USING THIS BULLETIN

Introduction

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

Use this section and navigation tools throughout the site to become familiar with general Bulletin information and discover new ways to explore academic opportunities across Pennsylvania and the world.

Students should follow the edition of the Bulletin that is active on their first day of class at the University. Past versions can be found on the Archive (https://bulletins.psu.edu/undergraduate/archive/) page.

New Features

Program Page Layout

- Consistent layout of program information organized within the following tabs:
  - Overview
  - How to Get In
  - Program Requirements (University Degree, Bachelor of Arts Degree, General Education, and Major requirements)
  - Integrated Undergrad-Grad Program
  - Learning Outcomes
  - Academic Advising
  - Suggested Academic Plan
  - Career Paths
  - Contact

Begin and End Campus

At the top each program page, you will find a box that indicates where you can begin and end a program. Programs may have different begin and end campuses, so it is important to use this information to determine program availability at each campus.

How to Get In

This section describes requirements on how to enter your major. Common examples include, but are not limited to, minimum GPA and/ or successful completion of a skills test, coursework, or preparation programs.

Suggested Academic Plan

The course series provided in the Suggested Academic Plan provides only one of many possible ways to move through the curriculum. To create a personalized academic plan, begin by taking the following steps:

- Consult with a Penn State academic adviser on a regular basis to develop and refine your academic plan.
- Use the Suggested Academic Plan in conjunction with your degree audit (accessible in LionPATH as either an *Academic Requirements* or *What If* report).
- Familiarize yourself with information available in this Bulletin to learn about academic opportunities.
- Explore resources available on your college and campus websites.

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

Changes Page

- Real-time amendments to information in the Bulletin will be tracked on the Changes (p. 6) page.
- Currently or previously enrolled students should consult the Bulletin Archive (https://bulletins.psu.edu/undergraduate/archive/), their adviser, and degree audit reports for specific requirements.

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;
- course attributes and General Education learning objectives;
- if the course is repeatable;
- if the course is cross-listed;
- if the course can be counted towards General Education requirements.

Nondiscrimination Statement

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.

Start Exploring

The Undergraduate Bulletin is Penn State's comprehensive source for undergraduate academic information and program requirements. Using the search features, explore options to design your own, unique academic path at one of the world's leading research institutions. Discover new opportunities as you pursue your academic passion. Search boxes are located on the Undergraduate Bulletin landing page and throughout the website.

Narrow your search by using the following fields:

Degree Type

Choose the degree type to begin your search. Information on the following degrees are included in the Undergraduate Bulletin:

Associate Degree

Two-year majors that, with few exceptions, provide concentrated instruction to prepare graduates for specialized occupational assignments.

Baccalaureate Degree

Baccalaureate programs of study consist of no less than 120 credits and typically take four years to complete.

Minor

An academic program of at least 18 credits that supplements a major. A minor program may consist of course work in a single area or from several disciplines.

Undergraduate Certificate

Undergraduate certificates can reflect emerging academic areas, necessary professional development requirements, or groups of courses that do not constitute a degree program.

Learn more in the Definitions and Abbreviations (p. 2) section.

Campus

Penn State has over 20 campuses across Pennsylvania. Visit the Campus (https://bulletins.psu.edu/undergraduate/campuses/) page to see the full listing and a brief description of each campus.

Interest

Search broad topics to discover programs associated with your interests. From helping people, to science, or business, select an area to help narrow down your academic choices.

College

Academic colleges at Penn State grant degrees and are generally organized around a subject matter. All Penn State majors are divided among academic colleges, which are the units from which students receive their degrees. Visit the College (https://bulletins.psu.edu/undergraduate/colleges/) page to see the full listing.

Academic Authority

The University Faculty Senate has responsibility for, and authority over, all academic information contained in the Undergraduate 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 (https://aappm.psu.edu/policy/p-8-program-descriptions-for-the-bulletin/)

Understanding Course Description Information

The course description data that appears in the University Bulletins is directly imported from LionPATH, the student information system. At several times within an academic year, new or updated course description information is approved by the Faculty Senate and entered into LionPATH. This updated information subsequently appears in the University Bulletins on the date(s) it takes effect.

What course description data is currently showing in the University Bulletins?

There are three course effective dates within an academic year. These effective dates correspond to the first day of the summer, fall, and spring semesters. The University Bulletins shows course description data that is active as of the current semester. On the date a new semester begins, the course description information is updated on the same day to match that course data.

