driven Decision Making</td>
<td></td>
</tr>
<tr>
<td>BAN 540</td>
<td>Marketing Analytics</td>
<td></td>
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<tr>
<td>SWENG 545</td>
<td>Data Mining</td>
<td></td>
</tr>
<tr>
<td>DAAN 822</td>
<td>Data Collection and Cleaning</td>
<td></td>
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<tr>
<td></td>
<td>Total Credits</td>
<td>15</td>
</tr>
</tbody>
</table>

Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact
Certificate Program Head: Robin Qiu
Primary Program Contact: Alyssa Schneider
Email: amh5583@psu.edu
Mailing Address: Penn State Great Valley, 30 East Swedesford Road, Malvern, PA 19355
Telephone: (610) 648-3318
Program Website: Cyber Threat Analytics and Prevention at World Campus (https://www.worldcampus.psu.edu/degrees-and-certificates/penn-state-online-cyber-threat-analytics-prevention-certificate/overview)

Data Analytics Graduate Credit Certificate Program
Person-in-Charge: Colin J. Neill
Program Code: DAANG
Campus(es): Great Valley
deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact
Certificate Program Head: Colin Neill
Primary Program Contact: Alyssa Schneider
Email: amh5583@psu.edu
Mailing Address: 30 East Swedesford Road, Malvern, PA 19355
Telephone: (610) 648-3318
Program Website: Data Analytics Graduate Certificate (http://greatvalley.psu.edu/academics/graduate-certificates/data-analytics)

Dietetic Internship
Postbaccalaureate Credit Certificate Program

Person-in-Charge: Denise Lawson
Program Code: DIETIN
Campus(es): University Park

Penn State's Dietetic Internship Program is a post baccalaureate, general, supervised practice program. The internship program is structured according to the Accreditation Council for Education in Nutrition and Dietetics (ACEND) Accreditation Standards for Nutrition and Dietetic Internship Programs (DI). Upon completion of the program, students are eligible to take the registration examination to obtain the Registered Dietitian Nutritionist (RDN)/Registered Dietitian (RD) certification administered by the Commission on Dietetic Registration.

Effective Date: Summer 2017
Expiration Date: Summer 2022

Admission Requirements
Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

International applicants may be required to satisfy an English proficiency requirement; see GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac-300/admission-requirements-international-students) for more information.

Students who have completed a baccalaureate degree and hold a valid Verification Statement from a Didactic Program in Dietetics (DPD) may submit an application for consideration.

Certificate Requirements
Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/postbaccalaureate-credit-certificate-programs).

Students are required to complete 15 graduate-level credits earning a grade a “B” or better.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>NUTR 595A</td>
<td>Application of Community Nutrition -- Internship</td>
<td>3</td>
</tr>
<tr>
<td>NUTR 595B</td>
<td>Application of Food Service Management -- Internship</td>
<td>3</td>
</tr>
<tr>
<td>NUTR 595C</td>
<td>Dietetic Enrichment Experience - Dietetic Internship</td>
<td>1</td>
</tr>
<tr>
<td>NUTR 595D</td>
<td>Application Clinical Nutrition -- Internship</td>
<td>6</td>
</tr>
<tr>
<td>NUTR 595E</td>
<td>Introduction to Nutrition Research -- Internship</td>
<td>1</td>
</tr>
<tr>
<td>NUTR 595F</td>
<td>Professional Portfolio Internship</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Total Credits</td>
<td>15</td>
</tr>
</tbody>
</table>

Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact
Certificate Program Head: Denise Lawson
Primary Program Contact: x
Email: dmc209@psu.edu
Mailing Address: 110 Chandlee Lab, University Park, PA 16802
Telephone: (814) 865-9150
Program Website: Dietetic Internship (http://nutrition.hhdev.psu.edu/internship)

Distance Education
Postbaccalaureate Credit Certificate Program

Person-in-Charge: William Diehl
Program Code: DISTED
Campus(es): World Campus

The certificate in Distance Education is a postbaccalaureate program designed for educators and trainers who want to expand their knowledge and build competencies in the field of distance education. The goal of the program is to assist the students in learning the latest trends, issues, and applications within the field of distance education while experiencing them firsthand as a student.

Effective Date: Fall Semester 2016
Expiration Date: Fall Semester 2021

Admission Requirements
Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-
students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies). International applicants may be required to satisfy an English proficiency requirement; see GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

Applicants must submit the following materials:

- A one-page resume
- A statement describing professional goals, experiences, and responsibilities (2 page maximum)
- One letter of recommendation
- Official transcripts from all post-secondary institutions attended (http://www.gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission)

Certificate Requirements

Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/postbaccalaureate-credit-certificate-programs).

The certificate program consists of 12 credits of course work in Lifelong Learning and Adult Education (ADTED) of which 6 credits must be at the 500 level.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADTED 460</td>
<td>Introduction to Lifelong Learning and Adult Education</td>
<td>3</td>
</tr>
<tr>
<td>ADTED 470</td>
<td>Introduction to Distance Education</td>
<td>3</td>
</tr>
<tr>
<td>ADTED 531</td>
<td>Course Design and Development in Distance Education</td>
<td>3</td>
</tr>
<tr>
<td>ADTED 532</td>
<td>Research and Evaluation in Distance Education</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td></td>
<td><strong>12</strong></td>
</tr>
</tbody>
</table>

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact

Certificate Program Head: William Diehl

Director of Graduate Studies/Professor-in-Charge: Esther Prins

Primary Program Contact: Whitney Deshong

Email: wad5021@psu.edu

Mailing Address: 303 Keller Building, University Park, PA 16802

Telephone: (814) 865-0473

Program Website: Distance Education (http://www.worldcampus.psu.edu/degrees-and-certificates/distance-education-certificate/overview)

Distributed Energy and Grid Modernization Graduate Credit Certificate

Person-in-Charge: Colin Neill

Program Code: DEGM

Campus(es): Great Valley

This graduate certificate is designed specifically for current and aspiring practitioners who seek advanced skills for advancing the electric power generation, distribution, and energy management sectors. Upon successful completion of the certificate, the student will be able to distinguish stakeholder perspectives across utility scale and microgrid systems, explain the characteristics of distributed energy generation systems with respect to electric grid integration, and appraise existing electric grid systems for opportunities to apply grid modernization strategies.

Effective Semester: Fall 2016

Expiration Semester: Summer 2021

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies). International applicants may be required to satisfy an English proficiency requirement; see GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

The successful applicant is generally expected to have a minimum combined junior/senior grade-point average of 3.0 (B) on a 4.0 scale.

Certificate Requirements

Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/postbaccalaureate-credit-certificate-programs).

To be awarded the Graduate Certificate in Distributed Energy and Grid Modernization, students must successfully complete 12 credits of course work. All courses must be completed with a grade of C or better and a grade-point average of 3.0 to be awarded the certificate.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EE 588</td>
<td>Power System Control and Operation</td>
<td>3</td>
</tr>
<tr>
<td>AE 862</td>
<td>Distributed Energy Planning and Management</td>
<td>3</td>
</tr>
</tbody>
</table>

Electives

Select two of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AE 868</td>
<td>Commercial Solar Electric Systems</td>
<td>3</td>
</tr>
<tr>
<td>AE 878</td>
<td>Solar Project Development and Finance</td>
<td>3</td>
</tr>
<tr>
<td>Course Code</td>
<td>Course Title</td>
<td>Credits</td>
</tr>
<tr>
<td>-------------</td>
<td>--------------------------------------------------</td>
<td>---------</td>
</tr>
<tr>
<td>AERSP 886</td>
<td>Engineering of Wind Project Development</td>
<td></td>
</tr>
<tr>
<td>CSE 543</td>
<td>Computer Security</td>
<td></td>
</tr>
<tr>
<td>INF SY 863</td>
<td>Network Security</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Total Credits</strong></td>
<td><strong>12</strong></td>
</tr>
</tbody>
</table>

**Courses**

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**Contact**

Certificate Program Head: Colin Neill
Primary Program Contact: Alyssa Schneider
Email: amh5583@psu.edu
Mailing Address: 30 East Swedesford Road, Malvern, PA 19355
Telephone: (610) 648-3318
Program Website: Distributed Energy and Grid Modernization (http://greatvalley.psu.edu/academics/graduate-certificates/distributed-energy-and-grid-modernization)

**e-Learning Design Graduate Credit Certificate Program**

<table>
<thead>
<tr>
<th>Person-in-Charge</th>
<th>Program Code</th>
<th>Campus(es)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roy Clariana</td>
<td>ELEARN</td>
<td>World Campus</td>
</tr>
</tbody>
</table>

This 12-credit certificate program will prepare those who want to develop a thorough understanding of design issues and technology used to create and deliver online teaching and learning experiences, with primary delivery of content through the Internet, with use of a variety of advanced technological tools. The target audience works or aspires to work in corporate, agency, and military training departments; entrepreneurial consulting companies; museums, nature centers, and other informal learning settings; community college learning resource centers; and colleges and universities.

**Effective Semester:** Spring 2016
**Expiration Semester:** Spring 2021

**Admission Requirements**

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies). International applicants may be required to satisfy an English proficiency requirement; see GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac-300/admission-requirements-international-students) for more information.

**Certificate Requirements**

Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac-gcac-200/postbaccalaureate-credit-certificate-programs).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>LDT 415A</td>
<td>Systematic Instructional Development</td>
<td>3</td>
</tr>
<tr>
<td>LDT 467</td>
<td>Emerging Web Technologies and Learning</td>
<td>3</td>
</tr>
<tr>
<td>ADTED 531</td>
<td>Course Design and Development in Distance Education</td>
<td>3</td>
</tr>
<tr>
<td>LDT 832</td>
<td>Designing e-learning Within Course Management Systems</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td><strong>Total Credits</strong></td>
<td><strong>12</strong></td>
</tr>
</tbody>
</table>

**Courses**

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**Contact**

Certificate Program Head: Roy Clariana
Director of Graduate Studies/Professor-in-Charge: Susan Land
Primary Program Contact: Whitney Deshong
Email: wad5021@psu.edu
Mailing Address: 303 Keller Building, University Park, PA 16802
Telephone: (814) 865-0473
Program Website: e-Learning Design (http://www.worldcampus.psu.edu/degrees-and-certificates/penn-state-online-e-learning-design-certificate/overview)

**Educating Individuals with Autism Postbaccalaureate Credit Certificate Program**

<table>
<thead>
<tr>
<th>Person-in-Charge</th>
<th>Program Code</th>
<th>Campus(es)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pamela Wolfe</td>
<td>AUTISM</td>
<td>World Campus</td>
</tr>
</tbody>
</table>

The focus of this post-baccalaureate certificate program is to provide comprehensive, evidence-based information on creating effective educational programming for individuals with autism spectrum disorders. After completing the 12-credit program, students will be able to:
Educational Technology Integration Postbaccalaureate Credit Certificate Program

- assess individuals with autism spectrum disorders to effectively provide instruction;
- develop strategies to enhance social, behavioral, communication, and academic gains;
- strengthen professional skills to work with families; and
- develop professional competencies to work with other educators and personnel in related disciplines.

Effective Semester: Fall Semester 2017
Expiration Semester: Summer Session 2022

Admission Requirements
Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies). International applicants may be required to satisfy an English proficiency requirement; see GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

Certificate Requirements
Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/postbaccalaureate-credit-certificate-programs).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPLED 461</td>
<td>Introduction to Autism Spectrum Disorders: Issues and Concerns</td>
<td>3</td>
</tr>
<tr>
<td>SPLED 462</td>
<td>Autism and Applied Behavior Analysis</td>
<td>3</td>
</tr>
<tr>
<td>SPLED 463</td>
<td>Communication and Social Competence</td>
<td>3</td>
</tr>
<tr>
<td>SPLED 464</td>
<td>Assessment and Curriculum</td>
<td>3</td>
</tr>
<tr>
<td>Total Credits</td>
<td></td>
<td>12</td>
</tr>
</tbody>
</table>

Students choose LDT 415A or LDT 415B to match the professional context in which they want to apply the skills learned in the program. The remaining twelve credits of the program can be chosen to best meet the individual interests, needs, and goals of the learner. In these courses, the intended professional context is addressed by the choice of projects.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>LDT 415A</td>
<td>Systematic Instructional Development</td>
<td>3</td>
</tr>
<tr>
<td>LDT 415B</td>
<td>Systematic Instructional Development for Teachers</td>
<td>3</td>
</tr>
<tr>
<td>Select four of the following:</td>
<td></td>
<td>12</td>
</tr>
<tr>
<td>LDT 440</td>
<td>Educational Technology Integration</td>
<td></td>
</tr>
<tr>
<td>LDT 467</td>
<td>Emerging Web Technologies and Learning</td>
<td></td>
</tr>
<tr>
<td>LDT 566</td>
<td>Computers as Learning Tools</td>
<td></td>
</tr>
<tr>
<td>LDT 527</td>
<td>Designing Constructivist Learning Environments</td>
<td></td>
</tr>
<tr>
<td>LDT 505</td>
<td>Integrating Mobile Technologies into Learning Environments</td>
<td></td>
</tr>
<tr>
<td>LDT 550</td>
<td>Learning Design Studio</td>
<td></td>
</tr>
<tr>
<td>Total Credits</td>
<td></td>
<td>15</td>
</tr>
</tbody>
</table>

Program Website: Educating Individuals with Autism (http://www.worldcampus.psu.edu/degrees-and-certificates/autism-certificate/overview)

Educational Technology Integration Postbaccalaureate Credit Certificate Program

Person-in-Charge: Roy Clariana
Program Code: EDTECH
Campus(es): World Campus

This 15-credit certificate program prepares educators and instructional design professionals who want to advance their skills in the design, development, and implementation of technology-based learning experiences.

Effective Semester: Summer Semester 2015
Expiration Semester: Spring Semester 2020

Admission Requirements
Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies). International applicants may be required to satisfy an English proficiency requirement; see GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

Certificate Requirements
Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/postbaccalaureate-credit-certificate-programs).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>LDT 415A</td>
<td>Systematic Instructional Development</td>
<td></td>
</tr>
<tr>
<td>or LDT 415B</td>
<td>Systematic Instructional Development for Teachers</td>
<td></td>
</tr>
<tr>
<td>Select four of the following:</td>
<td></td>
<td>12</td>
</tr>
<tr>
<td>LDT 440</td>
<td>Educational Technology Integration</td>
<td></td>
</tr>
<tr>
<td>LDT 467</td>
<td>Emerging Web Technologies and Learning</td>
<td></td>
</tr>
<tr>
<td>LDT 566</td>
<td>Computers as Learning Tools</td>
<td></td>
</tr>
<tr>
<td>LDT 527</td>
<td>Designing Constructivist Learning Environments</td>
<td></td>
</tr>
<tr>
<td>LDT 505</td>
<td>Integrating Mobile Technologies into Learning Environments</td>
<td></td>
</tr>
<tr>
<td>LDT 550</td>
<td>Learning Design Studio</td>
<td></td>
</tr>
<tr>
<td>Total Credits</td>
<td></td>
<td>15</td>
</tr>
</tbody>
</table>

Contact
Certificate Program Head: Pamela Wolfe
Primary Program Contact: Erin Garthe
Email: emb189@psu.edu
Mailing Address: 304A CEDAR Building, University Park, PA 16802
Telephone: (814) 865-7307
Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact
Certificate Program Head: Roy Clariana
Director of Graduate Studies/Professor-in-Charge: Susan Land
Primary Program Contact: Whitney Deshong
Email: wad5021@psu.edu
Mailing Address: Learning and Performance Systems Department, 303 Keller Building, University Park, PA 16802-1303
Telephone: (814) 865-0473
Program Website: Educational Technology Integration (http://www.worldcampus.psu.edu/degrees-and-certificates/educational-technology-integration-certificate/overview)

Engineering Leadership and Innovation Management Graduate Credit Certificate Program

<table>
<thead>
<tr>
<th>Person-in-Charge</th>
<th>Sven G Bilen</th>
</tr>
</thead>
<tbody>
<tr>
<td>Program Code</td>
<td>ELIM</td>
</tr>
<tr>
<td>Campus(es)</td>
<td>University Park World Campus</td>
</tr>
</tbody>
</table>

The primary goal of the Engineering Leadership and Innovation Management certificate program is to provide professionals with the knowledge and skills in the key aspects of engineering business: leading teams, identifying new business opportunities, working across international and cultural boundaries, effectively managing projects, and promoting internal innovation. The certificate program highlights the changing nature of the field of Engineering, impacted by globalization and the importance of intercultural competencies and innovation management in the workforce. Upon completion of the certificate, students will have developed attributes required by today's successful engineering executives. Specifically, these include improved ability to lead technical teams and expanded professional skills in leadership, intercultural competence, and innovation management within the engineering profession. The twelve-credit certificate program is built from the College of Engineering approved Engineering Leadership and Innovation Management (ELIM) graduate degree program.

Effective Semester: Fall 2017
Ending Semester: Spring 2022

Admission Requirements
Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

International applicants may be required to satisfy an English proficiency requirement; see GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac-gcac-300/admission-requirements-international-students) for more information.

Applicants must hold either (1) a baccalaureate degree in engineering, science, or relevant discipline from a regionally accredited U.S. institution or (2) a tertiary (postsecondary) degree that is deemed comparable to a four-year bachelor's degree from a regionally accredited U.S. institution. This degree must be from an officially recognized degree-granting institution in the country in which it operates.

Applicants must have a 3.0 minimum undergraduate GPA (or equivalent). Exceptions to the minimum 3.0 grade-point average may be made for students with special backgrounds, abilities, and interests. Applicants to the Engineering Leadership and Innovation Management (ELIM) certificate must submit the following materials:

- Penn State Graduate School application form (http://gradschool.psu.edu/prospective-students/how-to-apply) and nonrefundable application fee;
- World Campus program application (if applicable);
- A Leadership and Innovation Portfolio that includes a statement of career and educational goals including documentation of a minimum of one year of related full-time work. Students wishing to enter the program directly from an undergraduate degree can fulfill the 1-year requirement for work experience through summer internships, summer employment, or co-op experiences plus additional experience within professional societies. Justification for this experience should be included in the Leadership and Innovation Portfolio. The statement should be an essay (2-3 pages in length) that demonstrates the applicant's written communication skills.
- Submission of a resume
- Submission of official transcripts from all post-secondary institutions attended (http://www.gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission).

Admissions decisions for the program are based on the quality of the applicant's credentials. The decisions are based on a review of the complete application portfolio. During the admission process, students who appear to be better suited for another graduate level program will be encouraged to apply to the appropriate program. Graduate Record Examination (GRE) scores are not required.

Certificate Requirements
Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac-gcac-200/postbaccalaureate-credit-certificate-programs).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGR 501</td>
<td>Engineering Leadership for Corporate Innovation</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 802</td>
<td>Engineering Across Cultures and Nations</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 804</td>
<td>Engineering Product Innovation</td>
<td>3</td>
</tr>
<tr>
<td>ENGR 405</td>
<td>Project Management for Professionals</td>
<td>3</td>
</tr>
<tr>
<td>Total Credits</td>
<td></td>
<td>12</td>
</tr>
</tbody>
</table>


Related courses may be substituted for ENGR 405 per an approved list of courses by the ELD office. Other elective courses outside this list may be petitioned for substitution to meet the ENGR 405 requirement.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact

Certificate Program Head: Sven Bilen
Director of Graduate Studies/Professor-in-Charge: Teresa Lang
Primary Program Contact: Mandy Thompson (met15@psu.edu)
Program Email: ENGRleadership@engr.psu.edu
Mailing Address: 115 Henning Building, University Park, PA 16802
Telephone: (814) 865-2771
Program Website: Engineering Leadership and Innovation Management Graduate Certificate at World Campus (http://www.worldcampus.psu.edu/degrees-and-certificates/penn-state-online-engineering-leadership-innovation-management-certificate/overview)

English as a Second Language (ESL) Program Specialist and Leadership Postbaccalaureate Credit Certificate Program

Person-in-Charge: Karin Sprow Forté
Program Code: CLES
Campus(es): Abington Harrisburg

The primary goal of the Pennsylvania Department of Education (PDE)-approved ESL Specialist and Leadership Certificate Program, a U.S. Department of Education, Office of English Language Acquisition (OELA), National Professional Development grant-funded program, is to prepare mainstream PreK-12 teachers to work effectively with English learners (ELs), their families, and communities. The curriculum includes:

1. Legal, historical, and socio-cultural background and history of ELs in the U.S.;
2. English language structure and linguistics;
3. Second language acquisition;
4. ESL curricular, instructional, and assessment strategies and best practices; and
5. ESL instructional leadership, action research, and advocacy with EL populations.

The curriculum focuses on helping PreK-12 teachers do the following:

1. become ESL instructional leaders by learning, understanding, and incorporating curricular, instructional, and assessment strategies specifically tailored for ELs;
2. learn to develop and implement ESL action research projects within their own classrooms; and
3. develop cultural competence, engage in active outreach, and become advocates for ELs.

Effective Date: Summer 2017
Expiration Date: Spring 2022

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies). International applicants may be required to satisfy an English proficiency requirement; see GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac-300/admission-requirements-international-students) for more information.

• A baccalaureate degree in education or education-related field of study from a regionally accredited U.S. institution with a minimum 3.0 GPA;
• official transcripts from all post-secondary institutions attended (http://www.gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission);
• Level I or II teaching certification in Pennsylvania; and
• a written statement describing the applicant’s teaching situation, demographic information about the school district and English Language Learners (ELLs), and why the applicant is applying to obtain the ESL specialist certificate.

Certificate Requirements

Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac-200/postbaccalaureate-credit-certificate-programs).

Students are required to take all five courses (15 credits) in sequence.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDUC 466</td>
<td>Foundations of Teaching English as a Second Language</td>
<td>3</td>
</tr>
<tr>
<td>EDUC 467</td>
<td>English Language Structure for English as a Second Language Teachers</td>
<td>3</td>
</tr>
<tr>
<td>EDUC 468</td>
<td>Language Acquisition for English as a Second Language Teachers</td>
<td>3</td>
</tr>
<tr>
<td>EDUC 469</td>
<td>Teaching Methods and Assessment of English as a Second Language</td>
<td>3</td>
</tr>
<tr>
<td>EDUC 475</td>
<td>ESL Leadership, Research and Advocacy</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits: 15

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may...
be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact
Abington Campus
Primary Program Contact: Robin Burgess
Email: rmb33@psu.edu
Telephone: (215) 881-7401
Program Website: CLESL at Abington (http://www.abington.psu.edu/continuing-education/esl-specialist-certificate)

Harrisburg Campus
Primary Program Contact: Karin Forté
Email: kms588@psu.edu
Telephone: (717) 948-6295
Program Website: CLESL at Harrisburg (https://harrisburg.psu.edu/behavioral-sciences-and-education/teacher-education/certificate-program-esl-specialist-and-leadership)

English as a Second Language Program Specialist Postbaccalaureate Credit Certificate Program

Person-in-Charge: Mari Haneda
Program Code: ESL
Campus(es): Berks, Lehigh Valley, University Park, York

The postbaccalaureate ESL Program Specialist Certificate is designed to give teachers the essential knowledge and skills to effectively work with English learners, their families, and communities in public school (K-12) contexts. Students are required to take five three-credit courses which correspond to the ESL Program Specialist K-12 Program Guidelines of the Pennsylvania Department of Education. It involves 15 credit hours of course work, including 60 hours of integrated field experience. The program will lead to demonstration of knowledge of the fundamental concepts and teaching practices of English as a Second Language instruction and services to the growing numbers of English learners in public schools.

Effective Semester: Summer 2018
Expiration Semester: Spring 2023

Admission Requirements
Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies). International applicants may be required to satisfy an English proficiency requirement; see GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

Applicants to the English as a Second Language certificate program must have a minimum TOEFL score of 100 with a 23 on the speaking section for the Internet-based test (iBT), or a 600 on the paper-based test.

Certificate Requirements
Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/postbaccalaureate-credit-certificate-programs).