Course Description Update Calendar

May 12, 2025: University Bulletins begins showing course description information that is active for the Summer 2025 semester
August 18, 2025: University Bulletins begins showing course description information that is active for the Fall 2025 semester
December 22, 2025: University Bulletins begins showing course description information that is active for the Spring 2026 semester

Previous Versions of Course Description Information

If a course description is updated after the beginning of an academic year, the previous course description information for that course can be found on the Changes to the UG Bulletin page (p. 6). Course description information from past years can be found in the appropriate archived Bulletin edition (https://bulletins.psu.edu/undergraduate/archive/).

Definitions and Abbreviations

Described below are definitions referring to degrees, majors, options, minors, concurrent or sequential majors programs, and integrated undergraduate-graduate degree programs:

Associate Degree

Two-year majors that, with few exceptions, provide concentrated instruction to prepare graduates for specialized occupational assignments.

Baccalaureate Degree

Penn State offers more than 160 majors with four-year baccalaureate degrees. A baccalaureate program of study shall consist of no less than 120 credits. Students may elect to take courses beyond the minimum requirements of a degree program. Particular types of baccalaureate degrees identify educational programs having common objectives and requirements. Degree programs may provide academic, pre-professional, or professional experiences and preparation. Majors lead to a baccalaureate degree. Each student must select a major within a baccalaureate degree type. If options are offered within a major, a student selects one. The student may also elect to enroll in a minor to supplement the major. Alternatively, the student may seek to enroll in multiple majors within the same type of baccalaureate degree or to enroll in a simultaneous degree program.

Undergraduate majors offered at Penn State lead to one or more of the following baccalaureate degrees: Bachelor of Arts, Bachelor of Science, Bachelor of Architectural Engineering (five-year program), Bachelor of Architecture (five-year program), Bachelor of Design, Bachelor of Fine Arts, Bachelor of Humanities, Bachelor of Landscape Architecture (five-year program), Bachelor of Music, Bachelor of Musical Arts, and Bachelor of Philosophy.

Not all degrees are offered at every location. Baccalaureate degrees offered at Penn State include both those that are designed to provide an academic (including pre-professional) experience and those that are specifically designed to provide professional preparation.

To ensure excellence, all professionally oriented degree majors provide a strong academic base. The Bachelor of Arts degree (with a given major) is an academic degree; the Bachelor of Science degree (with a given major) and the bachelor's degree in any subject area (e.g., Bachelor of Architecture) are professional degrees. The Bachelor of Philosophy

degree, described in the Intercollege Undergraduate Programs section of this Bulletin, is planned individually and may be designed to serve either academic or professional purposes.

Major

A major is a plan of study in a field of concentration within a type of baccalaureate degree. Colleges and other degree-granting units may have common requirements for all of their majors. Each major may have requirements identified in prescribed, additional, and supporting courses and related areas categories. Elective credits are not considered part of the major.

MORE INFORMATION ABOUT MAJORS (https://senate.psu.edu/ curriculum/introduction-to-guide-to-curricular-procedures/section-one- baccalaureate-degree-curriculum/)

Option

An option is a specialization within a major that should involve at least one-third of the course work credits required for the major, but need not be more than 18 credits. All options within a major must have in common at least one-fourth of the required course work credits in the major. A student can only be enrolled in an option within their own major.

Minor

A minor is defined as an academic program of at least 18 credits that supplements a major. A minor program may consist of course work in a single area or from several disciplines, with at least 6 but ordinarily not more than half of the credits at the 400-course level. Total requirements are to be specified and generally limited to 18 to 21 credits. Entrance to some minors may require the completion of a number of prerequisites, including courses, portfolios, auditions, or other forms of documentation that are not included in the total requirements for the minor. All courses for a minor require a grade of C or above.

Concurrent and Sequential Majors Programs

At the baccalaureate or associate degree level, students may be approved for admission to more than one major under the Concurrent Majors Program. A Concurrent Majors Program is one in which students take courses to concurrently meet the requirements of at least two majors, with graduation for all majors in the program occurring during the same semester. Concurrent majors must all be at the baccalaureate or associate degree level. Under the Sequential Majors Program, upon graduation from an associate or baccalaureate degree program, a student may apply for re-enrollment in another undergraduate degree program.

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:/p>

- 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;
- learn from current graduate students who share academic interests.

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.