The program is a joint offering of the Department of Curriculum and Instruction in the College of Education and the Department of Applied Linguistics in the College of the Liberal Arts at The Pennsylvania State University.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>WLED 400</td>
<td>Foundations of Language in Second Language Teaching</td>
<td>3</td>
</tr>
<tr>
<td>WLED 444</td>
<td>Language, Culture and the Classroom: Issues for Practitioners</td>
<td>3</td>
</tr>
<tr>
<td>APLNG 484</td>
<td>Discourse-Functional Grammar</td>
<td>3</td>
</tr>
<tr>
<td>APLNG 493</td>
<td>Teaching English as a Second Language</td>
<td>3</td>
</tr>
<tr>
<td>WLED 483</td>
<td>Evaluating Schools Performances and Programs with English Language Learners (ELLs)</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits: 15

Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact
Elizabeth Smolcic
257 Chambers Building
Telephone: 814-867-3199
E-Mail: eas260@psu.edu

Enterprise Architecture Graduate Credit Certificate Program

Person-in-Charge: Mary Beth Rosson
Program Code: ENTARC
Campus(es): World Campus

The certificate in Enterprise Architecture (EA) is designed to provide an introduction to EA and increase the knowledge of professionals seeking advanced leadership roles within an organization. EA strives to align the
enterprise information systems and technology with business strategy and goals to enable the most effective use of technology to both support and grow an organization.

The certificate program is an attractive option not only for those who desire advanced education and do not want a full Master’s Degree program, but also for students who might want to take a certificate to determine if they are interested in a complete professional graduate degree program in Enterprise Architecture and Business Transformation. Up to 15 credits of Penn State course work taken in non-degree status may count towards a graduate degree in EA, but completion of the course work neither implies nor guarantees admission to a graduate degree program at Penn State. Courses taken in the certificate program may be applied toward a graduate degree in Enterprise Architecture, subject to restrictions outlined in GCAC-309 Transfer Credit (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/transfer-credit). Certificate students who wish to have certificate courses applied towards a graduate degree in Enterprise Architecture and Business Transformation must apply and be admitted to that degree program. Admission to the Enterprise Architecture and Business Transformation graduate degree program is a separate step and is not guaranteed.

Effective Date: Fall Semester 2018
Expiration Date: Fall Semester 2023

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies). International applicants may be required to satisfy an English proficiency requirement; see GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

A bachelor’s degree in a related area (e.g., information sciences, business architecture, or computer science), while not required, is helpful in the successful completion of the certificate. It is expected that students will have a foundation in information technology or enterprise architecture with a minimum of two (2) years of relevant professional work experience. Applicants with less than two years of relevant professional work experience may be considered but may be required to take pre-requisite courses. For admission to the certificate, a 2.75 GPA, either overall or from the last 60 undergraduate credits, is needed. GRE scores are not required for non-degree graduate students.

Certificate Requirements

Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/postbaccalaureate-credit-certificate-programs).

The certificate is highly flexible and is designed to meet the different needs of students and organizations. The courses are delivered online through the World Campus. With online delivery, the certificate can easily fit into the work schedule of professionals from around the globe.

All candidates are required to complete nine (9) credits.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EA 871</td>
<td>Enterprise Architecture Foundations I</td>
<td>3</td>
</tr>
<tr>
<td>EA 873</td>
<td>Enterprise Modeling</td>
<td>3</td>
</tr>
<tr>
<td>EA 874</td>
<td>Enterprise Information Technology Architecture</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits 9

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact

Certificate Program Head: Mary Beth Rosson
Director of Graduate Studies/Professor-in-Charge: David Fusco
Primary Program Contact: Sherry Hartman
Email: slr8@psu.edu
Mailing Address: Education Strategy and Planning Office, College of IST/ E143 Westgate Building, University Park, PA 16802
Telephone: (814) 863-9461

Program Website: Enterprise Architecture Graduate Certificate at World Campus (http://www.worldcampus.psu.edu/degrees-and-certificates/enterprise-architecture-certificate/overview)

Enterprise Information and Security Technology Architecture Graduate Credit Certificate Program

Person-in-Charge: Mary Beth Rosson
Program Code: ENTSEC
Campus(es): World Campus

The goal of this advanced nine-credit graduate certificate in Enterprise Information and Security Technology Architecture (ENTSEC) is to provide information technology and business professionals with advanced knowledge of the enterprise information technology stack, enterprise architecture gap analysis, analytical risk management, migration planning, governance, and measurement, as well as security and network management strategy including: intrusion detection, encryption, authentication, and network management.

The certificate program is an attractive option for professionals who may also consider completing the M.P.S. in Enterprise Architecture. Up to 15 credits of Penn State course work taken in non-degree status may count towards a graduate degree in EA, but completion of the course work neither implies nor guarantees admission to a graduate degree program at Penn State. Courses taken in the certificate program may be applied toward a graduate degree in Enterprise Architecture, subject to restrictions outlined in GCAC-309 Transfer Credit (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/transfer-credit).
transfer-credit). Certificate students who wish to have certificate courses applied towards a graduate degree in Enterprise Architecture must apply and be admitted to that degree program. Admission to the Enterprise Architecture graduate degree program is a separate step and is not guaranteed.

**Effective Semester:** Fall Semester 2018  
**Expiration Semester:** Fall Semester 2023

### Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

International applicants may be required to satisfy an English proficiency requirement; see GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac-gcac-300/admission-requirements-international-students) for more information.

A bachelor's degree in a related area (e.g., information sciences, engineering, or computer science), while not necessary for admission, is helpful in the successful completion of the certificate. It is expected that students will have advanced knowledge in information technology and enterprise architecture with a minimum of five years of relevant professional work experience. Applicants with less than five years of relevant professional work experience may be considered but will be required to take pre-requisite courses. For admission to the certificate, a 2.75 GPA, either overall or from the last 60 undergraduate credits, is needed. GRE scores are not required for non-degree graduate students.

### Certificate Requirements

Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac-gcac-200/postbaccalaureate-credit-certificate-programs).

The certificate is highly flexible and is designed to meet the different needs of students and organizations. The courses are delivered online through the World Campus. With online delivery, the certificate can easily fit into the work schedule of professionals from around the globe.

To be awarded the certificate, students must successfully complete 9 credits of graduate course work with a grade point average of 3.0 or higher.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EA 874</td>
<td>Enterprise Information Technology Architecture</td>
<td>3</td>
</tr>
<tr>
<td>EA 876</td>
<td>Architecting Enterprise Security and Risk Analysis</td>
<td>3</td>
</tr>
<tr>
<td>IST 554</td>
<td>Network Management and Security</td>
<td>3</td>
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<tr>
<td><strong>Total Credits</strong></td>
<td></td>
<td><strong>9</strong></td>
</tr>
</tbody>
</table>

**Courses**

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

### Contact

**Certificate Program Head:** Mary Beth Rosson  
**Director of Graduate Studies/Professor-in-Charge:** David Fusco  
**Primary Program Contact:** Sherry Hartman  
**Email:** slr8@psu.edu  
**Mailing Address:** Education Strategy and Planning Office, College of IST/  
E143 Westgate Building, University Park, PA 16802  
**Telephone:** (814) 863-9461

**Program Website:** Enterprise Information and Security Technology Architecture at World Campus (http://www.worldcampus.psu.edu/degrees-and-certificates/penn-state-online-enterprise-information-and-security-technology-architecture-certificate/overview)

### Family Literacy Postbaccalaureate Credit Certificate Program

**Person-in-Charge:** Esther Prins  
**Program Code:** FMLTRC  
**Campus(es):** World Campus  

The certificate in Family Literacy, based on a multidisciplinary approach to literacy instruction involving both adult educators and early childhood education and family literacy specialists, is intended for location-bound students who work in a variety of literacy-related settings, both formal and informal. These settings include public schools and preschools (teachers, teaching assistants, reading specialists), organizations such as Head Start and grant-funded family literacy programs. The goal of the certificate is to build the capacity of the field to provide high-quality, research-based instruction and program development in family literacy. The certificate consists of a 12-credit program delivered online through the World Campus. The program objectives include strengthening program effectiveness through developing an understanding of staff roles and responsibilities as part of a collaborative family literacy team and supporting a learner-centered approach to delivering program services.

**Effective Date:** Fall Semester 2010  
**Expiration Date:** Spring Semester 2020

### Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies). International applicants may be required to satisfy an English proficiency requirement; see GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac-gcac-300/admission-requirements-international-students) for more information.
Certificate Requirements

Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/postbaccalaureate-credit-certificate-programs).

<table>
<thead>
<tr>
<th>Code</th>
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<tbody>
<tr>
<td>ADTED 456</td>
<td>Introduction to Family Literacy</td>
<td>3</td>
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<tr>
<td>ADTED 457</td>
<td>Adult Literacy</td>
<td>3</td>
</tr>
<tr>
<td>ADTED 458</td>
<td>Early Literacy Development</td>
<td>3</td>
</tr>
<tr>
<td>ADTED 459</td>
<td>Interactive Literacy and Parental Involvement: Supporting Academic Success</td>
<td>3</td>
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</table>

Total Credits: 12

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact

Certificate Program Head: Esther Prins

Primary Program Contact: Elisabeth McLean

Email: elg6@psu.edu

Mailing Address: 125 CEDAR Building, University Park, PA 16802

Telephone: (814) 863-3777

Program Website: Family Literacy at World Campus (http://www.worldcampus.psu.edu/degrees-and-certificates/family-literacy-certificate/overview)

Family Nurse Practitioner Graduate Credit Certificate Program

Person-in-Charge: Judith Hupcey

Program Code: FNP

Campus(es): University Park

The purpose of the Family Nurse Practitioner certificate is to prepare individuals with a Master's degree or higher in Nursing seeking additional certification as a Family Nurse Practitioner. The curriculum includes the didactic and clinical courses required for application of the NP role and required for certification.

Effective Semester: Summer 2016

Expiration Semester: Summer 2020

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

International applicants may be required to satisfy an English proficiency requirement; see GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

Applicants are required to have a Master's degree in nursing from an ACEN or CCNE accredited institution. In addition, undergraduate chemistry and statistics are required. Students need to submit two recommendations and official transcripts from all post-secondary institutions attended (http://www.gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission).

Certificate Requirements

Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/postbaccalaureate-credit-certificate-programs).

<table>
<thead>
<tr>
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<th>Title</th>
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<tbody>
<tr>
<td>NURS 870</td>
<td>Nurse Practitioner Role with Healthy Individuals and Families</td>
<td>3</td>
</tr>
<tr>
<td>NURS 871</td>
<td>Nurse Practitioner Role with Individuals and Families with Complex and/or Chronic Health Problems</td>
<td>3</td>
</tr>
<tr>
<td>NURS 872</td>
<td>Family Nurse Practitioner Practicum I</td>
<td>3</td>
</tr>
<tr>
<td>NURS 873</td>
<td>Family Nurse Practitioner Practicum II</td>
<td>4</td>
</tr>
<tr>
<td>NURS 874</td>
<td>Family Nurse Practitioner Integrative Practicum</td>
<td>6</td>
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<tr>
<td>NURS 875</td>
<td>Nurse Practitioner Role with Children and Families</td>
<td>2</td>
</tr>
<tr>
<td>NURS 876</td>
<td>Family Nurse Practitioner Practicum with Pediatric Populations</td>
<td>2</td>
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</table>

Additional Course Work May Be Required

Advanced Practice Core

<table>
<thead>
<tr>
<th>Code</th>
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</tr>
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<tbody>
<tr>
<td>NURS 802</td>
<td>Advanced Health Assessment of Adult Populations</td>
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<tr>
<td>NURS 803</td>
<td>Pathophysiology</td>
<td></td>
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<tr>
<td>NURS 804</td>
<td>Pharmacologic Therapy</td>
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Master's Core

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<tr>
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<tbody>
<tr>
<td>NURS 501</td>
<td>Issues in Nursing and Health Care</td>
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</tr>
<tr>
<td>NURS 510</td>
<td>Theoretical and Scientific Foundations of Advanced Nursing Practice</td>
<td></td>
</tr>
<tr>
<td>NURS 512</td>
<td></td>
<td>23</td>
</tr>
</tbody>
</table>

1 Any or all of these courses may be waived based on the certificate program chair's evaluation of transcripts and prior courses completed.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up
deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**Contact**

Certificate Program Head: Judith Hupcey

Director of Graduate Studies/Professor-in-Charge: Madeline Mattern

Primary Program Contact: Xiaohong Sheng

Email: xus1@psu.edu

Mailing Address: 203 Nursing Sciences Building, Pennsylvania State University, University Park, PA 16802

Telephone: (814) 863-2211

Program Website: Family Nurse Practitioner (http://www.nursing.psu.edu/graduate/certificates)

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**Financial Risk Management Graduate Credit Certificate Program**

Person-in-Charge: James Nemes

Program Code: FINRIS

Campus(es): Great Valley

The Finance faculty in the Master of Finance program at the School of Graduate Professional Studies at Penn State Great Valley offers a four-course (12-credit) graduate certificate program in financial risk management.

Financial risk management involves identifying and quantifying risk exposure and controlling the risk exposure. This certificate program is designed to help prepare individuals to manage financial risk, including credit risk, market risk, interest rate risk, currency risk, and inflation risks using financial derivative instruments such as: forwards, futures, swaps, and options. Course work emphasizes the development of competencies in the valuation of financial derivatives, fixed income securities, and quantitative methods in finance. Content is both theoretical and applied, with an emphasis on practical application of knowledge gained.

The program is ideal for individuals who wish to develop and expand their analytical, technical, evaluative, and communication skills and expertise in this particular area of finance. Individuals working or aspiring to work as financial risk managers and in related positions focusing on the area of derivatives and managing risk in organizations, including insurance companies, commercial and retail banks, asset management firms, and regulatory agencies, will find the program particularly valuable.

This certificate program is an attractive option for individuals who desire advanced education but who do not wish to pursue a master’s degree at this time. It is valuable for recent college graduates and others who wish to enroll in courses to determine if they are interested in a complete master’s degree program, as well as for professionals who already hold a master’s degree and wish to update or expand their knowledge and skills. With program approval, the courses in this graduate certificate program may be applied to the Master of Finance degree program or the Master of Business Administration program at Great Valley, subject to restrictions outlined in GCAC-309 Transfer Credit (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-309/transfer-credit). Certificate students who wish to have certificate courses applied towards a graduate degree must apply and be admitted to that degree program. Admission to the M.Fin. or M.B.A. graduate degree program is a separate step and is not guaranteed.

**Effective Date:** Fall 2011

**Expiration Date:** Summer 2020

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**Admission Requirements**

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies). International applicants may be required to satisfy an English proficiency requirement; see GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

Applicants are expected to have achieved a 3.0 (B) or higher undergraduate grade point average and should have satisfactorily completed some course work in Business Statistics, Financial Management/Corporate Finance, and Microeconomics. Applicants holding a master’s degree should have attained at least a cumulative grade point average of 3.0 in previous graduate work. Professional experience will be taken into consideration for admission.

Supporting credentials include official transcripts from all post-secondary institutions attended (http://www.gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission), a current résumé, and a statement of intent or career objective.

Admission decisions are made by a faculty committee and are based on the quality of the applicant’s credentials in relation to those of other applicants. Evaluation criteria include professional and academic accomplishments. Upon approval, certificate program students will enroll in course work on a nondegree basis. Note that admission as a nondegree graduate student neither guarantees nor implies subsequent admission to a degree program. Nondegree students are not eligible to receive fellowships or graduate assistantships.

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**Certificate Requirements**

Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/postbaccalaureate-credit-certificate-programs).

The graduate certificate in financial risk management requires a total of four courses (12 graduate credits). Students completing each of the four courses with a grade of B or better will be eligible to receive a graduate certificate.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>FIN 531</td>
<td>Financial Management</td>
<td>3</td>
</tr>
<tr>
<td>FIN 813</td>
<td>Speculative Markets</td>
<td>3</td>
</tr>
<tr>
<td>BUSAD 525</td>
<td>Quantitative Methods in Finance</td>
<td>3</td>
</tr>
<tr>
<td>BUSAD 827</td>
<td>Fixed Income Securities</td>
<td>3</td>
</tr>
</tbody>
</table>
Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Certificate Program Head: James Nemes
Director of Graduate Studies/Professor-in-Charge: Qiang Qiang
Primary Program Contact: Leanne Wallace
Email: lw31@psu.edu
Mailing Address: 30 East Swedesford Road, Malvern, PA 19355
Telephone: (610) 648-3336
Program Website: Financial Risk Management (http://greatvalley.psu.edu/academics/graduate-certificates/finance)

Folklore and Ethnography Graduate Credit Certificate Program

Person-in-Charge: John Haddad
Program Code: CLFKET
Campus(es): Harrisburg

This 15-credit graduate certificate program offered at Penn State Harrisburg provides students with skills and practices used in projects and institutions of folklore and ethnography, which include field/folk schools and other educational settings, festivals and arts councils, historical and heritage societies, community and cultural organizations and centers, archives and record management programs, governmental agencies, cultural conservation/sustainability groups, and media production companies.

Effective Semester: Summer 2014
Expiration Semester: Spring 2019

Admission Requirements
Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies). International applicants may be required to satisfy an English proficiency requirement; see GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

Applicants are expected to have 2.75 GPA or above in the last two years of undergraduate work in folklore, anthropology, sociology, American Studies, ethnic studies, history, communications, or other fields related to folklore and ethnography.

A student in the certificate program may also become a student in the M.A. and Ph.D. in American Studies, M.A. in Communications, or M.A. in Humanities, if the student meets criteria for admission to the Graduate School and to the graduate program; however, successful completion of the certificate neither implies nor guarantees admission to a graduate program at Penn State. Courses taken in the certificate program may be applied toward a graduate degree, subject to restrictions outlined in GCAC-309 Transfer Credit (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/transfer-credit). Certificate students who wish to have certificate courses applied towards a graduate degree must apply and be admitted to that degree program.

Certificate Requirements
Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/postbaccalaureate-credit-certificate-programs).

The Folklore and Ethnography certificate is awarded for successful completion of 9 credits of prescribed courses plus 6 credits of electives from an approved list of courses. Students must earn a grade of B or above in each course that counts toward the certificate program. Substitution of topical courses and seminars with variable content related to folklore and ethnography for elective credits is possible with approval in advance from the certificate coordinator.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMST 530</td>
<td>Topics in American Folklore</td>
<td>3</td>
</tr>
<tr>
<td>AMST 531</td>
<td>Material Culture and Folklife</td>
<td>3</td>
</tr>
<tr>
<td>AMST 540</td>
<td>Ethnography and Society</td>
<td>3</td>
</tr>
</tbody>
</table>

In addition to the 9 credits of prescribed course work, students must select 6 credits from the following list of elective courses:

AMST/RLST 422 (3 per semester, maximum of 6)
AMST 439 American Regional Cultures
ANTH 448 Ethnography of the United States
AMST 480 Museum Studies
AMST 481 Historic Preservation
AMST 482 Public Heritage Practices
AMST 483
AMST/ENGL 493 The Folktales in American Literature
AMST 550 Seminar in Public Heritage
AMST 551 Seminar in Local and Regional Studies
AMST 592
AMST 595 Internship

Total Credits: 15

Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate
student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact
Certificate Program Head: John Haddad
Primary Program Contact: Hannah Murray (hbm5103@psu.edu)
Program Email: amstd@psu.edu
Mailing Address: Penn State Harrisburg, 777 W Harrisburg Pike 356W Olmsted, Middletown, PA 17057
Telephone: (717) 948-6201
Program Website: Folklore and Ethnography (https://harrisburg.psu.edu/humanities/american-studies/graduate-certificate-folklore-and-ethnography)

Fundraising Leadership Graduate Credit Certificate Program
Person-in-Charge: Raymond E. Lombra
Program Code: PHILED
Campus(es): World Campus

Nonprofit organizations need well-educated fundraising leaders in the face of decreasing government support and increasing targets for private support. The Postbaccalaureate Credit Certificate in Fundraising Leadership is designed to instill graduates of the program with an understanding of fundraising principles and leadership. The certificate encourages development of critical thinking and problem solving required of leaders in nonprofits. The goal of the certificate is to develop the next generation of fundraising leaders, preparing them to serve as leaders from any position and also as directors and vice presidents of development. The program will benefit: recent college graduates entering the profession; fundraisers who seek to move into higher-level positions; for-profit professionals in marketing, advertising, sales, communications who wish to move into nonprofits and fundraising; nonprofit leaders directly responsible for fundraising or are supervising fundraisers.

Effective Semester: Summer 2017
Expiration Semester: Summer 2022

Admission Requirements
Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies). International applicants may be required to satisfy an English proficiency requirement; see GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

Due to the multidisciplinary nature of philanthropy, no specific courses or majors are required for admission to the certificate program.

Certificate Requirements
Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/postbaccalaureate-credit-certificate-programs).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>LA 402</td>
<td>Fundraising Leadership: Building a Strong Base</td>
<td>3</td>
</tr>
<tr>
<td>LA 802</td>
<td>Fundraising Leadership II: Achieving Success</td>
<td>3</td>
</tr>
<tr>
<td>LA 895</td>
<td>Internship</td>
<td>1-3</td>
</tr>
</tbody>
</table>

Electives

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMM 428A</td>
<td>Principles of Strategic Communications</td>
<td>3</td>
</tr>
<tr>
<td>or HIED 552</td>
<td>Administration and Organization in Higher Education</td>
<td></td>
</tr>
</tbody>
</table>

Total Credits: 10-12

Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact
Certificate Program Head: Raymond Lombra
Primary Program Contact: x
Email: rl3@psu.edu
Mailing Address: 136 Sparks Bldg, University Park, PA 16802
Telephone: (814) 865-9555
Program Website: Fundraising Leadership at World Campus (http://www.worldcampus.psu.edu/degrees-and-certificates/penn-state-online-philanthropic-leadership-certificate/overview)

Geodesign Graduate Credit Certificate Program
Person-in-Charge: Eliza Pennypacker
Program Code: GEOZ
Campus(es): World Campus

The purpose of the graduate certificate in Geodesign is to provide students with a foundation in geospatially-oriented design through investigating interdisciplinary methods and the collaborative nature of the Geodesign process. This program is for current or aspiring practitioners, from a variety of professional backgrounds, employed in government agencies, businesses, and non-profit organizations, who see limitations in how regional and urban planning and design challenges are currently addressed. The program is designed for professional practitioners who wish to advance their careers, and for those seeking to make career changes, while remaining in their current location or maintaining full-time professional responsibilities.
Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies). International applicants may be required to satisfy an English proficiency requirement; see GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

Certificate Requirements

Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/postbaccalaureate-credit-certificate-programs).

The certificate consists of a five-course, 14-credit curriculum that can be completed in one year and is delivered online through the World Campus. Students must earn a “C” or better in each course that is intended to count toward the certificate.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEODZ 511</td>
<td>Geodesign History, Theory, Principles</td>
<td>3</td>
</tr>
<tr>
<td>GEODZ 822</td>
<td>GeoDesign Models I: Evaluation and Decision</td>
<td>3</td>
</tr>
<tr>
<td>GEODZ 824</td>
<td>GeoDesign Models II: Process and Impact</td>
<td>3</td>
</tr>
<tr>
<td>or GEODZ 826</td>
<td>GeoDesign Models III: Representation and Change</td>
<td></td>
</tr>
</tbody>
</table>

In addition to the 9 required credits specified above, students must select at least 5 credits of GEOG courses at the 400 level or higher; courses must be approved in advance by the student’s adviser. A list of acceptable electives is maintained by the program office.

<table>
<thead>
<tr>
<th>Electives</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>

Total Credits: 14

1 Students will take one of these two “Models” courses; placement is dependent on previous experience.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact

Certificate Program Head: Eliza Pennypacker
Primary Program Contact: Kelleann Foster
Email: kxf15@psu.edu

Mailing Address: Geodesign Program Office, 121 Stuckeman Family Building, University Park, PA 16802
Telephone: (814) 863-8133
Program Website: Geodesign Graduate Certificate at World Campus (http://www.worldcampus.psu.edu/degrees-and-certificates/geodesign-certificate/overview)

Geographic Information Systems Postbaccalaureate Credit Certificate Program

Graduate Program Head: Anthony C. Robinson
Program Code: GISC
Campus(es): World Campus

The Postbaccalaureate Certificate Program in Geographic Information Systems (GIS) helps professionals in a variety of fields become knowledgeable and skillful users of geographic information systems. The program was designed specifically for experienced GIS practitioners who lack formal education in geography and GIS and wish to advance their careers, and for those who seek to make career changes. The program is offered through Penn State World Campus.

Students subsequently admitted to the Department of Geography Master of Geographic Information Systems degree program may count up to 15 credits of certificate program courses toward the M.G.I.S. degree, subject to restrictions outlined in GCAC-309 Transfer Credit (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/transfer-credit). Certificate students who wish to have certificate courses applied towards a graduate degree in Geographic Information Systems must apply and be admitted to that degree program. Admission to the Geographic Information Systems graduate degree program is a separate step and is not guaranteed.

Effective Date: Fall 2017
Expiration Date: Fall 2022

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies). International applicants may be required to satisfy an English proficiency requirement; see GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

Certificate Requirements

Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/postbaccalaureate-credit-certificate-programs).

Students earn the Postbaccalaureate Certificate by completing four instructor-led online courses — three required and one elective. Students who successfully complete the program earn 12 academic credits.
# Geospatial Intelligence Analytics Graduate Credit Certificate Program

**Person-in-Charge:** Todd Bacastow  
**Program Code:** GEOINT  
**Campus(es):** World Campus

The graduate credit certificate in Geospatial Intelligence Analytics is for geospatial intelligence professionals with experience in Geographic Information Systems and Remote Sensing who are only able to participate part-time and at a distance, while maintaining professional responsibilities. The program promotes sound theory, methodologies, techniques, ethics, and best practices in the professional application of geospatial intelligence. The 15-credit curriculum integrates the geospatial information science and intelligence disciplines in a synergistic manner. The program is well suited for the geospatial intelligence professional serving outside the continental US.

**Effective Date:** Fall 2018  
**Expiration Date:** Fall 2023

## Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies). International applicants may be required to satisfy an English proficiency requirement; see GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac-300/admission-requirements-international-students) for more information.

An entering student must have worked, anticipate working, or have completed in a satisfactory manner course work in an area related to national security, law enforcement, or business. The student must be admitted to (1) Penn State's Graduate School, and (2) the graduate certificate in Geospatial Intelligence Analytics offered by the department of Geography.

## Certificate Requirements

Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac-gcac-200/postbaccalaureate-credit-certificate-programs).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOG</td>
<td>Intelligence Analysis, Cultural Geography, and</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Homeland Security</td>
<td></td>
</tr>
<tr>
<td>GEOG</td>
<td>Culminating Experiences in Geospatial Intelligence</td>
<td>1</td>
</tr>
<tr>
<td>GEOG</td>
<td>Geospatial Intelligence Capstone Experience</td>
<td>2</td>
</tr>
<tr>
<td>GEOG</td>
<td>Remote Sensing Image Analysis and Applications</td>
<td>3</td>
</tr>
<tr>
<td>GEOG</td>
<td>Geographic Information Systems for the Geospatial</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Intelligence Professional</td>
<td></td>
</tr>
</tbody>
</table>

**Electives**

Select at least 3 credits of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOG</td>
<td>Exploring Imagery and Elevation Data in GIS</td>
<td></td>
</tr>
<tr>
<td>GEOG</td>
<td>Making Maps That Matter With GIS</td>
<td></td>
</tr>
<tr>
<td>GEOG</td>
<td>Problem-Solving with GIS</td>
<td></td>
</tr>
<tr>
<td>GEOG</td>
<td>GIS Database Development</td>
<td></td>
</tr>
<tr>
<td>GEOG</td>
<td>GIS Programming and Software Development</td>
<td></td>
</tr>
<tr>
<td>GEOG</td>
<td>Cartography and Visualization</td>
<td></td>
</tr>
<tr>
<td>GEOG</td>
<td>Environmental Applications of GIS</td>
<td></td>
</tr>
<tr>
<td>GEOG</td>
<td>Acquiring and Integrating Geospatial Data</td>
<td></td>
</tr>
<tr>
<td>GEOG</td>
<td>GIS Application Development</td>
<td></td>
</tr>
<tr>
<td>GEOG</td>
<td>Geospatial System Analysis and Design</td>
<td></td>
</tr>
<tr>
<td>GEOG</td>
<td>Geographical Information Analysis</td>
<td></td>
</tr>
<tr>
<td>GEOG</td>
<td>Planning GIS for Emergency Management</td>
<td></td>
</tr>
<tr>
<td>GEOG</td>
<td>The Earth is Round and Maps are Flat: Working</td>
<td></td>
</tr>
<tr>
<td></td>
<td>with Spatial Reference Systems in GIS</td>
<td></td>
</tr>
<tr>
<td>GEOG</td>
<td>GPS and GNSS for Geospatial Professionals</td>
<td></td>
</tr>
<tr>
<td>GEOG</td>
<td>Web Application Development for the Geospatial</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Professional</td>
<td></td>
</tr>
<tr>
<td>GEOG</td>
<td>Geospatial Technology Project Management</td>
<td></td>
</tr>
</tbody>
</table>

## Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not be used to meet requirements for an advanced degree.

## Contact

**Certificate Program Head:** Anthony Robinson  
**Primary Program Contact:** Kary Blaschak-Isett (kdb6@psu.edu)  
**Program Email:** info@gis.psu.edu  
**Mailing Address:** 418 Earth & Engr Sciences, University Park, PA 16802  
**Telephone:** (814) 865-2557  
**Program Website:** Geographic Information Systems Post-Baccalaureate Certificate (https://gis.e-education.psu.edu/cpgis)
Geospatial Intelligence Applications Postbaccalaureate Credit Certificate Program

GEOG 885  Advanced Analytic Methods in Geospatial Intelligence

Total Credits 15

Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Certificate Program Head: Todd Bacastow
Primary Program Contact: Kary Blaschak-Isett (kdb6@psu.edu)
Program Email: info@geoint.psu.edu
Mailing Address: 418 Earth & Engr Sciences, University Park, PA 16802
Telephone: (814) 865-2557
Program Website: Geospatial Intelligence Analytics

Geospatial Intelligence Applications Postbaccalaureate Credit Certificate Program

Person-in-Charge: Todd Bacastow
Program Code: GEOAPP
Campus(es): World Campus

The postbaccalaureate credit certificate in Geospatial Intelligence Applications provides a foundation in geospatial intelligence for the aspiring professional who has little or no experience in geography, geographic information systems, and remote sensing. The program addresses the theory, methodologies, techniques, and ethics in the professional application of geospatial intelligence. The curriculum integrates geospatial information science and analytic thinking in a synergistic manner.

Effective Date: Fall 2017
Expiration Date: Fall 2022

Admission Requirements
Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies). International applicants may be required to satisfy an English proficiency requirement; see GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

An entering student must have worked, anticipate working, or have completed in a satisfactory manner course work in an area related to international affairs, national security, law enforcement, or business.

Certificate Requirements
Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/postbaccalaureate-credit-certificate-programs).

All candidates must take 13 credits, which includes a 3-credit course in geographic fundamentals of geospatial intelligence, a 3-credit course in the nature of geographic information course, 6 credits of geospatial information science and technology courses, and a 1-credit capstone course.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOG 480</td>
<td>Exploring Imagery and Elevation Data in GIS Applications</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 482</td>
<td>Making Maps That Matter With GIS</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 483</td>
<td>Problem-Solving with GIS</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 594A</td>
<td>Geographic Foundations of Geospatial Intelligence</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 594A</td>
<td>Culminating Experiences in Geospatial Intelligence (Capstone Course)</td>
<td>1</td>
</tr>
</tbody>
</table>

Total Credits 13

Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact
Certificate Program Head: Todd Bacastow
Primary Program Contact: Kary Blaschak-Isett (kdb6@psu.edu)
Program Email: info@geoint.psu.edu
Mailing Address: 418 Earth & Engr Sciences, University Park, PA 16802
Telephone: (814) 865-2557
Program Website: Geospatial Intelligence Applications (https://gis.e-education.psu.edu/geointel)
Geospatial Programming and Web Map Development Graduate Credit Certificate Program

Graduate Program Head: Anthony C. Robinson
Program Code: GEOWBD
Campus(es): University Park, World Campus

The Graduate Certificate in Geospatial Programming and Web Map Development helps geospatial professionals become skillful developers of software for the GIS and mapping industries. These skills include the ability to script the automation of geospatial business processes, to develop custom user interface tools on top of existing desktop applications, and to author web-based mapping applications that support the exploration and analysis of geospatial datasets. Such skills are in high demand in the geospatial industry. This program is designed specifically for geospatial practitioners who seek formal education in geospatial programming and web mapping for the purposes of advancing their professional development or seeking a career change. It covers software development in the uniquely geospatial context using a mixture of proprietary and open source languages and technologies. The core learning objectives for students in this program are:

- Apply contemporary programming principles to automate geospatial analysis and mapping processes.
- Design and implement custom user interfaces to support mapping and spatial analysis.
- Create interactive web-based mapping applications that support spatial data exploration and analysis.

The certificate is offered online through Penn State’s World Campus, and students earn the certificate by completing three prescribed courses and two elective courses. Students who successfully complete the program earn 15 academic credits. Students admitted to the Department of Geography’s Master of GIS degree program may count up to 15 credits of certificate program courses toward the M.G.I.S. degree, subject to restrictions outlined in GCAC-309 Transfer Credit (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-309/transfer-credit). Certificate students who wish to have certificate courses applied towards a graduate degree must apply and be admitted to that degree program. Admission to a graduate degree program is a separate step and is not guaranteed.

Effective Semester: Summer 2018
Expiration Semester: Summer 2023

Admission Requirements
Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies). International applicants may be required to satisfy an English proficiency requirement; see GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-305/admission-requirements-international-students) for more information.

Intermediate-level experience with professional applications of geographic information systems is expected as pre-requisite knowledge. Course work to establish that pre-requisite knowledge is available through the related Postbaccalaureate Certificate in GIS (http://bulletins.psu.edu/graduate/programs/certificates/geographic-information-systems-postbaccalaureate-credit-certificate-program) program.

Certificate Requirements
Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Certificate Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-212/postbaccalaureate-credit-certificate-programs).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOG 485</td>
<td>GIS Programming and Software Development</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 863</td>
<td>Web Application Development for the Geospatial Professional</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 585</td>
<td>Open Web Mapping</td>
<td>3</td>
</tr>
</tbody>
</table>

Electives
Choose 6 credits from:

- GEOG 486 Cartography and Visualization
- GEOG 489 GIS Application Development
- GEOG 868 Spatial Database Management for the Geospatial Professional
- GEOG 865 Cloud and Server GIS

Total Credits 15

Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact
Certificate Program Head: Anthony Robinson
Primary Program Contact: Kary Isett
Email: kdb6@psu.edu
Telephone: (814) 865-2557

Geriatric Nursing Education Graduate Credit Certificate Program

Person-in-Charge: Judith Hupcey
Program Code: GNRED
Campus(es): World Campus

In conjunction with the Hartford Center of Geriatric Nursing Excellence, the Penn State School of Nursing offers a Geriatric Nursing Education Graduate Certificate program. The primary goal of the program is to prepare individuals with a current Master’s degree in Nursing or a related...
health discipline to teach geriatric content at both the Associate and Baccalaureate degree levels. The curriculum includes 6 credits (two 3 credit courses) of didactic content in gerontology and 6 credits (two 3 credit courses) of didactic content in education. All four courses will be delivered using distance technology, and are available through the World Campus.

Effective Date: Fall 2017
Expiration Date: Fall 2022

Admission Requirements
Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies). International applicants may be required to satisfy an English proficiency requirement; see GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

Official transcripts from all post-secondary institutions attended (http://www.gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission) must accompany the application. Applicants must hold a master’s degree in nursing or a related health discipline from a U.S. regionally accredited institution, or a master’s degree that is equivalent to a U.S. master’s degree from an officially recognized degree-granting international institution. The credit conditions for the master’s degree must be substantially equivalent to those required by Penn State’s master’s degree programs in nursing or related health disciplines. Prior to an applicant’s admission, transcripts are evaluated by the Director of the Center for Geriatric Nursing Excellence to ascertain the applicant’s potential for successful completion of the core nursing courses. A recommendation regarding admission is discussed with the Associate Dean for Graduate Education and Research prior to making an offer of admission to this certificate program.

Certificate Requirements
Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/postbaccalaureate-credit-certificate-programs).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>NURS 522</td>
<td>Comprehensive Assessment of the Older Adult</td>
<td>3</td>
</tr>
<tr>
<td>NURS 523</td>
<td>Interventions for Common Health Issues in Older Adults</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Select two of the following:</td>
<td>6</td>
</tr>
<tr>
<td>NURS 840</td>
<td>Nursing Education Theories and Strategies</td>
<td></td>
</tr>
<tr>
<td>NURS 841</td>
<td>Assessment and Evaluation in Nursing Education</td>
<td></td>
</tr>
<tr>
<td>NURS 842</td>
<td>Curriculum and Program Development in Nursing Education</td>
<td></td>
</tr>
</tbody>
</table>

Total Credits 12

Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact
Certificate Program Head: Judith Hupcey
Director of Graduate Studies/Professor-in-Charge: Donna Fick
Primary Program Contact: Xiaohong Sheng
Email: xus1@psu.edu
Mailing Address: 203 Nursing Sciences Building, The Pennsylvania State University, University Park, PA 16802
Telephone: (814) 863-2211
Program Website: Geriatric Nursing Education (http://www.nursing.psu.edu/graduate/certificates)

Gerontology, Postbaccalaureate Credit Certificate Program

Person-in-Charge Judith Hupcey
Program Code GERON
Campus(es) University Park

In conjunction with the Center of Geriatric Nursing Excellence, the Penn State College of Nursing offers a Gerontology Graduate Certificate program. The primary goal of the program is to prepare individuals with a Baccalaureate’s or higher degree in Nursing or a related health discipline in gerontology. The curriculum includes 6 credits (two 3 credit courses) of didactic content in geriatric assessment and interventions for common health issues in the elderly and 3 credits (one 3 credit course) in primary palliative care or person-centered care. All courses will be delivered using distance technology.

EFFECTIVE DATE: Fall Semester 2018
EXPIRATION DATE: Fall Semester 2023

Admission Requirements
Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies). International applicants may be required to satisfy an English proficiency requirement; see GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

Official transcripts from all post-secondary institutions attended (http://www.gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission) must accompany the
application. Prior to an applicant’s admission, transcripts are evaluated by the Director of the Center to ascertain the applicant’s potential for successful completion of the core nursing courses. A recommendation regarding admission is discussed with the Associate Dean for Graduate Education and Research prior to making an offer of admission to this certificate program.

Certificate Requirements
Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/postbaccalaureate-credit-certificate-programs).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>NURS 522</td>
<td>Comprehensive Assessment of the Older Adult</td>
<td>3</td>
</tr>
<tr>
<td>NURS 523</td>
<td>Interventions for Common Health Issues in Older Adults</td>
<td>3</td>
</tr>
<tr>
<td>Choose one of the following:</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>NURS 824</td>
<td>Primary Palliative Care: An Interdisciplinary Approach</td>
<td></td>
</tr>
<tr>
<td>NURS 825</td>
<td>Primary Palliative Care: Interdisciplinary Management of Advanced Serious Illness</td>
<td></td>
</tr>
<tr>
<td>NURS 828</td>
<td>Person-Centered Care: Emerging Interdisciplinary Approaches for Older Adults</td>
<td></td>
</tr>
</tbody>
</table>

Total Credits 9

Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact
Certificate Program Head: Judith Hupcey
Primary Program Contact: Marsha Freije
Email: mmf19@psu.edu
Mailing Address: 203 Nursing Sciences Building, University Park, PA 16802
Telephone: (814) 867-5026
Program Website: Gerontologyst Post-Baccalaureate Certificate (http://www.nursing.psu.edu/graduate)

Global Health, Graduate Credit Certificate Program
Person-in-Charge Kristin Sznajder
Program Code GLBHL
Campus(es) Hershey

The purpose of this 12-credit graduate certificate in Global Health is to provide students with foundational graduate-level course work in global health. All course work will be at the 500 or 800 level. Upon completion of the Public Health certificate, students will be able to:

1. Demonstrate their knowledge of the major players and issues in global health, how global health systems interact, and the social, political, and cultural determinants related to health and health systems.
2. Apply their skills to assessing global health issues and developing solutions.

Certificate course work may be transferable to the Penn State Master of Public (M.P.H.) graduate degree program subject to restrictions outlined in GCAC-309 Transfer Credit, (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/transfer-credit) should a student wish to continue public health training at the graduate level. Students must earn a grade of B or better for a course to be applied to the M.P.H. degree program. Students who wish to pursue the M.P.H. degree must formally apply and be admitted to the Penn State M.P.H. degree program. Admission into the Penn State M.P.H. degree program is a separate step and is not guaranteed. Admission into the M.P.H. program, and credit towards a graduate degree for specific courses is not guaranteed based on acceptance into or completion of the certificate program.

EFFECTIVE DATE: Spring 2018
EXPIRATION DATE: Spring 2023

Admission Requirements
 Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies). International applicants may be required to satisfy an English proficiency requirement; see GCAC-308 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

Applicants must submit the following items with their application for admission to the Public Health certificate program:

• official transcripts from all post-secondary institutions attended (http://www.gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission)
• Resume/CV
• Statement of Purpose or Rationale for seeking a Graduate Certificate in Global Health
• Two letters of recommendation

Admission decisions are made by a faculty committee and are based on the quality of the applicant’s professional and academic accomplishments. Upon approval, certificate program students will enroll in course work on a nondegree basis. Note that admission as a nondegree graduate student neither guarantees nor implies subsequent admission to a degree program. Nondegree students are not eligible to receive fellowships or graduate assistantships.

Certificate Requirements
Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/postbaccalaureate-credit-certificate-programs).
Health Sector Management Graduate Credit Certificate Program

Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/postbaccalaureate-credit-certificate-programs).

Students must complete each course with a grade of B or better in order to receive the certificate.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHS 803</td>
<td>Principles of Global Health</td>
<td>3</td>
</tr>
<tr>
<td>PHS 809</td>
<td>Principles of Public Health ¹</td>
<td>3</td>
</tr>
<tr>
<td>or PHS 577</td>
<td>Integrative Seminar in Social &amp; Behavioral Determinants of Health</td>
<td>3</td>
</tr>
</tbody>
</table>

Select 6 credits from the following: 6

- HLHED 501 World Health Promotion
- HLHED 553 Multicultural Health Issues
- PHS 551 Advanced Epidemiological Methods ²
- PHS 557 Global Impact of Infectious Diseases
- PHS 804 Integrating Systems Thinking in Global Health
- PHS 890 Colloquium
- PHS 895A Master of Public Health Internship
- PHS 895B Advanced Field Experience
- PHS 895C MPH Global Health Internship
- PHS 895D Dr.P.H. Global Advanced Field Experience

Total Credits: 12

¹ Dr.P.H. students take PHS 577.
² Epidemiology and Biostatistics Track students only.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact

Certificate Program Head: Kristin Sznajder
Primary Program Contact: Shannon Tuinga

Email: smb611@psu.edu
Telephone: (717) 531-7178

Program Website: Global Health (http://med.psu.edu/global-health-certificate)

Health Sector Management Graduate Credit Certificate Program

Person-in-Charge: James Nemes
Program Code: HLTHMT
Campus(es): Great Valley

The School of Graduate Professional Studies at Penn State Great Valley offers a four-course (12-credit) Graduate Certificate program in Health Sector Management.

The program is designed to provide preparation for individuals who work or aspire to work in the health sector as administrators, managers, physicians, nurses, pharmaceutical representatives and scientists, and other health sector organizations. The program is designed to respond to the needs of professionals in health care provider organizations, third-party payors, biopharmaceutical organizations, and other organizations whose business is focused on the health sector including information technology, medical devices, benefits management, clinical research organizations, and consulting firms.

The curriculum emphasizes development of the knowledge, skills, and abilities necessary to understand and influence the dynamics of the health sector’s business environment. The curriculum's broad focus considers business issues from the vantage points of multiple stakeholders to prepare students with a comprehensive understanding of the health sector. The program is designed to help students build a distinctive competence in health sector management that is relevant not only to managers and professionals employed by payor and provider organizations but also for those employed by biopharmaceutical, medical device, information technology, and other organizations that comprise the health sector. Required course work emphasizes the key dimensions of policy, financing, and organization in the health sector; critical analysis of current issues that health sector organizations face; as well as legal and ethical dimensions of decision making in the health sector. The cost, quality, access paradigm serves as an over arching framework for study of current issues in the health sector including commercialization of biopharmaceuticals, information technology (IT) solutions, marketing, managing business processes, developing new ventures, regulation, and quality improvement. Content is grounded in research and best demonstrated practice and is both theoretical and applied, with an emphasis on practical application of knowledge gained.

This certificate program is attractive to individuals who desire advanced education in health sector management but who do not wish to pursue a master’s degree at this time, as well as those interested in pursuing specialized knowledge of health sector management concurrent with a graduate degree program. With program approval, the courses in this graduate certificate program may be applied to the Master of Business Administration program at Great Valley or, in the case of two courses in the certificate program (BUSAD 830 and BUSAD 834) to the Master of Leadership Development (M.L.D.) program, subject to restrictions outlined in GCAC-309 Transfer Credit (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/transfer-credit). Certificate students who wish to have certificate courses applied towards a graduate degree must apply and be admitted to that degree program. Admission to the M.B.A. or M.L.D. graduate degree program is a separate step and is not guaranteed. This graduate certificate program also is valuable for individuals who already hold a master's degree and wish to update or expand their knowledge and skills.

Effective Semester: Spring 2017
Expiration Semester: Spring 2022

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to
Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies). International applicants may be required to satisfy an English proficiency requirement; see GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

Applicants are expected to have achieved a 3.0 (B) or higher undergraduate grade point average. Applicants holding a master's degree or doctoral degree should have attained at least a cumulative grade point average of 3.0 (B) in previous graduate work. Professional experience will be taken into consideration for admission.

Applicants are required to submit:

- official transcripts from all post-secondary institutions attended (http://gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission);
- a current resume, and
- a statement of intent or career objective.

Admission decisions are made by a faculty committee and are based on the quality of the applicant's credentials in relation to those of other applicants. Evaluation criteria include professional and academic accomplishments. Upon approval, certificate program students will enroll in course work on a nondegree basis. Students must complete each course with a grade of B or better in order to receive the certificate. Note that admission as a nondegree graduate student neither guarantees nor implies subsequent admission to a degree program. Nondegree students are not eligible to receive fellowships or graduate assistantships.

Students who are already enrolled at Penn State in a master's degree program must make a new, separate online application to the certificate program. Certificate program courses will only apply to their master's program with adviser approval and subject to restrictions outlined in GCAC-309 Transfer Credit. (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/transfer-credit) Courses applied to the student's master's degree program must be completed with a grade of "B" or better.

Certificate Requirements

Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/postbaccalaureate-credit-certificate-programs).

The graduate certificate program in health sector management requires a total of four 3-credit courses (12 graduate credits) as outlined below. Students completing each of the four 3-credit courses with a grade of B or better will be eligible to receive a graduate certificate.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BUSAD 830</td>
<td>Biotechnology and Health Industry Overview</td>
<td>3</td>
</tr>
<tr>
<td>BUSAD 834</td>
<td>Ethical Dimensions of Management in the Biotechnology and Health Industry</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HPA 836</td>
<td>Health Law</td>
<td></td>
</tr>
</tbody>
</table>

Total Credits 12

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact

Certificate Program Head: James Nemes
Director of Graduate Studies/Professor-in-Charge: Karen Duhala
Primary Program Contact: Leanne Wallace
Email: lxw31@psu.edu
Mailing Address: Penn State Great Valley, 30 E. Swedesford Road, Malvern, PA 19355
Telephone: (610) 648-3336
Program Website: Health Sector Management (http://greatvalley.psu.edu/academics/graduate-certificates/health-sector-management)

Heritage and Museum Practice Graduate Credit Certificate Program

Person-in-Charge: John Haddad
Program Code: CLHMP
Campus(es): Harrisburg

This 15-credit graduate certificate program offered at Penn State Harrisburg provides students with knowledge of practices in the heritage and museum sector, which includes historical and heritage societies, public folk arts and folklife centers and programs, art galleries, archives and record management programs, educational institutions, cultural and governmental agencies, preservation and cultural resource management groups, and media production companies. A goal of the program is to enable students to conceptualize, deliver, and manage effective heritage and museum projects.