Code	Explanation
A	Special topics (course suffix; indicates different versions of the same course, e.g., CAS 100A, CAS 100B, CAS 100C)
A & A	Arts and Architecture (college abbreviation)
AA	Arts and Architecture (college code)
AAPPM	Academic Administrative Policies and Procedures Manual
AB	Abington (campus code)
AB	Abington (college code)
ACUE	Administrative Council on Undergraduate Education
AG	Agricultural Sciences (college code)
AL	Altoona (campus code)
AL	Altoona (college code)
AP	Advanced Placement Program
APPL	Course requires an application with the School of Music (course characteristic)
APPT	By appointment (class meeting time)
AU	Audit, attended regularly (grade reporting symbol)
AUDN	Course requires an audition (course characteristic)
AUU	Audit, did not attend regularly (grade reporting symbol)
B	Special topics (course suffix; indicates different versions of the same course, e.g., CAS 100A, CAS 100B, CAS 100C)
BA	Business, Smeal College of (college code)
BC	Behrend (college code)
BK	Berks (campus code)
BK	Berks (college code)
BR	Beaver (campus code)
BW	Brandywine (campus code)
C	Special topics (course suffix; indicates different versions of the same course, e.g., CAS 100A, CAS 100B, CAS 100C)
CA	Capital (college code)
CALC	Course requires a calculator (course characteristic)
CAMP	College Assistance Migrant Program
CAT	Online catalog, University Libraries
CC	Commonwealth Campuses

CCP	College Contact Person
CCRR	College Contact and Referral Representative
CCSG	Council of Commonwealth Student Governments
CE	Continuing Education
CGPA	Cumulative grade-point average
CIC	Committee on Institutional Cooperation
CLEP	College-Level Examination Program
CM	Communications (college code)
CNCR	Course is scheduled concurrently with another course (course characteristic)
CNTL	Course is controlled (course characteristic)
COMM	Communications (college abbreviation)
CORD	Course is coordinated with other course(s) (course characteristic)
COST	Course requires an additional fee (course characteristic)
D	Special topics (course suffix; indicates different versions of the same course, e.g., HIST 297D, HIST 297E)
DAA	Dean/Director of Academic Affairs
DF	Deferred grade (grade reporting symbol)
DN	Dickinson School of Law (campus code)
DS	DuBois (campus code)
DU	Division of Undergraduate Studies (college code)
D U S	Division of Undergraduate Studies (college abbreviation)
E	Special topics (course suffix; indicates different versions of the same course, e.g., HIST 297D, HIST 297E)
ECoS	Eberly College of Science
ED	Education (college code)
EM	Earth and Mineral Sciences (college code)
EM SC	Earth and Mineral Sciences (college abbreviation)
EN	Engineering (college code)
ENGR	Engineering (college abbreviation)
EOP	Educational Opportunity Program
EPR	Early Progress Report
EPS	Educational Planning Survey
ER	Behrend (campus code)
ESL	English as a Second Language
EVEX	Course has evening exams (course characteristic)
F	Special topics (course suffix; indicates different versions of the same course, e.g., HIST 297F, HIST 297G)
FE	Fayette (campus code)
FINL	Course has a final exam (course characteristic)
FL	Failure under pass/fail option (grade reporting symbol)
FYS	First-Year Seminar
G	Special topics (course suffix; indicates different versions of the same course, e.g., HIST 297F, HIST 297G)
GA	Arts (General Education code)
GA	Greater Allegheny (campus code)
GH	Humanities (General Education code)
GHW	Health and Wellness (General Education code)
GN	Graduate non-degree (college code)
GN	Natural Sciences (General Education code)
GPA	Grade-point average
GQ	Quantification (General Education code)
GR	Graduate (level code)
GR ND	Graduate non-degree (college code)
GS	Social and Behavioral Sciences (General Education code)
GV	Great Valley (campus code)
GV	Great Valley (college code)
GWS	Writing/Speaking (General Education code)
H	Honors course or section (course suffix)
HB	Harrisburg (campus code)
H H D	Health and Human Development (college abbreviation)
HH	Health and Human Development (college code)
HN	Hazleton (campus code)
HY	Hershey Medical Center (campus code)
I	Incomplete (grade reporting symbol)
I	Special topics (course suffix; indicates different versions of the same course, e.g., HIST 297I, HIST 297K)
I COL	Intercollege programs (college abbreviation)
IB	International Baccalaureate Program
IC	Intercollege programs (college code)