Effective Semester: Fall 2017
Expiration Semester: Spring 2022

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies). International applicants may be required to satisfy an English proficiency requirement; see GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.
The Heritage and Museum Practice certificate is awarded for successful completion of 9 credits of prescribed courses plus 6 credits of electives from an approved list of courses. Students must earn a grade of B or above in each course that counts toward the certificate program.

Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

Applicants are expected to have 2.75 GPA or above in the last two years of undergraduate work in American Studies, history, art, architecture, anthropology, folklore, management, communications, or fields related to museum and heritage practice.

A student in the certificate program may also become a student in the Master of Arts in American Studies, Master of Arts in Humanities, or Master of Arts in Public Administration degree programs if the student is admitted to one of these graduate degree programs; however, successful completion of the certificate program neither implies nor guarantees admission to any graduate degree program at Penn State. Certificate program students who wish to have the certificate courses applied to a degree program must formally apply and be admitted to that degree program. Students enrolled in any of these degree programs may apply credits earned toward the certificate as elective credits with program approval, subject to restrictions outlined in GCAC-309 Transfer Credit. (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/transfer-credit)

## Certificate Requirements

Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/postbaccalaureate-credit-certificate-programs).

The Heritage and Museum Practice certificate is awarded for successful completion of 9 credits of prescribed courses plus 6 credits of electives from an approved list of courses. Students must earn a grade of B or above in each course that counts toward the certificate program.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMST 480</td>
<td>Museum Studies</td>
<td>3</td>
</tr>
<tr>
<td>AMST 481</td>
<td>Historic Preservation</td>
<td>3</td>
</tr>
<tr>
<td>or AMST 482</td>
<td>Public Heritage Practices</td>
<td></td>
</tr>
<tr>
<td>AMST 550</td>
<td>Seminar in Public Heritage</td>
<td>3</td>
</tr>
</tbody>
</table>

### Electives

Students must select 6 credits from the following list of 500-level elective courses:

- AMST 520 Topics in Popular Culture
- AMST 530 Topics in American Folklore
- AMST 531 Material Culture and Folklore
- AMST 540 Ethnography and Society
- AMST 551 Seminar in Local and Regional Studies
- AMST 570 Topics in American Art
- AMST 575 Museum Internship
- AMST 595 Internship
- PADM 500 Public Organization and Management
- PADM 505 Human Resources in the Public and Nonprofit Sectors
- PADM 516 Strategic Planning
- PADM 517 Nonprofit Organizations: History and Evolution
- PADM 518 Nonprofit Organizations: Management and Leadership

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PADM 519</td>
<td>Nonprofit Organizations: Resource Development and Management</td>
<td>15</td>
</tr>
</tbody>
</table>

### Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

### Contact

Certificate Program Head: John Haddad
Primary Program Contact: Hannah Murray (hb5103@psu.edu)
Program Email: amst@psu.edu
Mailing Address: School of Humanities, 777 West Harrisburg Pike, 356W Olmsted Bldg., Middletown, PA 17057
Telephone: (717) 948-6201
Program Website: Heritage and Museum Practice (http://harrisburg.psu.edu/programs/graduate-certificate-heritage-and-museum-practice)

### Homeland Security Graduate Credit Certificate Program

Person-in-Charge: Alexander Siedschlag
Program Code: CLHLS
Campus(es): Harrisburg
World Campus

In this 12-credit graduate certificate program, students will learn about the origins and organization of the Homeland Security Enterprise, including relevant Congressional acts, Presidential policies, and national strategies, as well as the roles and shared responsibility of key agencies and partners at federal, state, and local levels, and from the private sector. They will apply that knowledge to current situations and select scenarios based on an all-hazards and whole-community approach.

The certificate program offers a viable opportunity for those who seek advanced education but do not wish or have not yet determined if they are ready to pursue a full master's degree program. For students in the Intercollege Master of Professional Studies in Homeland Security (IMPS-HLS), this program may be pursued to earn an embedded certificate as an additional credential.

Effective Date: Fall Semester 2017
Expiration Date: Fall Semester 2020

### Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).
International applicants may be required to satisfy an English proficiency requirement; see GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

Applicants are expected to have a 3.0 or higher GPA in their undergraduate work.

**Certificate Requirements**

Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/postbaccalaureate-credit-certificate-programs).

The curriculum consists of two required courses (6 credits) and two electives (6 credits). Students must achieve a GPA of 3.00 or above to be awarded the certificate.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HLS 811</td>
<td>Fundamentals of Homeland Security</td>
<td>3</td>
</tr>
<tr>
<td>HLS 404</td>
<td>Homeland Security and Defense in Practice</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td><strong>Electives</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Choose 6 credits from the following:</td>
<td>6</td>
</tr>
<tr>
<td>HLS 802</td>
<td>Multifaceted Approaches to Homeland Security</td>
<td></td>
</tr>
<tr>
<td>HLS 804</td>
<td>Strategic Planning and Organizational Imperatives in Homeland Defense and Security</td>
<td></td>
</tr>
<tr>
<td>HLS 540</td>
<td>Comparative Homeland Security and Related Methods</td>
<td></td>
</tr>
<tr>
<td>HLS 558</td>
<td>Disaster Psychology</td>
<td></td>
</tr>
<tr>
<td>HLS 875</td>
<td>U.S. Homeland Security Law</td>
<td></td>
</tr>
<tr>
<td>HLS 832</td>
<td>U.S. Military's Domestic Imperative: Homeland Defense and Defense Support of Civil Authorities</td>
<td></td>
</tr>
<tr>
<td>PUBPL 475</td>
<td>Critical Infrastructure Protection</td>
<td></td>
</tr>
</tbody>
</table>

**Total Credits**: 12

**Courses**

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**Contact**

**Certificate Program Head**: Alexander Siedschlag

**Primary Program Contact**: Lesa Stanford

**Email**: lis12@psu.edu

**Mailing Address**: 777 West Harrisburg Pike, 131W Olmsted Bldg., Middletown, PA 17057

**Telephone**: (717) 948-6050

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**Hospital and Health System Preparedness Graduate Credit Certificate Program**

**Person-in-Charge**: Eugene J. Lengerich

**Program Code**: HHSP

**Campus(es)**: World Campus

The Graduate Certificate in Hospital and Health System Preparedness provides students with knowledge and skills to protect the critical infrastructure of hospitals, medical facilities, and emergency management systems. The effective protection of critical infrastructure will allow medical facilities and emergency management systems to remain functional in the midst of natural disasters and intentional and unintentional incidents. The curriculum will emphasize a systems-based and an all-hazards approach to preparedness. Graduates will be experienced in development and revision of an emergency operations plan, both at facility- and community-level, and exercises to test and evaluate the plan. Graduates will be expected to understand and use an evidence-based approach in designing emergency operations plans and procedures. Graduates are employed by public health, hospitals and healthcare facilities, military and law enforcement, and emergency management services. The certificate is intended for students who seek to further their career in:

- Facility management and services
- Healthcare administration and management
- Emergency management and services
- Infection and quality control

**Effective Semester**: Spring 2016

**Expiration Semester**: Fall 2020

**Program Website**: Homeland Security Graduate Certificate (https://www.worldcampus.psu.edu/homeland-security-ccn)

**Admission Requirements**

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies). International applicants may be required to satisfy an English proficiency requirement; see GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

Applicants are required to submit a resume, statement of purpose, 3 names of recommenders, and GRE scores. Applicants may request a waiver from the GRE requirement if they meet one of the following criteria:

- 3.00 undergraduate grade-point average (GPA) either overall or in the last 60 credits;
- 5+ years of professional work experience;
- 3.00 GPA upon completion of a graduate certificate; or
- successful completion of a graduate or professional degree.
Certificate Requirements

Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/postbaccalaureate-credit-certificate-programs).

This 15-credit graduate certificate requires the following courses:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHP 410</td>
<td>Public Health Preparedness for Disaster and Terrorist Emergencies I</td>
<td>3</td>
</tr>
<tr>
<td>PHP 510</td>
<td>Public Health Preparedness for Disaster and Terrorist Emergencies II</td>
<td>3</td>
</tr>
<tr>
<td>PHP 530</td>
<td>Critical Infrastructure Protection of Health Care Delivery Systems</td>
<td>3</td>
</tr>
<tr>
<td>PHP 831</td>
<td>Public Health Preparedness and the Emergency Operations Plan</td>
<td>3</td>
</tr>
<tr>
<td>PHP 832</td>
<td>Fundamentals of Biorisk Management</td>
<td>3</td>
</tr>
<tr>
<td>or PHP 527</td>
<td>Public Health Evaluation of Disasters and Bioterrorism</td>
<td></td>
</tr>
</tbody>
</table>

Total Credits: 15

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact

Certificate Program Head: Eugene Lengerich
Primary Program Contact: Rachel Reager
Email: rmr16@psu.edu
Mailing Address: 500 University Dr., MC H170; Room C1712, Hershey, PA 17033
Telephone: (717) 531-8892

Program Website: Hospital and Health System Preparedness at World Campus (https://www.worldcampus.psu.edu/degrees-and-certificate/penn-state-online-hospital-preparedness-certificate/overview)

Human Factors Engineering and Ergonomics Graduate Credit Certificate Program

Person-in-Charge: Andris Freivalds
Program Code: HUMFAC
Campus(es): University Park

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies). International applicants may be required to satisfy an English proficiency requirement; see GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

The successful applicant will possess a baccalaureate degree in a related technical field (with courses in calculus and physics) and is generally expected to have a minimum GPA of 3.0. GRE scores are not required for nondegree graduate students.

Certificate Requirements

Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/postbaccalaureate-credit-certificate-programs).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IE 479</td>
<td>Human Centered Product Design and Innovation</td>
<td>3</td>
</tr>
<tr>
<td>IE 553</td>
<td>Engineering of Human Work</td>
<td>3</td>
</tr>
<tr>
<td>IE 558</td>
<td>Engineering of Cognitive Work</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits: 9

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact

Certificate Program Head: Andris Freivalds
Primary Program Contact: x
Email: axf@psu.edu
Mailing Address: 310 Leonhard Building, University Park, PA 16802
Telephone: (814) 863-2361
The goal of this graduate certificate program is to prepare students to make managerial decisions that integrate HR strategies and practices with organizational strategy in order to improve business performance.

**Effective Semester:** Fall 2014  
**Expiration Semester:** Spring 2019

**Admission Requirements**  
Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies). International applicants may be required to satisfy an English proficiency requirement; see GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

The successful applicant is generally expected to have a minimum combined junior/senior grade-point average of 3.0 (B) on a 4.0 scale.

**Certificate Requirements**  
Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/postbaccalaureate-credit-certificate-programs).

To be awarded the Graduate Certificate in Human Resource Management, students must successfully complete 15 credits of course work. All courses must be completed with a grade of C or better and a grade-point average of 3.0 to be awarded the certificate.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Required Courses</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MGMT 841</td>
<td>Human Resource Management</td>
<td>3</td>
</tr>
</tbody>
</table>

**Electives**  
Select one course from each of the following four categories; each course listed is worth 3 credits:

| Category I: Internal Consulting                    |         |
| ACCTG 524 | Managerial Accounting                               | 3       |
| BUSAD 523 | Prices and Markets                                  |   |
| BUSAD 578 | Managing Business Processes                         |   |
| HRER 516  | Labor Market Analysis                               |   |
| HRER 816  | Labor Market Analysis                               |   |

| Category II: Organizational Development & Change   |         |
| BUSAD/LEAD 519 | Developing Creative High Performance Organizations |         |

1 Students who already have completed a graduate-level course that provides a comprehensive overview of the HR function in organizations and an in-depth examination of the strategic planning and implementation of HRM, as determined in advance by the head of the certificate program, may be permitted to waive this course if completed within five years prior to admission.

2 With advance approval of the head of the certificate program and the instructor, special topics courses and online graduate courses that are particularly relevant to the categories listed below may be used to satisfy certificate requirements.

3 This course has prerequisites or requires demonstration of prior preparation in a subject area. Please contact the management division at Penn State Great Valley prior to registering for this course.

**Courses**

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**Contact**

Certificate Program Head: Denise Potosky  
Primary Program Contact: Leanne Wallace  
Email: lxw31@psu.edu  
Mailing Address: 30 East Swedesford Road, Malvern, PA 19355  
Telephone: (610) 648-3336
Human Resources and Employment Relations Graduate Credit Certificate Program

Person-in-Charge
Paul F Clark

Program Code
HRER

Campus(es)
University Park

The program is designed for professionals who desire further education in the specialized field of Human Resources and Employment Relations (HRER) without completing a full master's degree. Many professionals and recent graduates believe they need further education beyond their bachelor's degree for personal and professional development and to compete effectively in the labor market for HRER practitioners. The certificate program provides flexibility for working professionals and advanced knowledge in the rapidly changing field of HRER in many areas, including: dispute management and resolution, workplace diversity, work and family, trends in human resources, and technology and the workplace. Upon successful completion of the certificate program, students may opt to apply for the master's degree in HRER.

Effective Semester: Summer 2010
Expiration Semester: Spring 2020

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies). International applicants may be required to satisfy an English proficiency requirement; see GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

Admission to the program does not assume former knowledge of the field of HRER. An applicant must have received a valid bachelor's degree from a regionally accredited institution and have two years of full-time professional work experience. The following documentation must be submitted for evaluation prior to admission:

- Official transcripts from all post-secondary institutions attended (http://www.gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission)
- A one-page statement of purpose, focusing on educational and professional objectives
- A resume

Certificate Requirements

Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/postbaccalaureate-credit-certificate-programs).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HRER 504</td>
<td>Seminar in Employment Relations</td>
<td>3</td>
</tr>
<tr>
<td>HRER 505</td>
<td>Seminar in Human Resources</td>
<td>3</td>
</tr>
</tbody>
</table>

Select one of the following:

- HRER 500 Topics in Comparative Industrial Relations
- HRER 501 Labor and Employment Law
- HRER 502 Human Behavior at Work
- HRER 512 Research Methods in Human Resources and Employment Relations I
- HRER 513 Research Methods in Human Resources and Employment Relations II
- HRER 516 Labor Market Analysis
- HRER 536 Diversity in the Workplace

Total Credits: 9

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact

Certificate Program Head: Paul Clark
Director of Graduate Studies/Professor-in-Charge: Elaine Farndale
Primary Program Contact: Erin Hetzel
Email: eab27@psu.edu
Mailing Address: 506 Keller Building, University Park, PA 16802
Telephone: (814) 867-4167

Program Website: Human Resources and Employment Relations Graduate Certificate (http://ler.la.psu.edu/graduates/graduate-certificate-program)

Information Systems Cybersecurity Postbaccalaureate Credit Certificate Program

Person-in-Charge
Mary Beth Rosson

Program Code
ISSEC

Campus(es)
World Campus

This postbaccalaureate certificate program is designed to provide students with both a breadth and depth of training in information cybersecurity. The certificate will enable those completing the program to market to academic institutions, government, and technology-based businesses. Students will be exposed to principles, models, tools,
and applications in information security that specifically focus on network security, security and risk management, digital forensics, crisis and disaster management, and web security and privacy. A distance education format is used to accommodate the needs of professionals already active in this area. The certificate program is an attractive option not only for those who desire advanced education but do not wish a full master’s degree program, but also for students who might wish to take a certificate to determine if they are interested in a complete postbaccalaureate degree program in Information Sciences and Technology (IST).

Effective Date: Spring 2017
Expiration Date: Spring 2022

Admission Requirements
Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies). International applicants may be required to satisfy an English proficiency requirement; see GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

A bachelor’s degree in a related area (e.g., engineering and science), while not necessary for admission, is helpful in the successful completion of the certificate. It is expected that students will have a basic level of competency in computer language and information technology (related work experience can be used to demonstrate such competency). GRE scores are not required for nondegree graduate students.

Certificate Requirements
Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/postbaccalaureate-credit-certificate-programs).

To be awarded the certificate, students must successfully complete 15 credits of course work. A 3.0 GPA must be obtained in order to successfully complete the certificate.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IST 815</td>
<td>Foundations of Information Security and Assurance</td>
<td>3</td>
</tr>
<tr>
<td>IST 554</td>
<td>Network Management and Security</td>
<td>3</td>
</tr>
<tr>
<td>Electives</td>
<td>Select 9 credits from the following courses:</td>
<td>9</td>
</tr>
<tr>
<td>IST 451</td>
<td>Network Security</td>
<td></td>
</tr>
<tr>
<td>IST 454</td>
<td>Computer and Cyber Forensics</td>
<td></td>
</tr>
<tr>
<td>IST 456</td>
<td>Information Security Management</td>
<td></td>
</tr>
<tr>
<td>IST 564</td>
<td>Crisis, Disaster and Risk Management</td>
<td></td>
</tr>
<tr>
<td>INSC 561</td>
<td>Web Security and Privacy</td>
<td></td>
</tr>
<tr>
<td>Total Credits</td>
<td>15</td>
<td></td>
</tr>
</tbody>
</table>

Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact
Certificate Program Head: Mary Beth Rosson
Director of Graduate Studies/Professor-in-Charge: David Fusco
Primary Program Contact: Sherry Hartman
Email: slr8@psu.edu
Mailing Address: Education Strategy and Planning Office, College of IST/ E143 Westgate Building, University Park, PA 16802
Telephone: (814) 863-9461
Program Website: Information Systems Cyber Security (http://www.worldcampus.psu.edu/degrees-and-certificates/information-systems-security-certificate/overview)

Institutional Research Graduate Credit Certificate Program
Person-in-Charge: Karen Paulson
Program Code: INSTRH
Campus(es): World Campus

The primary goal of the program is to improve the skills of institutional researchers on college and university campuses. The curriculum includes research design, assessment and evaluation of student and faculty issues, and the integration of strategic planning with institutional finance.

Effective Date: Summer Session 2014
Expiration Date: Spring Semester 2019

Admission Requirements
Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies). International applicants may be required to satisfy an English proficiency requirement; see GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

Students are expected to have prior knowledge of introductory statistics.

Certificate Requirements
Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate
Interdisciplinary Educational Intervention Research Postbaccalaureate Credit Certificate Program

All candidates are required to take 15 credits of course work in Higher Education including HIED 801, and HIED 830. Students may include up to 6 credits in statistics as part of their program of study for the Institutional Research certificate.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIED 801</td>
<td>Foundations of Institutional Research</td>
<td>3</td>
</tr>
<tr>
<td>HIED 830</td>
<td>Designing Institutional Research Studies</td>
<td>3</td>
</tr>
</tbody>
</table>

Select three of the following: 9

- HIED 552 Administration and Organization in Higher Education
- HIED 556 Higher Education Students and Clientele
- HIED 595 Internship in Higher Education
- HIED 596 Individual Studies
- HIED 810 Planning and Resource Management in Higher Education
- HIED 820 Studying Students & Student Affairs Program
- HIED 840 Assessing Student Outcomes & Evaluating Academic Programs
- HIED 850 Analyzing Faculty Workload, Performance, and Compensation
- HIED 860 Enrollment Management
- STAT 500 Applied Statistics
- STAT 501 Regression Methods

Total Credits: 15

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact

Certificate Program Head: Karen Paulson

Primary Program Contact: x

Email: kxp4@psu.edu

Mailing Address: 405F Rackley Bldg, University Park, PA 16802

Telephone: (814) 863-5553

Program Website: Institutional Research (https://www.worldcampus.psu.edu/degrees-and-certificates/institutional-research-certificate/overview)

Mailing Address:
405F Rackley Bldg, University Park, PA 16802

Telephone: (814) 863-5553

Program Website: Institutional Research (https://www.worldcampus.psu.edu/degrees-and-certificates/institutional-research-certificate/overview)

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies). International applicants may be required to satisfy an English proficiency requirement; see GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

This program is designed specifically for students pursuing research-focused doctoral programs in fields related to education, including:

- educational psychology,
- school psychology,
- special education,
- developmental psychology,
- child-clinical psychology, or
- human development and family studies.

However, other graduate students interested in interdisciplinary training in the educational sciences will be eligible for this certificate after completing prerequisites for the certificate course work.

Certificate Requirements

Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/postbaccalaureate-credit-certificate-programs).
### Required Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSY/HDFS/EDPSY 578</td>
<td>Contemporary Issues in Interdisciplinary Educational Intervention Sciences</td>
<td>3</td>
</tr>
<tr>
<td>Choose 1 of 2 program evaluation courses:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HDFS 506</td>
<td>Design and Evaluation of Prevention and Health Promotion Programs Across the Life Span</td>
<td>3</td>
</tr>
<tr>
<td>EDPSY 560</td>
<td>Contemporary Issues in the Evaluation of Educational Programs</td>
<td></td>
</tr>
<tr>
<td>Choose 1 of 3 multi-level modeling courses:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SOC 578</td>
<td>Multilevel Regression Models</td>
<td></td>
</tr>
<tr>
<td>HDFS 517</td>
<td>Multivariate Study of Change and Human Development</td>
<td></td>
</tr>
<tr>
<td>EDPSY 557</td>
<td>Hierarchical Linear Modeling in Educational Research</td>
<td></td>
</tr>
<tr>
<td>Choose 1 elective 3-credit 500-level course that focuses on a content area of education intervention research. Options include (but are not limited to):</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HDFS 508</td>
<td>Best Practices in Preventive Intervention</td>
<td></td>
</tr>
<tr>
<td>PSY 576</td>
<td>Clinical Child Interventions</td>
<td></td>
</tr>
<tr>
<td>SPSY 535</td>
<td>School-Based Psychological Interventions for Children and Youth</td>
<td></td>
</tr>
<tr>
<td>SPLED 504</td>
<td>Classroom and School-Wide Management Practices in Special Education</td>
<td></td>
</tr>
<tr>
<td>Total Credits</td>
<td></td>
<td>12</td>
</tr>
</tbody>
</table>


**Effective Semester:** Spring 2018  
**Expiration Semester:** Spring 2023

### Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies). International applicants may be required to satisfy an English proficiency requirement; see GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

All applicants submit an application (including payment of the nonrefundable application fee), two letters of recommendation, and a personal statement addressing their reasons for pursuing a certificate in international affairs and discussing their plans and goals.

### Certificate Requirements

Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/postbaccalaureate-credit-certificate-programs).

The 12-credit program offers a unique balance of academic study, hands-on training, and professional development; it includes 6 credits of core courses, 3 credits in additional core courses or SIA electives, and 3 credits in additional 500 or 800 level courses. In some cases, at the discretion of the certificate program head, substitution of a relevant course from an appropriate unit may be possible.

All courses must be taken for a letter grade with at least 3.0 grade-point average maintained; no grades below a C will be counted toward the certificate.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTAF 801</td>
<td>Actors, Institutions, and Legal Frameworks in International Affairs</td>
<td></td>
</tr>
<tr>
<td>INTAF 802</td>
<td>Foundations of Diplomacy and International Relations Theory</td>
<td></td>
</tr>
<tr>
<td>INTAF 803</td>
<td>Multi-sector and Quantitative Analysis</td>
<td></td>
</tr>
<tr>
<td>INTAF 804</td>
<td>Global Cultures and Leadership</td>
<td></td>
</tr>
<tr>
<td>INTAF 890</td>
<td>Colloquium</td>
<td></td>
</tr>
<tr>
<td>Select an additional 3 credits in Core Courses or SIA Elective Courses</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Select an additional 3 credits in 500 or 800 level courses</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Total Credits</td>
<td></td>
<td>12</td>
</tr>
</tbody>
</table>

**International Relations, Public Policy, Intelligence, Defense Policy, Military Affairs, Counterterrorism, Diplomacy, International Organizations, Law Enforcement, International Business, International Law, and International**

### Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

### Contact

**Certificate Program Head:** Karen Bierman  
**Email:** kb2@psu.edu  
**Mailing Address:** 521 Moore Building, Department of Psychology, University Park, PA 16802  
**Telephone:** (814) 865-3879

### International Affairs Graduate Credit Certificate Program

This program provides students, professionals, and others with an accessible, professional education in the rapidly evolving field of international affairs. The certificate builds career options in international relations, public policy, intelligence, defense policy, military affairs, counterterrorism, diplomacy, international organizations, law enforcement, international business, international law, international education, economic development, international environmental policy, and international energy policy.
be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**Certificate Program Head:** Scott Gartner

**Program Email:** admissions@sia.psu.edu

**Mailing Address:** 245 Lewis Katz, University Park, PA 16802

**Telephone:** (814) 867-2242

**Program Website:** International Affairs Graduate Certificate (https://www.sia.psu.edu/academics/graduate-certificate-program/international-affairs-certificate)

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### International Development Policy Graduate Credit Certificate Program

**Graduate Program Head**

Scott Gartner

**Program Code**

INTLDP

**Campus(es)**

University Park

This program provides students, professionals, and others with an accessible, professional education in the rapidly evolving field of international development policy. Students can study geopolitical, cultural, and legal aspects of international affairs pertaining to economic development. The certificate is a strong addition to the resume of anyone interested in a career in international relations, public policy, intelligence, defense, military affairs, counterterrorism, diplomacy, NGOs, international business, international law, or economic development.

**Effective Semester:** Fall 2018

**Expiration Semester:** Fall 2023

### Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies). International applicants may be required to satisfy an English proficiency requirement; see GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

All applicants submit an application (including payment of the nonrefundable application fee), two letters of recommendation, and a personal statement addressing their reasons for pursuing a certificate in international development policy and discussing their plans and goals.

### Certificate Requirements

Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/postbaccalaureate-credit-certificate-programs).

The 12-credit program offers a unique balance of academic study, hands-on training, and professional development; it includes 3 credits of SIA core courses, 3 credits in additional SIA core courses or SIA electives, and 6 credits in additional 400, 500, or 800 level courses. In some cases, at the discretion of the certificate program head, substitution of a relevant course from an appropriate unit may be possible. All courses must be taken for a letter grade with at least a 3.0 grade-point average maintained; no grades below a C will be counted toward the certificate.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTAF 803</td>
<td>Multi-sector and Quantitative Analysis</td>
<td>3</td>
</tr>
<tr>
<td>6 Credits in Additional SIA Core Courses or SIA Electives</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>3 Credits in SIA Core Courses. Select from the following:</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

**Total Credits:** 12

### Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**Certificate Program Head:** Scott Gartner

**Program Email:** admissions@sia.psu.edu

**Mailing Address:** The Penn State School of International Affairs, Lewis Katz Building, University Park, PA 16082

**Telephone:** (814) 867-2242

**Program Website:** International Development Policy (https://www.sia.psu.edu/academics/graduate-certificates/international-development-policy-certificate)

### International Human Resources and Employment Relations Graduate Credit Certificate Program

<table>
<thead>
<tr>
<th>Person-in-Charge</th>
<th>Paul Clark</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Program Code</strong></td>
<td>IHRER</td>
</tr>
<tr>
<td><strong>Campus(es)</strong></td>
<td>World Campus</td>
</tr>
</tbody>
</table>

This 12 credit program is designed to provide HR practitioners and those with an interest in global HR business practices with a comprehensive understanding of the law, policy and best practices necessary for effective management of global human resources, employment relations and labor relations responsibilities.

**Effective Date:** Spring Semester 2016
Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies). International applicants may be required to satisfy an English proficiency requirement; see GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

- Applicants admitted into the certificate program must have a 3.0 grade-point average in the last two years of undergraduate work. This requirement may be waived in exceptional circumstances;
- All applicants submit a Graduate School application (http://gradschool.psu.edu/prospective-students/how-to-apply) (including payment of the nonrefundable application fee), resume, and personal statement addressing their reasons for pursuing a certificate in international human resources and employment relations;
- Applicants must have two (2) years of full-time work experience (excludes part-time jobs and internships).

Certificate Requirements

Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/postbaccalaureate-credit-certificate-programs).

All courses must be completed with a grade of C or better and a grade-point average of 3.0 to be awarded the certificate.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Required Courses</strong></td>
<td></td>
</tr>
<tr>
<td>LER 403</td>
<td>International Human Resource Studies</td>
<td>3</td>
</tr>
<tr>
<td>HRER 803</td>
<td>Human Resources in Multinational Enterprises</td>
<td>3</td>
</tr>
<tr>
<td>HRER 801</td>
<td>Comparative and International Employment and Labor Law</td>
<td>3</td>
</tr>
<tr>
<td>LER 400</td>
<td>Comparative Employment Relations Systems</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td><strong>Total Credits</strong></td>
<td>12</td>
</tr>
</tbody>
</table>

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Certificate Requirements

Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/postbaccalaureate-credit-certificate-programs).

The 12-credit program offers a unique balance of academic study, hands-on training, and professional development; it includes 9 credits in required courses and 3 broader elective credits. All courses must be taken for a letter grade with at least a 3.0 grade-point average maintained; no grades below a C will be counted toward the certificate.
International Security Studies Graduate Credit Certificate Program

Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact
Certificate Program Head: Scott Gartner
Program Email: admissions@sia.psu.edu
Mailing Address: The Penn State School of International Affairs, Lewis Katz Building, University Park, PA 16802
Telephone: (814) 867-2242
Program Website: International Affairs Graduate Certificate (https://www.sia.psu.edu/academics/graduate-certificate-program/international-affairs-certificate)

International Security Studies Graduate Credit Certificate Program

Person-in-Charge: Scott Gartner
Program Code: INTLSS
Campus(es): University Park

This program provides students, professionals, and others with an accessible, professional education in the rapidly evolving field of international security studies. Students study geopolitical, cultural, and international law aspects of international affairs pertaining to security dilemmas. The certificate is a strong addition to the resume of anyone interested in a career in international relations, public policy, intelligence, defense, military affairs, counterterrorism, diplomacy, law enforcement, international organizations, or international law.

Effective Semester: Fall 2018
Expiration Semester: Spring 2023

Admission Requirements
Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies). International applicants may be required to satisfy an English proficiency requirement; see GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac-300/admission-requirements-international-students) for more information.

All applicants submit an application (including payment of the nonrefundable application fee), two letters of recommendation, and a personal statement addressing their reasons for pursuing a certificate in international security studies and discussing their plans and goals.

Certificate Requirements
Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/postbaccalaureate-credit-certificate-programs).

The 12-credit program offers a unique balance of academic study, hands-on training, and professional development; it includes 3 credits of SIA core courses, 3 credits in additional SIA core courses or SIA electives, and 6 credits in additional 400, 500, or 800 level courses. In some cases, at the discretion of the certificate program head, substitution of a relevant course from an appropriate unit may be possible. All courses must be taken for a letter grade with at least a 3.0 grade-point average maintained; no grades below a C will be counted toward the certificate.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTAF 801</td>
<td>Actors, Institutions, and Legal Frameworks in International Affairs</td>
<td>3</td>
</tr>
<tr>
<td>INTAF 802</td>
<td>Foundations of Diplomacy and International Relations Theory</td>
<td>3</td>
</tr>
<tr>
<td>INTAF 811</td>
<td>Cross Cultural Conflict Resolution</td>
<td>3</td>
</tr>
<tr>
<td>INTAF 814</td>
<td>U.S. Policy in the Middle East</td>
<td>3</td>
</tr>
<tr>
<td>INTAF 815</td>
<td>Political Economy of Development and Growth</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits: 12

Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact
Certificate Program Head: Scott Gartner
Program Email: admissions@sia.psu.edu
Mailing Address: The Penn State School of International Affairs, Lewis Katz Building, University Park, PA 16802
Telephone: (814) 867-2242
Program Website: International Security Studies Graduate Certificate (https://www.sia.psu.edu/academics/graduate-certificates/international-security-studies-certificate)
Laser-Materials Processing and Laser-Based Manufacturing Graduate Credit Certificate Program

Person-in-Charge: Judith A. Todd
Program Code: LASMAT
Campus(es): University Park

The purpose of this program is to prepare engineers to integrate laser-materials processing into the concurrent design and manufacture of multiscale components and systems of the future. Its objective is to offer a multidisciplinary curriculum drawing upon the strengths of several engineering departments and the Applied Research Laboratory.

Effective Date: Spring Semester 2016
Expiration Date: Fall Semester 2020

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies). International applicants may be required to satisfy an English proficiency requirement; see GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

Graduates in engineering, the sciences, or medicine who present a 3.0 grade-point average will be considered for admission. Exceptions to the minimum 3.00 GPA may be made for students with professional experience, special backgrounds, abilities, and interests. GRE scores are not required.

Certificate Requirements

Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/postbaccalaureate-credit-certificate-programs).

To be awarded the Laser-Materials Processing and Laser-Based Manufacturing certificate, students must successfully complete with a grade of B or higher 12 credits of graduate course work including the following, or other courses approved in advance by petition.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESC 540</td>
<td>Laser Optics Fundamentals</td>
<td>3</td>
</tr>
<tr>
<td>Select three of the following:</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>ESC 541</td>
<td>Laser-Materials Interactions</td>
<td></td>
</tr>
<tr>
<td>ESC 542</td>
<td>Laser-Integrated Manufacturing</td>
<td></td>
</tr>
<tr>
<td>ESC 543</td>
<td>Laser Microprocessing</td>
<td></td>
</tr>
<tr>
<td>ESC 544</td>
<td>Laser Laboratory</td>
<td></td>
</tr>
</tbody>
</table>

Total Credits 12

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact

Certificate Program Head: Judith Todd Copley
Director of Graduate Studies/Professor-in-Charge: Corina Drapaca
Primary Program Contact: Tammy Coval
Email: tlc21@psu.edu
Mailing Address: 212 Earth & Engineering Sciences Building, University Park, PA 16802
Telephone: (814) 863-4586

Literacy Leadership Postbaccalaureate Credit Certificate Program

Person-in-Charge: Mary Napoli
Program Code: CLLEAD
Campus(es): Harrisburg

The Literacy Leadership postbaccalaureate certificate program is offered by the Teacher Education unit in the School of Behavioral Sciences and Education at Penn State Harrisburg. The primary goal of the program is to prepare K-12 educators (teachers, specialists, and/or administrators) to serve in literacy leadership roles in K-12 educational contexts. The 12-credit curriculum integrates core principles of literacy education that address:

- curricular content,
- curriculum initiative planning,
- diverse K-12 students’ needs, and
- leadership development consistent with standards-based professional development and candidate preparation guidelines.

Students will complete four courses targeted to develop critical perspectives, reading, and writing associated with professional literacy initiatives and leadership skills. Students will complete three required courses and select the fourth course from a menu according to individual professional needs. The certificate is designed for educators who need to develop understandings of complexities involving literacy goals among K-12 students and adult educators.

Effective Semester: Fall Semester 2014
Expiration Semester: Spring Semester 2019
Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies). International applicants may be required to satisfy an English proficiency requirement; see GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

To be considered for admission into the certificate program, applicants must have a 3.0 grade-point average in the last two years of undergraduate work (or graduate work if applying with a master’s degree).

Certificate Requirements

Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/postbaccalaureate-credit-certificate-programs).

Students will earn the certificate upon successful completion of the four required courses. All courses must be taken for a letter grade with at least a 3.0 average maintained; no grades below a C will be counted toward the certificate.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDUC 452</td>
<td>Teaching Writing</td>
<td>3</td>
</tr>
<tr>
<td>EDUC 471</td>
<td>Best Practices in Literacy</td>
<td>3</td>
</tr>
<tr>
<td>EDUC 565</td>
<td>Literacy and Leadership</td>
<td>3</td>
</tr>
<tr>
<td>In addition, each candidate must take one additional 3-credit course from the following list of electives:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EDUC 477</td>
<td>Teaching Struggling Readers and Writers</td>
<td>3</td>
</tr>
<tr>
<td>EDUC 432</td>
<td>Children’s Literature in Teaching Writing</td>
<td></td>
</tr>
<tr>
<td>EDUC 466</td>
<td>Foundations of Teaching English as a Second Language</td>
<td></td>
</tr>
<tr>
<td>LLED 445</td>
<td>Teaching English in Bilingual/Dialectal Education</td>
<td></td>
</tr>
</tbody>
</table>

Total Credits: **12**

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Certificate Requirements

Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/postbaccalaureate-credit-certificate-programs).

The Long-Term Care Administration and Policy graduate credit certificate program consists of four Health Administration (HADM) graduate-level courses (12 credits). All courses must be taken for a letter grade. A 3.0 grade-point average in the certificate program courses is needed for the awarding of the certificate, and only grades of C or better will be counted toward the certificate.
If student in the certificate program already holds a graduate degree in health care administration or a related field and has taken graduate courses that duplicate the content of courses in the certificate program, he or she may substitute other HADM courses for those redundant courses with the prior approval of the person in charge.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HADM 542</td>
<td>Health Care Politics and Policy</td>
<td>3</td>
</tr>
<tr>
<td>HADM 543</td>
<td>Long-Term Care Administration and Policy</td>
<td>3</td>
</tr>
<tr>
<td>HADM 545</td>
<td>Health Financial Management</td>
<td>3</td>
</tr>
<tr>
<td>Electives selecting one of the following:</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>HADM 539</td>
<td>Health Systems Organization</td>
<td></td>
</tr>
<tr>
<td>HADM 551</td>
<td>Health Care Law</td>
<td></td>
</tr>
<tr>
<td>HADM 552</td>
<td>Health Delivery Systems</td>
<td></td>
</tr>
<tr>
<td>Total Credits</td>
<td></td>
<td>12</td>
</tr>
</tbody>
</table>

**Courses**

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**Contact**

Certificate Program Head: Hengameh Hosseini

Primary Program Contact: Maria Peiffer

Email: map54@psu.edu

Mailing Address: W160 Olmsted Bldg., 777 W. Harrisburg Pike, Middletown, PA 17057

Telephone: (717) 939-8431

Program Website: Long-Term Care Administration and Policy (https://harrisburg.psu.edu/public-affairs/health-administration/certificate-program-long-term-care)

**Marketing Analytics Graduate Credit Certificate Program**

Person-in-Charge: Chelsea C. Hammond

Program Code: MKTANL

Campus(es): World Campus

The Graduate Certificate in Marketing Analytics is a twelve-credit online program focused on building a core understanding of key functions in the field of marketing analytics. The program focuses on how marketing analytics are (1) applied within organizations, (2) conducted, and (3) meaningfully communicated and applied to business decision-making and strategy. The curriculum is geared towards college graduates interested in developing skills in marketing analytics functions, but who may have little or no formal training in the field. The certificate is industry applicable, since it is aimed at giving professionals the core knowledge they need to successfully apply marketing analytics in today’s data-driven organizations.

**Effective Semester:** Fall 2017

**Ending Semester:** Fall 2022

### Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies). International applicants may be required to satisfy an English proficiency requirement; see GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

Along with the submission of the online application and the nonrefundable application fee, the following is required:

- Official Transcripts and Grade Point Average (GPA) – Applicants must submit official transcripts from all post-secondary institutions attended (http://www.gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission). A Grade Point Average (GPA) of 3.00 on a 4.00 scale in the final two years of undergraduate studies or in the most recent graduate degree is required.
- Resume – Applicants must upload their current resume with the online application.
- Reference Letters – Applicants must submit two professional or academic letters of reference.
- Statement of Purpose - Applicants must upload a statement describing how professional experience and goals align with the certificate.

GRE or GMAT test scores are NOT required.

### Certificate Requirements

Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/postbaccalaureate-credit-certificate-programs).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MKTG 811</td>
<td>Driving Business Success with Marketing Analytics</td>
<td>3</td>
</tr>
<tr>
<td>MKTG 812</td>
<td>Evaluating Marketing Communications in the Digital World</td>
<td>3</td>
</tr>
<tr>
<td>MKTG 813</td>
<td>Data-Driven Customer Acquisition &amp; Retention</td>
<td>3</td>
</tr>
<tr>
<td>MKTG 814</td>
<td>Analytics for Brand Management and Customer Experience</td>
<td>3</td>
</tr>
<tr>
<td>Total Credits</td>
<td></td>
<td>12</td>
</tr>
</tbody>
</table>

### Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by
graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact
Certificate Program Head: Chelsea Hammond
Primary Program Contact: Michelle Rockower
Email: MKTGAN@psu.edu
Telephone: (814) 863-0474

Program Website: Marketing Analytics (http://www.worldcampus.psu.edu/degrees-and-certificates/penn-state-online-marketing-analytics-certificate/overview)

Nanotechnology Systems and Device Development Graduate Credit Certificate Program

Person-in-Charge: Victor Pasko
Program Code: NANOSD
Campus(es): University Park

The goal of the program is to prepare students to develop nanotechnology-enabled components, including wearable systems for simultaneously monitoring the medical condition of the wearer and the surrounding environment. The monitored data is transmitted in real time to a local base station (e.g., smartphone) that forwards it to a remote facility for further processing and action decisions. The ultimate purpose of these systems includes medical monitoring for diagnosis of environmentally related diseases, environmental monitoring to warn that the local environment contains allergens or other factors to be avoided.

Effective Semester: Fall 2014
Expiration Semester: Summer 2019

Admission Requirements
Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies). International applicants may be required to satisfy an English proficiency requirement; see GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-305/admission-requirements-international-students) for more information.

Ordinarily, an entering student must have completed in a satisfactory manner a minimum of course work in an Engineering or Science discipline that is equivalent to a Penn State major in those areas. Applicants must have a 3.0 or higher undergraduate GPA.

Certificate Requirements
Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/postbaccalaureate-credit-certificate-programs).

The exact course selection shall be determined in advance by the student and the student’s adviser following the guidelines below. Students shall provide written input to their adviser describing proposed course(s) and how the courses will contribute to the requirements of the certificate. Students must receive a C or better in each course included for the certificate, and must achieve an overall 3.0 GPA for the certificate courses.

The certificate requires a minimum of 12 credits, as described below. At least 50% of the total number of credits must be taken at the 500 level.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EE 442</td>
<td>Solid State Devices</td>
<td>3</td>
</tr>
<tr>
<td>EE 441</td>
<td>Semiconductor Integrated Circuit Technology</td>
<td></td>
</tr>
<tr>
<td>EE 542</td>
<td>Semiconductor Devices</td>
<td></td>
</tr>
<tr>
<td>MATSE 413</td>
<td>Solid-State Materials</td>
<td></td>
</tr>
<tr>
<td>MATSE 510</td>
<td>Surface Characterization of Materials</td>
<td></td>
</tr>
<tr>
<td>Select 3 credits from the following list:</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>EE 541</td>
<td>Manufacturing Methods in Microelectronics</td>
<td></td>
</tr>
<tr>
<td>ESC 481</td>
<td>Elements of Nano/Micro-electromechanical Systems Processing and Design</td>
<td></td>
</tr>
<tr>
<td>ESC 577</td>
<td>Engineered Thin Films</td>
<td></td>
</tr>
<tr>
<td>MATSE/ESC 450</td>
<td>Synthesis and Processing of Electronic and Photonic Materials</td>
<td></td>
</tr>
<tr>
<td>Select at least 2 credits from the following list:</td>
<td>2-3</td>
<td></td>
</tr>
<tr>
<td>ENGR 486</td>
<td>Business Opportunities in Engineering</td>
<td></td>
</tr>
<tr>
<td>ENGR 411</td>
<td>Entrepreneurship Business Basics</td>
<td></td>
</tr>
<tr>
<td>ENTR 430</td>
<td>Entrepreneurship and New Product Development</td>
<td></td>
</tr>
<tr>
<td>Electives</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The balance of the required credits shall be determined in advance by the student and his/her graduate adviser. Examples of acceptable courses (a current list of potential elective courses will be maintained by and available from the head of the certificate program):</td>
<td>3-4</td>
<td></td>
</tr>
<tr>
<td>EE 546</td>
<td>Field-Effect Devices</td>
<td></td>
</tr>
<tr>
<td>ESC 482</td>
<td>Micro-Optoelectromechanical Systems (MOEMS) and Nanophotonics</td>
<td></td>
</tr>
<tr>
<td>ESC 484</td>
<td>Biologically Inspired Nanomaterials</td>
<td></td>
</tr>
<tr>
<td>MATSE 400</td>
<td>Crystal Chemistry</td>
<td></td>
</tr>
<tr>
<td>MATSE/ESC 483</td>
<td>Simulation and Design of Nanostructures</td>
<td></td>
</tr>
<tr>
<td>MATSE 511B</td>
<td>Transmission Electron Microscopy</td>
<td></td>
</tr>
<tr>
<td>MATSE 514</td>
<td>Characterization of Materials</td>
<td></td>
</tr>
<tr>
<td>Total Credits</td>
<td>12</td>
<td></td>
</tr>
</tbody>
</table>

Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up
deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact
Certificate Program Head: Victor Pasko
Primary Program Contact: Sherry Jackson
Email: sdj2@psu.edu
Mailing Address: 121 Electrical Engineering East, University Park, PA 16802
Telephone: (814) 863-7294
Program Website: Nanotechnology Systems and Device Development (http://www.ee.psu.edu/Graduate/default.aspx)

New Ventures and Entrepreneurs Graduate Credit Certificate Program

Person-in-Charge: James Nemes
Program Code: NWVENT
Campus(es): Great Valley

This graduate certificate is designed specifically to help current and aspiring entrepreneurs conceptualize and develop new business ventures and/or new products to take to market. This 12-credit certificate will engage students in a creative process that includes opportunity recognition, idea generation and selection, the lean start-up process, and business plan development. Using a cross-disciplinary approach, students will gain competence in writing all sections of a professional business plan, including the presentation of financial statements and market data. Students will also have an opportunity to pitch their new ventures/products to potential funders.

Effective Date: Fall Semester 2016
Expiration Date: Summer 2021

Admission Requirements
Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies). International applicants may be required to satisfy an English proficiency requirement; see GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-305/admission-requirements-international-students) for more information.

The successful applicant is generally expected to have a minimum combined junior/senior grade-point average of 3.0 (B) on a 4.0 scale.

Certificate Requirements
Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/postbaccalaureate-credit-certificate-programs).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BUSAD 811</td>
<td>New Ventures Ideation and Feasibility Analysis</td>
<td>3</td>
</tr>
<tr>
<td>BUSAD 822</td>
<td>New Venture Start-up</td>
<td>3</td>
</tr>
</tbody>
</table>

Electives
Select two of the following: 6

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCTG 811</td>
<td>Financial Accounting</td>
</tr>
<tr>
<td>BUSAD 519</td>
<td>Developing Creative High Performance Organizations</td>
</tr>
<tr>
<td>BUSAD 545</td>
<td>Negotiation Strategies</td>
</tr>
<tr>
<td>BUSAD 882</td>
<td>Social Entrepreneurship and Community Leadership</td>
</tr>
<tr>
<td>BUSAD 809</td>
<td>Triple Bottom Line Accounting</td>
</tr>
<tr>
<td>MGMT 507</td>
<td>Positive Organizational Behavior and Wellbeing</td>
</tr>
<tr>
<td>SYSEN 505</td>
<td>Technical Project Management</td>
</tr>
<tr>
<td>SYSEN 550</td>
<td>Creativity and Problem Solving I</td>
</tr>
<tr>
<td>SYSEN 552</td>
<td>Creativity and Problem Solving II</td>
</tr>
<tr>
<td>SYSEN 554</td>
<td>Problem Solving Leadership</td>
</tr>
<tr>
<td>SYSEN 555</td>
<td>Invention and Creative Design</td>
</tr>
</tbody>
</table>

Total Credits 12

Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact
Certificate Program Head: James Nemes
Director of Graduate Studies/Professor-in-Charge: Karen Duhala
Primary Program Contact: Leanne Wallace
Email: lxw31@psu.edu
Mailing Address: 30 East Swedesford Road, Malvern, PA 19355
Telephone: (610) 648-3336
Program Website: New Ventures and Entrepreneurship (http://greatvalley.psu.edu/academics/graduate-certificates/new-ventures-and-entrepreneurship)

Nonprofit Administration Graduate Credit Certificate Program

Person-in-Charge: Triparna Vasavada
Program Code: CLNPFPT
Campus(es): Harrisburg

The graduate credit certificate program in Nonprofit Administration is offered by the graduate program in Public Administration at Penn State Harrisburg. The certificate is designed for administrators and
professionals in government and not-for-profit organizations who need to acquire additional knowledge and skills in the following areas:

- Management of nonprofit organizations and leadership
- In-depth understanding of nonprofit organizations’ evolution, current operation, and future direction
- Understanding of finance, taxation, and competition that affect an organization’s future
- Working in the nonprofit sector

Effective Date: Summer Session 2017
Expiration Date: Summer Session 2022

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies). International applicants may be required to satisfy an English proficiency requirement; see GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac-gcac-300/admission-requirements-international-students) for more information.

1. Applicants must have a GPA of 3.0 in the last two years of undergraduate work.
2. Applicants must have at least two years of managerial or administrative experience in the nonprofit sector.

If a student who is already enrolled in a graduate degree program wishes to enroll in this graduate credit certificate program as well, he/she must do so by completing the online certificate application and paying the nonrefundable application fee.

Students who are already enrolled in the Public Administration degree program at Penn State Harrisburg must complete a "Notice of Intent" form as well in order to enroll in the certificate program. These students can choose elective courses for their M.P.A. degree program in accordance with the requirements of the certificate program in order to earn the certificate in Nonprofit Administration. Courses taken in the certificate program may be applied toward a graduate degree in Public Administration, subject to restrictions outlined in GCAC-309 Transfer Credit (http://gradschool.psu.edu/graduate-education-policies/gcac-gcac-309/transfer-credit).

Certificate Requirements

Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac-gcac-200/postbaccalaureate-credit-certificate-programs).

The certificate program consists of four graduate courses (12 credits). All courses must be at the 500 level. Students are required to take three required courses and one elective course of their choice. All courses must be taken for a letter grade with at least a 3.0 average maintained; no grades below a C will be counted toward the certificate.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PADM 517</td>
<td>Nonprofit Organizations: History and Evolution</td>
<td>3</td>
</tr>
<tr>
<td>PADM 518</td>
<td>Nonprofit Organizations: Management and Leadership</td>
<td>3</td>
</tr>
<tr>
<td>PADM 519</td>
<td>Nonprofit Organizations: Resource Development and Management</td>
<td>3</td>
</tr>
</tbody>
</table>

Electives

Students are required to take one elective 3-credit course. Students are free to choose any 3-credit course at the 500 level that is relevant to their interest. Following is the suggested list of courses from which students can choose.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>PADM 510</td>
<td>Organization Behavior</td>
</tr>
<tr>
<td>PADM 514</td>
<td>Public Organization and Managerial Consultation</td>
</tr>
<tr>
<td>PADM 516</td>
<td>Strategic Planning</td>
</tr>
<tr>
<td>PADM 522</td>
<td>Government Financial Management</td>
</tr>
<tr>
<td>PADM 523</td>
<td>Governmental and Nonprofit Accounting</td>
</tr>
<tr>
<td>PADM 550</td>
<td>Policy and Program Evaluation</td>
</tr>
</tbody>
</table>

Total Credits 12

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact

Certificate Program Head: Triparna Vasavada
Primary Program Contact: Jordyn McCrady
Phone: (717) 948-6773
Email: jam5497@psu.edu
Mailing Address: W159 Olmsted Bldg, 777 W. Harrisburg Pike, Middletown, PA 17057

Program Website: Non-Profit Administration (https://harrisburg.psu.edu/public-affairs/public-administration/certificate-program-non-profit-administration)

Nurse Administrator Graduate Credit Certificate Program

Person-in-Charge: Judith Hupcey
Program Code: NSGADM
Campus(es): World Campus

The purpose of the Nurse Administrator graduate credit certificate is to prepare nurses with a baccalaureate or higher degree in Nursing for certification as a nurse administrator.

Effective Semester: Spring 2017
Expiration Semester: Spring 2022

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-
students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies). International applicants may be required to satisfy an English proficiency requirement; see GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

Applicants must hold a Bachelor's or higher degree in nursing from a U.S. regionally accredited institution or from an officially recognized degree-granting international institution. Official transcripts from all post-secondary institutions attended (http://www.gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission) must accompany the application. Prior to an applicant’s admission, transcripts are evaluated by the Graduate Admissions Committee to ascertain the applicant’s potential for successful completion of the core courses. A recommendation regarding admission is discussed with the Associate Dean for Graduate Education and Research prior to making an offer of admission to this certificate program.

Applicants must hold a current license to practice professional nursing in the United States or a foreign country.

Certificate Requirements

Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/postbaccalaureate-credit-certificate-programs).

The certificate requires completion of three 3-credit graduate-level nurse administrator didactic courses (9 credits); an optional practicum course (4 credits) is available as well. All courses are delivered using distance technology and are available through the World Campus.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>NURS 846</td>
<td>Leadership Concepts and Theories for Nurse Administrators</td>
<td>3</td>
</tr>
<tr>
<td>NURS 848</td>
<td>Synthesis and Application of the Nurse Administrator Role</td>
<td></td>
</tr>
</tbody>
</table>

Total Credits: 9

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact

Certificate Program Head: Judith Hupcey
Director of Graduate Studies/Professor-in-Charge: Kelly Wolgast
Primary Program Contact: Xiaohong Sheng

Email: xus1@psu.edu
Mailing Address: 203 Nursing Sciences Building, University Park, PA 16802
Telephone: (814) 863-2211
Program Website: Nurse Administrator (http://www.nursing.psu.edu/graduate/certificates)

Nurse Educator Graduate Credit Certificate Program

Person-in-Charge: Judith Hupcey
Program Code: NSGED
Campus(es): World Campus

The purpose of the Nurse Educator certificate is to provide nurses with a baccalaureate degree or higher in nursing formal content in nursing education for those who plan to teach in a variety of educational and clinical settings.

Effective Semester: Spring 2017
Expiration Semester: Spring 2022

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies). International applicants may be required to satisfy an English proficiency requirement; see GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

Applicants must hold a Bachelor’s or higher degree in nursing from a U.S. regionally accredited institution or from an officially recognized degree-granting international institution. Official transcripts from all post-secondary institutions attended (http://www.gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission) must accompany the application. Prior to an applicant’s admission, transcripts are evaluated by the Graduate Admissions Committee to ascertain the applicant’s potential for successful completion of the core courses. A recommendation regarding admission is discussed with the Associate Dean for Graduate Education and Research prior to making an offer of admission to this certificate program.

Applicants must hold a current license to practice professional nursing in the United States or a foreign country.
Certificate Requirements

Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/postbaccalaureate-credit-certificate-programs).

The certificate requires completion three 3-credit graduate-level nurse educator didactic courses (9 credits); an optional 4-credit nurse educator practicum is available as well. All courses are delivered using distance technology and are available through the World Campus.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>NURS 840</td>
<td>Nursing Education Theories and Strategies</td>
<td>3</td>
</tr>
<tr>
<td>NURS 841</td>
<td>Assessment and Evaluation in Nursing Education</td>
<td>3</td>
</tr>
<tr>
<td>NURS 842</td>
<td>Curriculum and Program Development in Nursing Education</td>
<td>3</td>
</tr>
</tbody>
</table>

**Optional Practicum Course**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>NURS 843</td>
<td>Synthesis and Application of the Nurse Educator Role</td>
<td>3</td>
</tr>
</tbody>
</table>

**Total Credits**: 9

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact

**Certificate Program Head**: Judith Hupcey

**Director of Graduate Studies/Professor-in-Charge**: Kelly Wolgast

**Primary Program Contact**: Xiaohong Sheng

**Email**: xus1@psu.edu

**Mailing Address**: 203 Nursing Sciences Building, University Park, PA 16802

**Telephone**: (814) 863-2211

**Program Website**: Nurse Educator (http://www.nursing.psu.edu/graduate/certificates)

Operations and Supply Chain Management Graduate Credit Certificate Program

**Person-in-Charge**: Richard R. Young

**Program Code**: CLOSCM

**Campus(es)**: Harrisburg

The goal of this 12 credit certificate program is to better prepare operations and supply chain management professionals with those contemporary skills and concepts necessary for the effective and efficient management of the physical, informational, and financial flows that collectively form the networks that add value to firms competing on a global scale. Students will learn to analyze, develop, and implement those functions related to sourcing materials, producing goods and services, delivering products, returning residuals, and planning how these are combined into a network.

**Effective Semester**: Spring 2016

**Expiration Semester**: Spring 2021

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies). International applicants may be required to satisfy an English proficiency requirement; see GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

This curriculum is designed for working operations and supply chain management professionals. Successful applicants will normally have, before the start of their first semester, at least two years’ post baccalaureate work experience in operations management, supply chain management, project management, or a closely allied field.

An applicant must have received, from a regionally accredited institution, a baccalaureate degree under residence with credit conditions substantially equivalent to those required by Penn State. Additionally, the applicant’s baccalaureate degree should be in business, engineering, economics, information sciences, or a related field and the applicant should have completed a college-level course in microeconomic principles with a course in supply operations and/or chain management strongly recommended. A minimum undergraduate GPA of 2.8 is required unless the student has earned a graduate degree from an accredited university.

Ideally, the applicant should have a working knowledge of Microsoft Excel and business statistics, plus a basic understanding of accounting principles.

Certificate Requirements

Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/postbaccalaureate-credit-certificate-programs).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Required Courses</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Select one of the following:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MNGMT 522</td>
<td>Operations and Supply Chain Management</td>
<td>3</td>
</tr>
<tr>
<td>MNGMT 523</td>
<td>Service Operations Management</td>
<td></td>
</tr>
</tbody>
</table>

**Electives**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Select two of the following:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MANGT 510</td>
<td>Project Management</td>
<td>6</td>
</tr>
<tr>
<td>SCIS 540</td>
<td>Transportation and Distribution Management</td>
<td></td>
</tr>
<tr>
<td>SCIS 546</td>
<td>Procurement and Supply Management</td>
<td></td>
</tr>
<tr>
<td>SCIS 570</td>
<td>Supply Chain Engineering</td>
<td></td>
</tr>
</tbody>
</table>
Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact

Certificate Program Head: Richard Young
Email: rry100@psu.edu
Mailing Address: 356P Olmsted Building, 777 W Harrisburg Pike, Middletown, PA 17057
Telephone: (717) 948-6169
Program Website: Operations and Supply Chain Management (https://harrisburg.psu.edu/business-administration/supply-chain-management/graduate-certificate-operations-supply-chain-management)

Organization Development and Change: Analytics Graduate Credit Certificate Program

Person-in-Charge: Roy Clariana
Program Code: ODCA
Campus(es): University Park, World Campus

The focus of this certificate program is for students to learn about the use of analytical tools and approaches as they apply to organization development and change initiatives. This includes approaches to evaluating organization development (OD) and consulting services; assessing and feeding back data in organization development; and use of labor supply models to evaluate investments.

Effective Semester: Spring 2016
Expiration Semester: Spring 2021

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies). International applicants may be required to satisfy an English proficiency requirement; see GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

Certificate Requirements

Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/postbaccalaureate-credit-certificate-programs).

To be awarded the Certificate in Organization Development and Change: Analytics, students must successfully complete 12 credits of course work in the required courses listed below.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>WFED 572</td>
<td>Foundations in Organization Development and Change</td>
<td>3</td>
</tr>
<tr>
<td>WFED 585</td>
<td>Appraising Organization Change and Development and Consulting</td>
<td>3</td>
</tr>
<tr>
<td>WFED 582</td>
<td>Assessing Data: Organizational Diagnosis</td>
<td>3</td>
</tr>
<tr>
<td>WFED 543</td>
<td>Evaluation of Investments in Workforce Education and Development</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits: 12

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact

Certificate Program Head: Roy Clariana
Director of Graduate Studies/Professor-in-Charge: Susan Land
Primary Program Contact: Jennifer McLaughlin
Email: jem73@psu.edu
Mailing Address: Learning and Performance Systems, 303 Keller Building, University Park, PA 16802
Telephone: (814) 863-2596

Organization Development and Change: Consulting Skills Graduate Credit Certificate Program

Person-in-Charge: Roy Clariana
Program Code: ODCOE
Campus(es): University Park, World Campus

To become effective Organization Development (OD) consultants and OD practitioners, hands-on experience is necessary. After completing the
Organization Development and Change: Essentials Graduate Credit Certificate Program

Certificate Program, students will have skills and competencies that can be applied to help the organizations they serve continuously improve and maximize potential.

Effective Semester: Spring 2016
Expiration Semester: Spring 2021

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies). International applicants may be required to satisfy an English proficiency requirement; see GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

Certificate Requirements

Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/postbaccalaureate-credit-certificate-programs).

To be awarded the Certificate in Organization Development and Change: Consulting Skills, students must successfully complete 12 credits of course work in the courses listed below.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>WFED 572</td>
<td>Foundations in Organization Development and Change</td>
<td>3</td>
</tr>
<tr>
<td>WFED 881</td>
<td>Marketing Organization Development</td>
<td>3</td>
</tr>
<tr>
<td>WFED 884</td>
<td>Appreciative Inquiry</td>
<td>3</td>
</tr>
<tr>
<td>WFED 582</td>
<td>Assessing Data: Organizational Diagnosis</td>
<td>3</td>
</tr>
<tr>
<td>TRDEV 565</td>
<td>is an approved substitution for one of the starred courses listed above.</td>
<td></td>
</tr>
</tbody>
</table>

Total Credits 12

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact

Certificate Program Head: Roy Clariana
Director of Graduate Studies/Professor-in-Charge: Susan Land
Primary Program Contact: Jennifer McLaughlin
Email: jem73@psu.edu

Mailing Address: Learning and Performance Systems, 303 Keller Building, University Park, PA 16802
Telephone: (814) 863-2596

Organization Development and Change: Essentials Graduate Credit Certificate Program

Person-in-Charge: Roy Clariana
Program Code: ODCESS
Campus(es): University Park, World Campus

The primary goal of the certificate programs is to provide essential knowledge skills in organization development and change, facilitation of groups and teams, appreciative inquiry, and process consultation. The certificate program focuses on exposing students to global issues and the way change occurs around and within organizations. Emphasis is placed on the importance of knowledge and skills when it comes to facilitating change initiatives from a humanistic perspective.

Effective Semester: Spring 2016
Expiration Semester: Spring 2021

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies). International applicants may be required to satisfy an English proficiency requirement; see GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

Certificate Requirements

Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/postbaccalaureate-credit-certificate-programs).

To be awarded the Certificate in Organization Development and Change: Essentials, students must successfully complete 12 credits of course work in the courses listed below.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>WFED 572</td>
<td>Foundations in Organization Development and Change</td>
<td>3</td>
</tr>
<tr>
<td>WFED 880</td>
<td>Facilitating Groups and Teams</td>
<td>3</td>
</tr>
<tr>
<td>WFED 884</td>
<td>Appreciative Inquiry</td>
<td>3</td>
</tr>
<tr>
<td>WFED 578</td>
<td>Process Consultation in Organization Development</td>
<td>3</td>
</tr>
</tbody>
</table>
TRDEV 565 is an approved substitution for one of the starred courses listed above.

Total Credits: 12

Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact
Certificate Program Head: Roy Clariana
Director of Graduate Studies/Professor-in-Charge: Susan Land
Primary Program Contact: Jennifer McLaughlin
Email: jem73@psu.edu
Mailing Address: Learning and Performance Systems, 303 Keller Building, University Park, PA 16802
Telephone: (814) 863-2596

Organization Development and Change: Occupational Safety and Health Graduate Credit Certificate Program

Person-in-Charge: Roy Clariana
Program Code: ODCOSH
Campus(es): University Park, World Campus

Accidents in the workforce and educational environments are metaphorically similar to a line of falling dominoes. As one incident occurs, it has the ability to trigger a harmful chain reaction. Therefore the Organization Development and Change, Occupational Safety and Health Certificate Program is designed to assist workforce development professionals in building the skills and abilities needed to create and support workplaces and educational environments that are free of occupational safety and health hazards. Emphasis is placed on leadership development to promote detection, analysis, and correction of unsafe workplace conditions and procedures.

Effective Semester: Spring 2016
Expiration Semester: Spring 2021

Admission Requirements
Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to

Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies). International applicants may be required to satisfy an English proficiency requirement; see GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

Certificate Requirements
Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/postbaccalaureate-credit-certificate-programs).

To be awarded the Certificate in Organization Development and Change: Occupational Safety and Health, students must successfully complete 12 credits of course work in the required courses listed below.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>WFED 572</td>
<td>Foundations in Organization Development and Change</td>
<td>3</td>
</tr>
<tr>
<td>WFED 573</td>
<td>Needs Assessment for Workforce Development Professionals</td>
<td>3</td>
</tr>
<tr>
<td>WFED 411</td>
<td>Occupational Safety and Health for Workforce Education and Development Professionals</td>
<td>3</td>
</tr>
<tr>
<td>WFED 806</td>
<td>Program and Facilities Management for Work Force Development Professionals</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits: 12

Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact
Certificate Program Head: Roy Clariana
Director of Graduate Studies/Professor-in-Charge: Susan Land
Primary Program Contact: Jennifer McLaughlin
Email: jem73@psu.edu
Mailing Address: Learning and Performance Systems, 303 Keller Building, University Park, PA 16802
Telephone: (814) 863-2596
Organization Development and Change: Operational Excellence Graduate Credit Certificate Program

Person-in-Charge: Roy Clariana
Program Code: ODCOE
Campus(es): University Park, World Campus

This certificate program teaches students how to change corporate culture from a continuous process improvement perspective. Recognizing that organizations either get better or worse, the focus of this certificate is on the tools and methodologies for making positive organizational impact. Emphasis is placed on the application of essential continuous improvement methodologies including lean and six sigma concepts to improve processes in any industry. A focus is also placed on the concepts and skills needed to complete project initiatives on time and within budget.

Effective Date: Spring 2016
Expiration Semester: Spring 2021

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies). International applicants may be required to satisfy an English proficiency requirement; see GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac-gcac-300/admission-requirements-international-students) for more information.

Certificate Requirements

Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac-gcac-200/postbaccalaureate-credit-certificate-programs).

To be awarded the Certificate in Organization Development and Change: Operational Excellence, students must successfully complete 12 credits of course work in the required courses listed below.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>WFED 572</td>
<td>Foundations in Organization Development and Change</td>
<td>3</td>
</tr>
<tr>
<td>WFED 880</td>
<td>Facilitating Groups and Teams</td>
<td>3</td>
</tr>
<tr>
<td>WFED 451</td>
<td>Lean-Sigma for Professionals</td>
<td>3</td>
</tr>
<tr>
<td>WFED 405</td>
<td>Project Management for Professionals</td>
<td>3</td>
</tr>
<tr>
<td>Total Credits</td>
<td></td>
<td>12</td>
</tr>
</tbody>
</table>

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact

Certificate Program Head: Roy Clariana
Director of Graduate Studies/Professor-in-Charge: Susan Land
Primary Program Contact: Jennifer McLaughlin

Email: jem73@psu.edu
Mailing Address: Learning and Performance Systems, 303 Keller Building, University Park, PA 16802
Telephone: (814) 863-2596


Primary Palliative Care Graduate Credit Certificate Program

Person-in-Charge: Judith Hupcey
Program Code: PRPLCR
Campus(es): University Park

The Penn State College of Nursing offers a Graduate Certificate in Primary Palliative Care program. The primary goal of the program is to prepare individuals with a Bachelor’s or higher degree in Nursing or a related health discipline in the principles and practice of primary palliative care.

Effective Date: Fall Semester 2017
Expiration Date: Spring Semester 2022

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies). International applicants may be required to satisfy an English proficiency requirement; see GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac-gcac-300/admission-requirements-international-students) for more information.

Official transcripts from all post-secondary institutions attended (http://www.gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission) are required.

Applicants must hold a bachelor’s or higher degree in nursing or a related health discipline from a U.S. regionally accredited institution or from an officially recognized degree-granting international institution.

Prior to an applicant’s admission, transcripts are evaluated by the program coordinator to ascertain the applicant’s potential for successful completion of the core courses. A recommendation regarding admission is discussed with the Associate Dean for Graduate Education and
Research prior to making an offer of admission to this certificate program.

Certificate Requirements

Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/postbaccalaureate-credit-certificate-programs).

The curriculum includes 6 credits (two 3 credit courses) of didactic content in primary palliative care and interdisciplinary management of advanced serious illness and one 3 credit course of the interdisciplinary practice of the palliative care role. The practicum course involves the application of knowledge acquired in previously completed courses related to primary palliative care. The practicum will build upon and extend students’ previous experiences and fulfill mutually agreed-upon objectives based on the student’s identified learning needs. All courses will be delivered using distance technology.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>NURS 824</td>
<td>Primary Palliative Care: An Interdisciplinary Approach</td>
<td>3</td>
</tr>
<tr>
<td>NURS 825</td>
<td>Primary Palliative Care: Interdisciplinary Management of Advanced Serious Illness</td>
<td>3</td>
</tr>
<tr>
<td>NURS 826</td>
<td>Interdisciplinary Practicum of the Primary Palliative Care Role</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Total Credits</td>
<td>9</td>
</tr>
</tbody>
</table>

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact

Certificate Program Head: Judith Hupcey
Primary Program Contact: Marsha Freije
Email: mmf19@psu.edu
Mailing Address: 203 Nursing Sciences Building, University Park, PA 16802
Telephone: (814) 867-5026
Program Website: Primary Palliative Care (http://www.nursing.psu.edu/graduate)

Principalship Graduate Credit Certificate Program

Person-in-Charge: Kevin Kinser
Program Code: IPRIN
Campus(es): University Park, World Campus

The goal of the program is to prepare students to apply for principal certification by earning 18 credits in Educational Leadership coursework. Successful completion of course work required for the iPrin Certificate partially fulfills Pennsylvania Department of Education (PDE) requirements for principal certification. This curriculum has been approved by PDE. Note that some states have reciprocity with Pennsylvania and may recognize completion of course work leading to certification. A U.S. student should check first with their state about reciprocity before applying to the certificate program. International students can enhance their professional credentials by earning the certificate and may be qualified to manage and lead a U.S.-based school overseas.

Effective Semester: Fall 2014
Expiration Semester: Spring 2019

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies). International applicants may be required to satisfy an English proficiency requirement; see GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

Certificate Requirements

Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/postbaccalaureate-credit-certificate-programs).

Students must maintain a minimum GPA of 3.0 for courses counting toward the certificate.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDLDR 559</td>
<td>School Improvement</td>
<td>3</td>
</tr>
<tr>
<td>EDLDR/C-S 560</td>
<td>Principles of Instructional Supervision</td>
<td>3</td>
</tr>
<tr>
<td>EDLDR 568</td>
<td>The Principalship</td>
<td>3</td>
</tr>
<tr>
<td>EDLDR 576</td>
<td>The Law and Education</td>
<td>3</td>
</tr>
<tr>
<td>EDLDR 579</td>
<td>Financial Management for Schools</td>
<td>3</td>
</tr>
<tr>
<td>EDLDR 595</td>
<td>Internship (Principal Internship)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Total Credits</td>
<td>18</td>
</tr>
</tbody>
</table>

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may
be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**Contact**

**Certificate Program Head:** Kevin Kinser

**Director of Graduate Studies/Professor-in-Charge:** Kai Schafft

**Primary Program Contact:** Barbara Duncan

**Email:** bld11@psu.edu

**Mailing Address:** 200 Rackley Bldg, University Park, PA 16802

**Telephone:** (814) 865-1487

**Program Website:** Principalship (http://www.worldcampus.psu.edu/degrees-and-certificates/principal-certification/overview)

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**Project Management Graduate Credit Certificate Program**

**Person-in-Charge:** Jeffrey Pinto

**Program Code:** PMPC

**Campus(es):** World Campus

Delivering complex projects on time and under budget is a daily challenge for most corporations. More organizations now use project-based methods to accomplish such tasks, resulting in increased demand for project managers. The online Graduate Certificate in Project Management is an interdisciplinary, 12-credit program that uses problem-based learning to provide a strong foundation in project management theory and practice. The program is offered by the AACSB Accredited Sam and Irene Black School of Business and Penn State is a Project Management Institute (PMI)® Registered Education Provider (R.E.P), making this certificate a well-respected credential.

The certificate in Project Management emphasizes application of course concepts to actual project management opportunities and problems. Therefore, students who currently are, or previously were, employed as project managers or project team members will derive the greatest benefit from the program. All applicants must provide evidence of sufficient current or previous work experience that will enable them to successfully complete course assignments requiring the application of course concepts to real project management situations. This evidence may be provided in either the form of two letters of recommendation from individuals who know the applicant in a professional capacity or through nomination to participate in the program by an appropriate official within the applicant’s employing organization. Those who write letters of recommendation or submit nominations on behalf of the applicant will be asked to attest to the nominee’s suitability for the program of study considering factors such as the applicant’s length of employment, level and areas of work responsibility, personal qualities, career goals, maturity of purpose, and program requirements to apply course concepts to work-related issues. Applicants are encouraged to consult with the program chair concerning the suitability of their work experiences in relationship to program requirements.

All students must be computer literate and have ready and reliable access to a computer and the Internet to successfully complete the certificate. They must know how to use word processing software, log on to an Internet provider, and use email. Additionally, students will use Microsoft Office in their course work that will require they have a working knowledge of Microsoft Office programs such as Word, Excel, Power Point, and Access. Access to fax facilities may be needed as an additional form of communication between student and instructor or between students.

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**Certificate Requirements**

Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/postbaccalaureate-credit-certificate-programs).

Students complete MANGT 510, in their first semester of study and three additional courses for a total of 12 credits. MANGT 515 through MANGT 540 may be taken either concurrently or subsequently with MANGT 510.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MANGT 510</td>
<td>Project Management</td>
<td>3</td>
</tr>
</tbody>
</table>

---

**Admission Requirements**

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies). International applicants may be required to satisfy an English proficiency requirement; see GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

Only applicants who demonstrate high promise of success for graduate work are admitted to the program. Admission decisions are based on:

1. Undergraduate grade-point average
2. A personal essay
3. Two submitted letters of recommendation

The applicant’s cumulative undergraduate grade-point average or the junior/senior grade-point average is required to be a 3.0 or better.

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**Effective Date:** Fall Semester 2012

**Expiration Date:** Fall Semester 2020
Select three of the following: 9

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MANGT 515</td>
<td>Cost and Value Management</td>
<td></td>
</tr>
<tr>
<td>MANGT 520</td>
<td>Planning and Resource Management</td>
<td></td>
</tr>
<tr>
<td>MANGT 525</td>
<td>Commercial Law and Project Procurement</td>
<td></td>
</tr>
<tr>
<td>MANGT 531</td>
<td>Organizations</td>
<td></td>
</tr>
<tr>
<td>MANGT 535</td>
<td>Interpersonal and Group Behavior</td>
<td></td>
</tr>
<tr>
<td>MANGT 540</td>
<td>Strategy: Corporate, Business and Project</td>
<td></td>
</tr>
</tbody>
</table>

Total Credits 12

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact

Certificate Program Head: Jeffrey Pinto
Primary Program Contact: Alice Puzarowski
Email: alg135@psu.edu
Mailing Address: 5101 Jordan Road, Erie, PA 16563-1400
Telephone: (814) 898-6200
Program Website: Project Management Graduate Certificate (http://www.worldcampus.psu.edu/degrees-and-certificates/project-management-certificate/overview)

Psychology: Applications in Clinical Psychology Graduate Credit Certificate Program

Person-in-Charge: Senel Poyrazli
Program Code: CLACPY
Campus(es): Harrisburg

The graduate certificate in Psychology: Applications in Clinical Psychology is treatment oriented and intended to prepare mental health counselors to work in community mental health settings. The four courses provide exposure to major subfields of applied clinical psychology, to enhance training received in a traditional master's degree program. This program helps enhance mental health professionals' skills in providing services for individuals and families coping with psychological issues such as relationship difficulties, depression, decision making, trauma, anxiety, child custody, or adjustment.

Effective Semester: Spring Semester 2006
Expiration Semester: Spring Semester 2021

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

Students must have obtained a master's degree from a regionally accredited institution of higher education in clinical or counseling psychology, or be concurrently enrolled as a degree student in Penn State Harrisburg's Applied Clinical Psychology master's program. For students currently enrolled in the master's program in Applied Clinical Psychology at Penn State Harrisburg, the certificate will be awarded upon completion of the 12 credits required for the certificate. The certificate cannot be awarded prior to completion of the master's degree. Course work counting for a graduate or undergraduate degree may not also be used to fulfill the requirements for the certificate.

Certificate Requirements

Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac-200/postbaccalaureate-credit-certificate-programs).

If one of the required subdisciplines of applied clinical psychology was included in a student’s master's program, the program will permit the student to select a substitute course that would provide the student with exposure to an area to which the student was not exposed in her or his master’s program. Students, with program permission may substitute a 500-level psychology course for a required course she or he had previously taken in a master’s program.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CNED 505</td>
<td>Foundations of Career Development and Counseling Information</td>
<td>3</td>
</tr>
<tr>
<td>PSYC 515</td>
<td>Clinical Health Psychology</td>
<td>3</td>
</tr>
<tr>
<td>PSYC 525</td>
<td>Forensic Psychology</td>
<td>3</td>
</tr>
<tr>
<td>PSYC 572</td>
<td>Neuropsychological Assessment</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits 12

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact

Certificate Program Head: Senel Poyrazli
Primary Program Contact: Mary Ann Sim
Email: mus19@psu.edu
Mailing Address: W-311 Olmsted Building, 777 W. Harrisburg Pike, Middletown, PA 17057
Public Budgeting and Financial Management Graduate Credit Certificate Program

Person-in-Charge: Odd Stalebrink
Program Code: CLPFIN
Campus(es): Harrisburg, World Campus

The primary goal of this graduate certificate is to educate administrators and professionals in government and not-for-profit organizations who need to acquire additional knowledge and skills in the following areas:

1. fiscal and governmental aspects of budgeting and financial management;
2. development of organizational budgets; and
3. governmental and not-for-profit accounting.

At the end of the program students will be able to:

- Explain the significance of key topics in government financial management (governmental accounting, auditing, financial reporting, internal controls and budgeting at the federal, state and local levels) as they relate to public sector organizations.
- Describe how government financial management can contribute toward more efficient use of public resources, increased transparency and improved accountability.
- Identify and describe the role of key actors in the government financial management process.
- Apply key financial management planning, management, and control tools to addressing resource constraints, and meeting transparency and accountability demands.

Effective Date: Spring Semester 2017
Expiration Date: Spring Semester 2022

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

International applicants may be required to satisfy an English proficiency requirement; see GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac-gcac-300/admission-requirements-international-students) for more information.

Certificate Requirements

Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac-gcac-200/postbaccalaureate-credit-certificate-programs).

To complete the program students need to successfully complete 9 credits. Successful completion of a course is defined as a grade of B- or better.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PADM 502</td>
<td>Governmental Fiscal Decision Making</td>
<td>3</td>
</tr>
<tr>
<td>PADM 522</td>
<td>Governmental Financial Management</td>
<td>3</td>
</tr>
<tr>
<td>PADM 523</td>
<td>Governmental and Nonprofit Accounting</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td></td>
<td><strong>9</strong></td>
</tr>
</tbody>
</table>

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact

Certificate Program Head: Odd Stalebrink
Primary Program Contact: Jordyn McCrady
Email: jam5497@psu.edu
Mailing Address: 777 West Harrisburg Pike, Middletown, PA 17057
Telephone: (717) 948-6773
Program Website:
- Public Budgeting at World Campus (https://www.worldcampus.psu.edu/degrees-and-certificates/public-budgeting-financial-management-certificate/overview)

Public Health Graduate Credit Certificate Program

Graduate Program Head: Wenke Hwang
Program Code: HYGCPH
Campus(es): Hershey

The purpose of the graduate certificate in Public Health is to provide students with foundational graduate-level course work in public health. Upon completion of the Public Health certificate, students will be able to:

1. Demonstrate their knowledge in core areas of public health, which include biostatistics, epidemiology, health services administration, and social and behavioral sciences.
2. Apply their knowledge and skills to solving public health problems.
All courses in the certificate program may be applied to the M.P.H. degree program, subject to restrictions outlined in GCAC-309 Transfer Credit (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-309/transfer-credit). Students must earn a grade of B or better for a course to be applied to the M.P.H. degree program. Certificate program students who wish to have the certificate courses applied to the M.P.H. degree program must formally apply and be admitted to the Penn State M.P.H. degree program. Admission into the Penn State M.P.H. degree program is a separate step and is not guaranteed.

Effective Semester: Spring 2018
Expiration Semester: Spring 2023

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies). International applicants may be required to satisfy an English proficiency requirement; see GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

Applicants must submit the following items with their applicant for admission to the Public Health certificate program:

- Official transcripts from all post-secondary institutions attended (http://gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission)
- Resume/CV
- Statement of Purpose or Rationale for seeking a Graduate Certificate in Public Health
- Two letters of recommendation

Upon approval, certificate program students will enroll in course work on a nondegree basis. Note that admission as a nondegree graduate student neither guarantees nor implies subsequent admission to a degree program. Nondegree students are not eligible to receive fellowships or graduate assistantships.

Certificate Requirements

Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-212/postbaccalaureate-credit-certificate-programs).

Students must complete each course with a grade of B or better in order to receive the certificate.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHS 504</td>
<td>Behavioral Health Intervention Strategies</td>
<td>3</td>
</tr>
<tr>
<td>PHS 520</td>
<td>Principles of Biostatistics</td>
<td>3</td>
</tr>
<tr>
<td>PHS 550</td>
<td>Principles of Epidemiology</td>
<td>3</td>
</tr>
<tr>
<td>PHS 571</td>
<td>Health Services Organization and Delivery</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td><strong>Total Credits</strong></td>
<td><strong>12</strong></td>
</tr>
</tbody>
</table>

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact

Certificate Program Head: Wenke Hwang
Primary Program Contact: Carol Laregina
Email: cxl58@psu.edu
Mailing Address: Dept of Public Health Sciences, A210, 90 Hope Dr, Suite 2200, Hershey, PA 17033
Telephone: (717) 531-6280
Program Website: Public Health Graduate Certificate (http://med.psu.edu/public-health-certificate)

Public Health Preparedness Graduate Credit Certificate Program

Person-in-Charge: Eugene J. Lengerich
Program Code: PHPGC
Campus(es): World Campus

This graduate certificate program is designed to provide non-science students with broad training in the field of public health preparedness. A distance education format is used to accommodate the needs of professionals already active in this area.

Effective Date: Summer Session 2017
Expiration Date: Summer Session 2022

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies). International applicants may be required to satisfy an English proficiency requirement; see GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

All applicants are expected to have a 3.0 or higher undergraduate grade point average. Three letters of recommendation are required. Special backgrounds, abilities, and interests related to homeland security are desirable.

Certificate Requirements

Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate
Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/postbaccalaureate-credit-certificate-programs).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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<tbody>
<tr>
<td>PHP 410</td>
<td>Public Health Preparedness for Disaster and Terrorist Emergencies I</td>
<td>3</td>
</tr>
<tr>
<td>PHP 510</td>
<td>Public Health Preparedness for Disaster and Terrorist Emergencies II</td>
<td>3</td>
</tr>
<tr>
<td>PHP 527</td>
<td>Public Health Evaluation of Disasters and Bioterrorism</td>
<td>3</td>
</tr>
<tr>
<td>PHP 530</td>
<td>Critical Infrastructure Protection of Health Care Delivery Systems</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits: 12

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact

Certificate Program Head: Eugene Lengerich

Primary Program Contact: Rachel Reager

Email: rmr16@psu.edu

Mailing Address: Office of Graduate Education, 500 University Dr., MC H170, Hershey PA 17033

Telephone: (717) 531-8892

Program Website: Public Health Preparedness Graduate Certificate (http://www.worldcampus.psu.edu/degrees-and-certificates/homeland-security/public-health-preparedness/overview)

Public Sector Human Resources Management Graduate Credit Certificate Program

Person-in-Charge: Bing Ran

Program Code: CLPHR

Campus(es): Harrisburg, World Campus

The graduate credit certificate program in Public Sector Human Resources Management is offered by the Public Administration program at Penn State Harrisburg.

The certificate is designed for administrators and other professionals in government and not-for-profit organizations who need to acquire additional knowledge and skills in the following areas:

- personnel/human resource management
- labor relations

- problem solving
- planning
- management of organizational change and development

Effective Date: Spring 2017
Expiration Date: Spring 2022

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies). International applicants may be required to satisfy an English proficiency requirement; see GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

A Graduate School application (http://gradschool.psu.edu/prospective-students/how-to-apply) must be completed and official transcripts from all post-secondary institutions attended (http://www.gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission) must be submitted.

Successful applicants typically have a 3.0 grade-point average in the last two years of undergraduate work.

Certificate Requirements

Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/postbaccalaureate-credit-certificate-programs).

The certificate program in Public Sector Human Resources Management requires taking four courses (12 credits) -- two required and two elective courses.

Applicants who have graduate degrees in public administration or a related field, and who have taken graduate courses that duplicate the content of courses in the certificate program, may substitute other PADM courses for those courses with the prior approval of the person in charge. Graduate transcripts, course syllabus, and course projects/term papers will be needed for this evaluation process.

Some certificate courses may be used toward completion of the master's degrees in Public Administration and in Health Administration, subject to restrictions outlined in GCAC-309 Transfer Credit (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/transfer-credit). Certificate students who wish to have certificate courses applied towards a graduate degree must apply and be admitted to that degree program. Admission to the M.P.A. or M.H.A. graduate degree program is a separate step and is not guaranteed.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PADM 505</td>
<td>Human Resources in the Public and Nonprofit Sectors</td>
<td>3</td>
</tr>
<tr>
<td>PADM 510</td>
<td>Organization Behavior</td>
<td>3</td>
</tr>
</tbody>
</table>

Electives

- problem solving
- planning
- management of organizational change and development

Effective Date: Spring 2017
Expiration Date: Spring 2022
Choose 2 courses from the following list of elective courses. With the approval by the certificate coordinator, students could also choose other HR-related Penn State graduate-level courses as elective courses for this certificate.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PADM 511</td>
<td>Organizational Change and Development</td>
<td></td>
</tr>
<tr>
<td>PADM 512</td>
<td>Issues in Human Resources</td>
<td></td>
</tr>
<tr>
<td>PADM 514</td>
<td>Public Organization and Managerial Consultation</td>
<td></td>
</tr>
<tr>
<td>PADM 515</td>
<td>Labor Management Relations</td>
<td></td>
</tr>
<tr>
<td>PADM 516</td>
<td>Strategic Planning</td>
<td></td>
</tr>
</tbody>
</table>

Total Credits: 12

**Courses**

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**Remote Sensing and Earth Observation Graduate Credit Certificate Program**

**Person-in-Charge**: Karen Schuckman  
**Program Code**: RMTSNG  
**Campus(es)**: World Campus

The Certificate in Remote Sensing and Earth Observation helps geospatial professionals become skillful users of imagery and sensor data in the context of geographic information systems and spatial analysis. This program is designed specifically for GIS practitioners who lack formal education in techniques and technologies associated with spatial image analysis and earth observation methods in order to pursue professional development and make career changes. The program explores theory and techniques for the professional application of remote sensing in geospatial systems and analysis. The program is offered through Penn State's World Campus.

**Admission Requirements**

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies). International applicants may be required to satisfy an English proficiency requirement; see GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

Intermediate-level experience with professional applications of geographic information systems is expected as prerequisite knowledge. Course work to establish that prerequisite knowledge is available through the related Postbaccalaureate Certificate in GIS (http://bulletins.psu.edu/graduate/programs/certificates/geographic-information-systems-postbaccalaureate-credit-certificate-program) program.

**Certificate Requirements**

Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/postbaccalaureate-credit-certificate-programs).

Students earn the certificate by completing four instructor-led online courses—three required and one elective. Students who successfully complete the program earn 12 academic credits.

Students admitted to the Department of Geography's Master of GIS degree program may count up to 15 credits of certificate program courses toward the M.G.I.S. degree, subject to restrictions outlined in GCAC-309 Transfer Credit (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/transfer-credit). Certificate students who wish to have certificate courses applied towards a graduate degree must apply and be admitted to that degree program. Admission to the M.G.I.S. graduate degree program is a separate step and is not guaranteed.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEOG 480</td>
<td>Exploring Imagery and Elevation Data in GIS Applications</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 883</td>
<td>Remote Sensing Image Analysis and Applications</td>
<td>3</td>
</tr>
<tr>
<td>GEOG 481</td>
<td>Topographic Mapping with Lidar</td>
<td>3</td>
</tr>
<tr>
<td>Electives</td>
<td>Emerging Trends in Remote Sensing</td>
<td>3</td>
</tr>
<tr>
<td>or GEOG 892</td>
<td>Geospatial Applications of Unmanned Aerial Systems</td>
<td></td>
</tr>
</tbody>
</table>

**Total Credits**: 12

**Effective Semester**: Summer 2016  
**Expiration Semester**: Summer 2021

**Contact**

**Certificate Program Head**: Bing Ran  
**Primary Program Contact**: Jordyn McCrady  
**Email**: jam5497@psu.edu

**Program Website**:


Public Sector Human Resources Management at World Campus (https://www.worldcampus.psu.edu/degrees-and-certificate-geographic-information-systems-postbaccalaureate-credit-certificate-program)

**Courses**

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up
deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**Contact**

**Certificate Program Head:** Karen Schuckman

**Primary Program Contact:** Kary Isett

**Email:** kdb6@psu.edu

**Mailing Address:** 418 Earth & Engr Sciences, University Park, PA 16802

**Telephone:** (814) 865-2557

**Program Website:** Remote Sensing and Earth Observation (https://gis.e-education.psu.edu/remotesensing/certificate)

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**Solar Energy Graduate Credit Certificate Program**

**Person-in-Charge:** Mark Fedkin

**Program Code:** SOLEGY

**Campus(es):** World Campus

The graduate certificate in Solar Energy is designed for current and aspiring practitioners seeking advanced skills in resource assessment, project development, and system design for solar thermal and solar electric systems. The program is offered by the Department of Energy and Mineral Engineering through Penn State's World Campus.

Courses taken in the certificate program may be applied toward the Master of Professional Studies in Renewable Energy and Sustainability Systems (RESS) if the student has earned a B- or better in each course, subject to restrictions outlined in GCAC-309 Transfer Credit (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/transfer-credit). Certificate students who wish to have certificate courses applied towards the M.P.S. in RESS must apply and be admitted to that degree program. Admission to the RESS graduate degree program is a separate step and is not guaranteed.

**Effective Semester:** Summer 2018

**Expiration Semester:** Summer 2023

**Admission Requirements**

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies). International applicants may be required to satisfy an English proficiency requirement; see GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

A background in systems science, engineering, or physics is strongly recommended.

**Certificate Requirements**

Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/postbaccalaureate-credit-certificate-programs).

Certificate students earn the certificate and 12 graduate credits by successfully completing each of four 3-credit, instructor-led online courses with a grade of C or better.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EME 810</td>
<td>Solar Resource Assessment and Economics</td>
<td>3</td>
</tr>
<tr>
<td>AE 878</td>
<td>Solar Project Development and Finance</td>
<td>3</td>
</tr>
</tbody>
</table>

**Electives**

Select 6 credits from the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>EME 811</td>
<td>Solar Thermal Energy for Utilities and Industry</td>
</tr>
<tr>
<td>EME 812</td>
<td>Utility Solar Power and Concentration</td>
</tr>
<tr>
<td>AE 862</td>
<td>Distributed Energy Planning and Management</td>
</tr>
<tr>
<td>AE 868</td>
<td>Commercial Solar Electric Systems</td>
</tr>
</tbody>
</table>

Total Credits 12

---

**Courses**

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

**Contact**

**Certificate Program Head:** Mark Fedkin

**Primary Program Contact:** Noelle Capparelle

**Email:** nlf5@psu.edu

**Mailing Address:** 2217 Earth & Engr Sciences, University Park, PA 16802

**Telephone:** (814) 867-5401

**Program Website:** Solar Energy (https://www.ress.psu.edu/certificates)

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**Supply Chain Management Graduate Credit Certificate Program**

**Person-in-Charge:** Nicholas Petruzzi

**Program Code:** SCMGT

**Campus(es):** World Campus

The Graduate Certificate in Supply Chain Management is a 12-credit online professional development program focused on building competence across the foundations of supply chain management. Through integration of strategic procurement, supply management, manufacturing, service operations, and demand fulfillment, this year-long program positions students to manage and enhance the value of today’s complex supply chains. In addition to core supply chain principles, topics in ethics, performance metrics, financial analysis, and information systems are covered. The certificate program starts with basic supply chain concepts that professionals are expected to know and then uses
a best-practices approach to build supply chain skills and analytical capabilities.

**Effective Date**: Fall Semester 2016  
**Expiration Date**: Fall Semester 2021

## Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

International applicants may be required to satisfy an English proficiency requirement; see GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

Applicants should have at least two years of professional experience along with an understanding of basic accounting and microeconomic terms and principles. Spreadsheet skills and knowledge of business statistics are necessary for successful participation in the program.

Along with the submission of the online application and the nonrefundable application fee, the following is required:

- **Official Transcripts and Grade Point Average (GPA)** - Applicants must submit official transcripts from all post-secondary institutions attended (http://www.gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/requirements-for-graduate-admission). A Grade Point Average (GPA) of 3.00 on a 4.00 scale in the final two years of undergraduate studies or in your most recent graduate degree is required.
- **Resume** - Applicants must upload their current resume with the online application.

## Certificate Requirements

Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/postbaccalaureate-credit-certificate-programs).

### Code | Title | Credits
<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Required Courses</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BA 803</td>
<td>BUSINESS ETHICS</td>
<td>1</td>
</tr>
<tr>
<td>SCM 800</td>
<td>Supply Chain Management</td>
<td>4</td>
</tr>
<tr>
<td>SCM 801</td>
<td>Supply Chain Performance Metrics and Financial Analysis</td>
<td>1</td>
</tr>
<tr>
<td>SCM 812</td>
<td>Demand Fulfillment</td>
<td>2</td>
</tr>
<tr>
<td>SCM 822</td>
<td>Supply Management</td>
<td>2</td>
</tr>
<tr>
<td>SCM 842</td>
<td>Manufacturing and Service Operations Planning</td>
<td>2</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td>12</td>
<td></td>
</tr>
</tbody>
</table>

## Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

## Contact

**Certificate Program Head**: Nicholas Petruzzi  
**Primary Program Contact**: Tami Confer (tlh3@psu.edu)  
**Program Email**: scm-mps@smeal.psu.edu  
**Mailing Address**: 489A Business Building, University Park, PA 16802  
**Telephone**: (814) 865-0073  
**Program Website**: Supply Chain Management Graduate Certificate (http://www.smeal.psu.edu/mps/gradcert)

## Survey Research Methods Graduate Credit Certificate Program

**Person-in-Charge**: Eric Plutzer  
**Program Code**: SURRES  
**Campus(es)**: University Park

The certificate in Survey Research Methods shall provide supplemental training to graduate students in social science, health, education, and policy-related graduate programs at Penn State. The collection of data by questionnaire, web surveys, phone or personal structured interviews is a highly specialized technique whose "best practices" and "cutting edge" change frequently. The data collected by surveys typically violate assumptions of random sampling that undergird graduate-level courses in applied statistics. Those earning this certificate will have supplemental training in data collection and take a coherent cluster of courses in applied statistics that will provide them with superior preparation for completion of their dissertation, and for employment in the academic, public, and private sectors.

**Effective Semester**: Spring Semester 2010  
**Expiration Semester**: Summer Semester 2019

## Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

International applicants may be required to satisfy an English proficiency requirement; see GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

All applicants must be enrolled in and have completed 18 credits in a graduate degree program at Penn State. A graduate grade-point average of 3.30 or higher shall normally be required. All applicants will be required to submit a letter from their academic adviser or department head that explains how the certificate program will enhance the student’s primary course of study.
Certificate Requirements

Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/postbaccalaureate-credit-certificate-programs).

All certificate recipients will be required to complete two core courses, two additional electives at the 500 level, and one hands-on internship or apprenticeship experience.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Required Courses</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PLSC/SOC 518</td>
<td>Survey Methods I: Survey Design</td>
<td>3</td>
</tr>
<tr>
<td>PLSC/SOC 519</td>
<td>Survey Methods II: Analysis of Survey Data</td>
<td>3</td>
</tr>
<tr>
<td>PLSC/SOC 595A</td>
<td>Survey Research Practicum</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Electives</th>
<th>Credits</th>
</tr>
</thead>
</table>
| In addition to the required courses listed above, students must select any two additional 3-credit courses in intermediate or advanced applied statistics or interviewing techniques, as approved by the chair of the Survey Research Center (SRC) Faculty Advisory Committee. | 6       

Total Credits: 13

1 There is no specific list of courses because offerings in the social and behavioral sciences change frequently and are most often offered under the 597 rubric. As a general rule, these courses must be at the 500 level, and they must have prerequisites equivalent to two semesters of applied statistics. For example, offerings in SOC that require prior completion of SOC 574–575 or offerings in PLSC that require prior completion of PLSC 502–503 would normally be eligible. We will apply comparable criteria for advanced methodology electives in departments such as (but not restricted to) Human Development and Family Studies, Education, and Psychology. These departments have offered relevant courses on topics such as:

- Hierarchical Modeling,
- Latent Class Analysis,
- Item Response Theory,
- Time Series,
- Analysis,
- Survival Analysis,
- and the Analysis of Missing Data.

In addition, some regularly offered classes, such as HDFS 526, SOC 578, and STAT 506, would satisfy the requirement.

Students accepted into the certificate program will submit a “Planned Program of Study” form annually. Approval by the Chair of the SRC Faculty Advisory Committee shall constitute formal approval for a course to count in meeting this requirement. All courses used to meet the requirements of the Certificate may be double-counted towards the student's doctoral degree program if permitted by the program.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact

Certificate Program Head: Eric Plutzer
Primary Program Contact: x
Email: exp12@psu.edu
Mailing Address: 322 Pond Lab, University Park, PA 16802
Telephone: (814) 865-6576
Program Website: Survey Research Methods (http://www.survey.psu.edu/graduate-certificate-survey-methodology)

Sustainability Management and Policy Graduate Credit Certificate Program

Person-in-Charge: Erich Schienke
Program Code: SUSPOL
Campus(es): World Campus

The graduate certificate in Sustainability Management and Policy is designed specifically for current and aspiring practitioners who seek advanced skills for advancing sustainability practice. The program is offered by the Department of Energy and Mineral Engineering through Penn State’s World Campus.

Courses taken in the certificate program may be applied toward the Master of Professional Studies in Renewable Energy and Sustainability Systems (RESS) if the student has earned a B- or better in each course, subject to restrictions outlined in GCAC-309 Transfer Credit (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/transfer-credit). Certificate students who wish to have certificate courses applied towards the M.P.S. in RESS must apply and be admitted to that degree program. Admission to the RESS graduate degree program is a separate step and is not guaranteed.

Effective Semester: Fall 2018
Expiration Semester: Summer 2023

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies). International applicants may be required to satisfy an English proficiency requirement; see GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

Certificate Requirements

Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/postbaccalaureate-credit-certificate-programs).
Certificate students earn the certificate and 12 graduate credits by successfully completing each of the four required 3-credit, instructor-led online courses with a grade of C or better.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BA 850</td>
<td>Sustainability Driven Innovation</td>
<td>3</td>
</tr>
<tr>
<td>EME 803</td>
<td>Applied Energy Policy</td>
<td>3</td>
</tr>
<tr>
<td>EME 805</td>
<td>Renewable Energy and Nonmarket Enterprise</td>
<td>3</td>
</tr>
<tr>
<td>EME 807</td>
<td>Technologies for Sustainability Systems</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td><strong>Total Credits</strong></td>
<td><strong>12</strong></td>
</tr>
</tbody>
</table>

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Certificate Requirements

Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/postbaccalaureate-credit-certificate-programs).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BUSAD 802</td>
<td>Cornerstone of Sustainability</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td><strong>Electives</strong></td>
<td><strong>9</strong></td>
</tr>
<tr>
<td>BUSAD 882</td>
<td>Social Entrepreneurship and Community Leadership</td>
<td></td>
</tr>
<tr>
<td>BUSAD 809</td>
<td>Triple Bottom Line Accounting</td>
<td></td>
</tr>
<tr>
<td>BUSAD 824</td>
<td>Finance and Investment for Sustainable Growth</td>
<td></td>
</tr>
<tr>
<td>BUSAD 879</td>
<td>Sustainable Supply Chain Management</td>
<td></td>
</tr>
<tr>
<td>MGMT 507</td>
<td>Positive Organizational Behavior and Wellbeing</td>
<td></td>
</tr>
<tr>
<td>SYSEN 507</td>
<td>Systems Thinking</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Total Credits</strong></td>
<td><strong>12</strong></td>
</tr>
</tbody>
</table>

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact

Certificate Program Head: Erich Schienke
Primary Program Contact: Noelle Capparelle
Email: nlf5@psu.edu
Mailing Address: 2217 Earth & Engr Sciences, University Park, PA 16802
Telephone: (814) 867-5401
Program Website: Sustainability Management and Policy (https://www.ress.psu.edu/certificates)

Sustainable Management Practices Graduate Credit Certificate Program

Person-in-Charge: James Nemes
Program Code: SUSMGT
Campus(es): Great Valley

The School of Graduate Professional Studies at Penn State Great Valley offers a 12-credit Graduate Certificate program in Sustainable Management Practices. The primary goal of this certificate program is to prepare individuals to design, implement, and evaluate new or existing sustainable practices in their organizations. Sustainability in this context refers to the operational policies and practices that seek to maximize not only the economic, but also the social (employees, community) and environmental (physical) outcomes of an organization.

Effective Date: Fall Semester 2016
Expiration Date: Fall Semester 2021

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies). International applicants may be required to satisfy an English proficiency requirement; see GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

Individuals wishing to enroll in this graduate certificate program are expected to have achieved a 3.0 (B) or higher undergraduate grade point average. Applicants holding a master’s degree should have attained at least a cumulative grade point average of 3.0 (B) in previous graduate work. Professional experience will be taken into consideration for admission. Applicants must submit a current resume and a statement of intent or career objective.

Contact

Certificate Program Head: James Nemes
Director of Graduate Studies/Professor-in-Charge: Karen Duhala
Primary Program Contact: Leanne Wallace
Email: lxw31@psu.edu
Mailing Address: Penn State Great Valley, 30 East Swedesford Road, Malvern, PA 19355
Telephone: (610) 648-3336
 Systems Engineering Graduate Credit Certificate Program

Person-in-Charge: James A. Nemes
Program Code: SYSENG
Campus(es): Great Valley

The goal of this graduate certificate program is to prepare students to apply systems engineering principles across the product development or acquisition lifecycle.

Effective Semester: Fall 2013
Expiration Semester: Spring 2018

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

International applicants may be required to satisfy an English proficiency requirement; see GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

The successful applicant will possess a degree in science or engineering or a closely aligned field and is generally expected to have a minimum combined junior/senior grade-point average of 3.0 (B) on a 4.0 scale.

Certificate Requirements

Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/postbaccalaureate-credit-certificate-programs).

To be awarded the Graduate Certificate in Systems Engineering, students must successfully complete 12 credits of course work. All courses must be completed with a grade of C or better and a grade-point average of 3.0 to be awarded the certificate.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SYSEN 520</td>
<td>Systems Engineering</td>
<td>3</td>
</tr>
<tr>
<td>SYSEN 522</td>
<td>Systems Verification Validation &amp; Testing</td>
<td>3</td>
</tr>
<tr>
<td>SWENG 586</td>
<td>Requirements Engineering</td>
<td>3</td>
</tr>
<tr>
<td>Electives</td>
<td>Select 3 credits from the following:</td>
<td></td>
</tr>
<tr>
<td>SYSEN 530</td>
<td>Systems Optimization</td>
<td></td>
</tr>
<tr>
<td>SYSEN 531</td>
<td>Probability Models and Simulation</td>
<td></td>
</tr>
<tr>
<td>SYSEN 533</td>
<td>Deterministic Models and Simulation</td>
<td></td>
</tr>
<tr>
<td>SYSEN 536</td>
<td>Decision and Risk Analysis in Engineering</td>
<td></td>
</tr>
<tr>
<td>SYSEN 550</td>
<td>Creativity and Problem Solving I</td>
<td></td>
</tr>
</tbody>
</table>

Total Credits: 12

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact

James A. Nemes, D.Sc.
School of Graduate Professional Studies
30 E. Swedeford Rd
Malvern, PA 19355
Telephone: 610-648-3335
email: jan16@psu.edu

Teaching and Learning Online in K-12 Settings Postbaccalaureate Credit Certificate Program

Person-in-Charge: Roy Clariana
Program Code: TLOK12
Campus(es): University Park
World Campus

This 15-credit certificate will prepare current or future K-12 educators to develop and teach online courses for K-12 student audiences. Students who complete this certificate will develop a thorough understanding of design issues and technology used to create and deliver effective online learning experiences. The course work aligns with the eleven National Standards for Quality Online Teaching which have been established by the International Association for K-12 Online Learning (iNACOL). Pennsylvania credentialed teachers have the option to use this certificate program to complete the requirements for the Pennsylvania Department of Education Online Instruction Endorsement.

Effective Date: Summer 2017
Expiration Date: Summer 2022

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

International applicants may be required to satisfy an English proficiency requirement; see GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

Certificate Requirements

Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/postbaccalaureate-credit-certificate-programs).
### Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

### Contact

**Certificate Program Head:** Roy Clarina

**Director of Graduate Studies/Professor-in-Charge:** Susan Land

**Primary Program Contact:** Whitney Deshong

**Email:** wad5021@psu.edu

**Mailing Address:** 303 Keller Building, University Park, PA 16802

**Telephone:** (814) 865-0473

**Program Website:** Teaching and Learning Online in K-12 Settings (https://www.worldcampus.psu.edu/degrees-and-certificates/penn-state-online-teaching-and-learning-online-in-k12-settings-certificate/overview)

### Teaching Writing and Literacy Post-baccalaureate Credit Certificate Program

**Person-in-Charge:** Mary Hutchinson

**Program Code:** TWL

**Campus(es):** Hazleton, Lehigh Valley, Wilkes-Barre

This program is designed to afford educators deep study in all aspects of teaching writing and literacy.

**Effective Semester:** Summer 2017

**Expiration Semester:** Summer 2022

### Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies). International applicants may be required to satisfy an English proficiency requirement; see GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac-gcac-300/admission-requirements-international-students) for more information.

### Certificate Requirements

Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac-gcac-200/postbaccalaureate-credit-certificate-programs).

The certificate will contain 12 core credits plus a 3-credit concentration for a total of 15 credits. A grade of C or higher must be earned in each course to be counted toward the certificate.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDUC 425</td>
<td>Literacy Assessment</td>
<td>3</td>
</tr>
<tr>
<td>EDUC 452</td>
<td>Teaching Writing</td>
<td>3</td>
</tr>
<tr>
<td>or ENGL 409</td>
<td>Composition Theory and Practice for Teachers</td>
<td></td>
</tr>
<tr>
<td>EDUC 463</td>
<td>Teaching With Modern Web Technologies</td>
<td>3</td>
</tr>
<tr>
<td>EDUC 477</td>
<td>Teaching Struggling Readers and Writers</td>
<td>3</td>
</tr>
</tbody>
</table>

**Electives**

Select 3 credits from the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDUC 400</td>
<td>Diversity and Cultural Awareness Practices in the K-12 Classroom</td>
<td>3</td>
</tr>
<tr>
<td>EDUC 416</td>
<td>Teaching Secondary English and the Humanities</td>
<td></td>
</tr>
<tr>
<td>EDUC 432</td>
<td>Children's Literature in Teaching Writing</td>
<td></td>
</tr>
<tr>
<td>EDUC 464</td>
<td>Technology and the Learning Process</td>
<td></td>
</tr>
<tr>
<td>EDUC 465</td>
<td>Serving Culturally and Linguistically Diverse (CLD) Learners</td>
<td></td>
</tr>
<tr>
<td>EDUC 471</td>
<td>Best Practices in Literacy</td>
<td></td>
</tr>
<tr>
<td>ENGL 472</td>
<td>Current Theories of Writing and Reading</td>
<td></td>
</tr>
</tbody>
</table>

**Total Credits:** 15

### Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

### Contact

**Certificate Program Head:** Mary Hutchinson

**Primary Program Contact:** Nicole Moschberger

**Email:** nrm157@psu.edu

**Mailing Address:** Penn State Lehigh Valley, 2809 Saucon Valley Road, Center Valley, PA 18034

**Telephone:** (610) 285-5000

**Program Website:** Teaching Writing and Literacy (http://www.lv.psu.edu/ce/credit.htm)
Translational Science Graduate Credit Certificate Program

Person-in-Charge: Gail D. Thomas
Program Code: HYTRSC
Campus(es): Hershey, University Park

The primary goal of this certificate is to provide a formal, structured program that allows medical and health care professionals, those wanting to enter the area of health care research, and graduate students seeking a career in a health care related discipline to develop or enhance a successful career in translational science.

Effective Semester: Summer 2018
Expiration Semester: Spring 2023

Admission Requirements
Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies). International applicants may be required to satisfy an English proficiency requirement; see GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-300/admission-requirements-international-students) for more information.

Certificate Requirements
Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/postbaccalaureate-credit-certificate-programs).

The curriculum includes courses in 4 specific translational science clusters. Students are required to complete 15 credits, including a 10 credit core of required 500-level courses and 5 elective credits. Courses must be selected from the detailed curriculum, or by permission in advance from the certificate director. Courses are available at the Hershey and University Park Campuses enabling the student to continue employment activities or graduate school programs. Students must obtain a B or better in each course.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Required Courses</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Select one of the following:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PHS 520</td>
<td>Principles of Biostatistics</td>
<td>3</td>
</tr>
<tr>
<td>STAT 500</td>
<td>Applied Statistics</td>
<td></td>
</tr>
<tr>
<td>STAT 501</td>
<td>Regression Methods</td>
<td></td>
</tr>
<tr>
<td>Select one of the following:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PHS 550</td>
<td>Principles of Epidemiology</td>
<td>3</td>
</tr>
<tr>
<td>HPA 540</td>
<td>Epidemiological Applications in Health Services Research</td>
<td></td>
</tr>
<tr>
<td>STAT 507</td>
<td>Epidemiologic Research Methods</td>
<td></td>
</tr>
<tr>
<td>Select one of the following:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PHS 580</td>
<td>Clinical Trials: Design and Analysis</td>
<td>3</td>
</tr>
<tr>
<td>STAT 503</td>
<td>Design of Experiments</td>
<td></td>
</tr>
</tbody>
</table>

| Statistic Analysis of Clinical Trials                                      | 1       |
| Research Ethics for Clinical Investigators                               |         |
| Ethics in the Life Sciences                                              |         |
| Biomedical Research Ethics                                               |         |

| Electives                                                                 |         |
| Select 5 credits from the following:                                     |         |
| BBH 505 | Behavioral Health Research Strategies                         |         |
| BIOL 555 | Statistical Analysis of Genomics Data                          |         |
| BMMB 852 | Applied Bioinformatics                                         |         |
| BMS 801 | Writing Grant Proposals for Biomedical Research               |         |
| CTS 590 | Colloquium                                                   |         |
| HPA 528 | Health Data Analysis for Research                             |         |
| HPA 564 | Research Methods in Health Services Research                 |         |
| HDFS 503 | Human Development Intervention: Analysis of Theories and Approaches |         |
| HDFS 516 | Methods of Research in Human Development                     |         |
| KINES 588 | Scientific Writing in Kinesiology                            |         |
| MCIBS 555 | Statistical Analysis of Genomics Data                         |         |
| NUTR 540 | Research Methods                                             |         |
| PHS 518 | Scientific Communication                                     |         |
| PHS 519 | Patient Centered Research                                    |         |
| PHS 521 | Applied Biostatistics                                       |         |
| PHS 536 | Health Survey Research Methods                               |         |
| PHS 540 | Decision Analysis I                                         |         |
| STAT 555 | Statistical Analysis of Genomics Data                        |         |

Total Credits: 15

Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact
Certificate Program Head: Gail Thomas
Primary Program Contact: Karen Shields
Email: kpb2@psu.edu
Mailing Address: Penn State College of Medicine, P.O. Box 850, MC H147, Hershey, PA 17033
Telephone: (717) 531-0003
Program Website: Translational Science Graduate Certificate (http://med.psu.edu/translational-science-certificate)
Trauma-Informed Psychotherapy Graduate Credit Certificate Program

Person-in-Charge: Melanie Hetzel-Riggin
Program Code: TRITH
Campus(es): Erie

The primary goal of this certificate is to prepare mental health professionals, and those in related fields, with training and practice in trauma-focused assessment, diagnosis, and treatment. The curriculum will provide thorough training in trauma informed conceptualization of and empirically-supported treatment for post-traumatic stress disorder and other trauma-related problems.

Effective Semester: Fall 2017
Ending Semester: Fall 2022

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

International applicants may be required to satisfy an English proficiency requirement; see GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac-gcac-300/admission-requirements-international-students) for more information.

An applicant must have a master's degree from a regionally accredited institution of higher education in clinical or counseling psychology, counselor education, marriage and family therapy, or social work, or be concurrently enrolled as a degree student in a Penn State master's degree in clinical or counseling psychology or counselor education.

Certificate Requirements

Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac-gcac-200/postbaccalaureate-credit-certificate-programs).

All candidates are required to take 12 credits in four courses (trauma and resiliency, foundations in trauma-focused treatment, advanced trauma-focused treatment, and crisis intervention.)

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tr>
<td>PSYCH 442</td>
<td>Trauma and Resiliency</td>
<td>3</td>
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<tr>
<td>PSYC 843</td>
<td>Trauma-Focused Approaches to Psychological Intervention I</td>
<td>3</td>
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<tr>
<td>PSYC 844</td>
<td>Trauma-Focused Approaches to Psychological Intervention II</td>
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<tr>
<td>PSYC 845</td>
<td>Crisis and Disaster-Related Interventions in Psychology</td>
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<td><strong>Total Credits</strong></td>
<td></td>
<td><strong>12</strong></td>
</tr>
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</table>

For students concurrently enrolled in a master's degree program, the certificate will be awarded upon completion of the 12 credits required for the certificate. The certificate cannot be awarded prior to completion of the master's degree.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact

Certificate Program Head: Melanie Hetzel-Riggin
Email: mdh33@psu.edu
Mailing Address: 170 Irvin Kochel Center Behrend, Erie, PA 16563
Telephone: (814) 898-6108

Weather and Climate Analytics Graduate Credit Certificate Program

Graduate Program Head: David Babb
Program Code: WCA
Campus(es): World Campus

This program is designed to address the emerging needs of corporate and government entities looking to integrate information gleaned from weather and climate data streams into their decision-making process. The 13-credit curriculum will prepare individuals to access, analyze, and manipulate atmospheric datasets, generate and test hypotheses, develop predictive analytics systems, and present the results in ways that their respective organizations can use.

Effective Semester: Fall 2018
Expiration Semester: Fall 2023

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies).

International applicants may be required to satisfy an English proficiency requirement; see GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac-gcac-300/admission-requirements-international-students) for more information.

Certificate Requirements

Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac-gcac-200/postbaccalaureate-credit-certificate-programs).

Students are required to complete four 3-credit courses along with a 1-credit capstone experience.
Wind Energy Graduate Credit Certificate Program

<table>
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<tr>
<th>Code</th>
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<tr>
<td>METEO 810</td>
<td>Weather and Climate Datasets</td>
<td>3</td>
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<tr>
<td>METEO 815</td>
<td>Applied Atmospheric Data Analysis</td>
<td>3</td>
</tr>
<tr>
<td>METEO 820</td>
<td>Time Series Analytics for Meteorological Data</td>
<td>3</td>
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<tr>
<td>METEO 825</td>
<td>Predictive Analytic Techniques for Meteorological Data</td>
<td>3</td>
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<tr>
<td>METEO 830</td>
<td>Weather and Climate Analytics Applications (Capstone Experience)</td>
<td>1</td>
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</table>

Total Credits 13

Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact
Certificate Program Head: David Babb
Primary Program Contact: Noelle Capparelle
Email: nlf5@psu.edu
Telephone: (814) 867-5401

Wind Energy Graduate Credit Certificate Program

Person-in-Charge: Susan Stewart
Program Code: WINDE
Campus(es): University Park, World Campus

This program is designed to provide technical depth in wind-turbine technology and the science of siting turbines. The certificate program is offered in residence by the Department of Aerospace Engineering and also is available for online delivery via Penn State's World Campus as a subset of the online intercollege Master of Professional Studies program in Renewable Energy and Sustainability Systems (IMPS-RESS (http://bulletins.psu.edu/graduate/programs/majors/renewable-energy-sustainability-systems)).

Effective Semester: Spring 2014
Expiration Semester: Fall 2018

Admission Requirements
Applicants apply for admission to the program via the Graduate School application for admission (http://gradschool.psu.edu/prospective-students/how-to-apply). Requirements listed here are in addition to Graduate Council policies listed under GCAC-300 General Admissions Standards (http://gradschool.psu.edu/graduate-education-policies). International applicants may be required to satisfy an English proficiency requirement; see GCAC-305 Admission Requirements for International Students (http://gradschool.psu.edu/graduate-education-policies/gcac-300/admission-requirements-international-students) for more information.

A background in incompressible fluid mechanics, statics, and dynamics is expected. Professional experience may be taken into consideration for admission.

The student must be admitted to the graduate certificate program in Wind Energy offered by the Department of Aerospace Engineering and to the Graduate School. GRE scores are not required for non-degree graduate students.

Certificate Requirements
Requirements listed here are in addition to requirements listed in Graduate Council policy GCAC-212 Postbaccalaureate Credit Certificate Programs (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-200/postbaccalaureate-credit-certificate-programs).

To be awarded the Certificate in Wind Energy, students must successfully complete 9 graduate credits with a grade of "C" or better in three required courses.

Students who subsequently are admitted to the IMPS-RESS degree program may count credits earned in the certificate program toward the RESS degree, subject to restrictions outlined in GCAC-309 Transfer Credit (http://gradschool.psu.edu/graduate-education-policies/gcac/gcac-309/transfer-credit). Certificate students who wish to have certificate courses applied towards a graduate degree must apply and be admitted to that degree program. Admission to the RESS graduate degree program is a separate step and is not guaranteed.

<table>
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<tr>
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<tr>
<td>AERSP 880</td>
<td>Wind Turbine Systems</td>
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<tr>
<td>AERSP 583</td>
<td>Wind Turbine Aerodynamics</td>
<td>3</td>
</tr>
<tr>
<td>AERSP 886</td>
<td>Engineering of Wind Project Development</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credits 9

Applicants who do not have the necessary background for the above courses will need to take the appropriate prerequisite courses.

Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Contact
Certificate Program Head: Susan Stewart
Primary Program Contact: Noelle Capparelle
Email: nlf5@psu.edu
Mailing Address: John A Dutton e-Education Institute, 2217 Earth & Engineering Sciences Bldg., University Park, PA 16802
Telephone: (814) 867-5401
Program Website: Wind Energy (https://www.ress.psu.edu/certificates)
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