IL	International Cultures (General Education code)
INCP	Incomplete (grade reporting symbol)
INTG	Course is integrated with other courses (course characteristic)
IS	Information Sciences and Technology (college code)
IST	Information Sciences and Technology (college abbreviation)
ITS	Information Technology Services
IUG	Integrated undergraduate/graduate degree programs
IVID	Course uses interactive video (course characteristic)
J	Individualized instruction (course suffix)
K	Special topics (course suffix; indicates different versions of the same course, e.g., HIST 297I, HIST 297K)
L	Lecture section (course suffix)
LA	Liberal Arts (college code)
LEAP	Learning Edge Academic Program
LIAB	Course has liability attendance policy (course characteristic)
LV	Lehigh Valley (campus code)
LW	Law (level code)
M	Writing Across the Curriculum and Honors (course suffix)
MA	Mont Alto (campus code)
MAC	Morgan Academic Center (for Student-Athletes)
MD	Medical (level code)
MD	Medicine (college code)
MED	Medicine (college abbreviation)
MEP	Multicultural Engineering Program
MRC	Multicultural Resource Center
MS	Military Science (ROTC) (college code)
NACADA	National Academic Advising Association
NC	Non-credit (level code)
NDEGR/C/H	Nondegree Regular/Conditional/High School (Classification of Undergraduate Students)
NG	No grade (grade reporting symbol)
NK	New Kensington (campus code)
NR	Nursing (college code)
NSO	New Student Orientation
OCLC	Course meets at an off-campus location (course characteristic)
ODS	Office for Disability Services
OSA	Office of Student Aid
OUR	Office of the University Registrar
P	Pass (noncredit course) (grade reporting symbol)
P	Practicum (or laboratory) section (course suffix)
PC	Penn College (Pennsylvania College of Technology; campus code)
PREQ	Course has prerequisites (course characteristic)
PS	Pass (pass/fail option) (grade reporting symbol)
PSU	Pennsylvania State University
R	Recitation section (course suffix)
R	Research (grade reporting symbol)
RAP	Recommended Academic Plan
RI	Resident Instruction
ROTC	Reserve Officers' Training Corps
S	First-Year Seminar (course suffix)
SA	Satisfactory achievement (grade reporting symbol)
SATL	Course is offered at multiple locations via satellite uplink (course characteristic)
SC	Science, Eberly College of (college code)
SCIEN	Science, Eberly College of (college abbreviation)
SEGM	Course is segmented (course characteristic)
SGPA	Semester grade-point average
SH	Shenango (campus code)
SI	Supplemental Instruction
SITE	Schreyer Institute for Teaching Excellence
SL	Schuylkill (campus code)
SLO	Special Living Options
SOTP	Student Orientation and Transition Programs
SRTE	Student Ratings of Teacher Effectiveness
SSSP	Student Support Services Program
T	First-Year Seminar and Honors (course suffix)
TMDT	Course has additional meeting times/dates (course characteristic)
U	United States Cultures/International Cultures and Honors (course suffix)
UAO	Undergraduate Admissions Office
UC	University College (college code)
UE	Undergraduate Education
UFO	University Fellowships Office
UG	Undergraduate (level code)
UG ND	Undergraduate non-degree (college code)
UN	Undergraduate nondegree (college code)

UN	Unsatisfactory achievement (grade reporting symbol)
UP	University Park (campus code)
UPUA	University Park Undergraduate Association
US	United States Cultures (General Education code)
W	Official withdrawal (grade reporting symbol)
W	Writing Across the Curriculum (course suffix)
WB	Wilkes-Barre (campus code)
WC	World Campus
WEB	Web course; offered entirely through the Internet (course characteristic)
WEP	Women in Engineering Program
WF	Withdrew failing (grade reporting symbol)
WISE	Women in the Sciences and Engineering
WN	Withdrew no grade (grade reporting symbol)
WP	Withdrew passing (grade reporting symbol)
WS	Worthington Scranton (campus code)
X	Writing Across the Curriculum and First-Year Seminar (course suffix)
XC	State College Continuing Education (campus code)
XF	Failure, academic dishonesty (course grade)
XS	Foreign studies program (campus code)
Y	Writing Across the Curriculum course and United States Cultures/ International Cultures (course suffix)
YK	York (campus code)

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

Changes to the Undergraduate Bulletin

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

Courses Added: Effective Summer 2025

- A-I 410: AI Systems and Tools
- AA 290G: Creating and Learning with AI in the Arts
- AFR 233: Connecting Social Movements: U.S. Civil Rights and African Liberation
- AIE 355: Optimization for Machine Learning
- ART 116N: Art of Mathematics
- ART 434: Found and Fabricated: Found Objects in Sculpture
- BBH 477: Sleep and Biobehavioral Health
- BIOL 496H: Independent Studies - Honors
- BMB 494: Research Project
- CAMS 415: The Roman Empire and Its Frontiers
- CI 240: Language, Culture & Community: Study abroad in Mexico
- CI 340N: Languages & Cultures in Mexico: Community-based Learning
- CMPSC 150N: Computing and Society
- CMPSC 315: Computer Systems I
- CMPSC 316: Computer Systems II
- CMPSC 320: Software Engineering Principles
- CMPSC 478: Advanced Algorithms
- DA 494: Research Projects
- EE 415: Computing with Commercial Quantum Computers
- EME 428: Negative Emissions Technologies
- ENGR 293: Clark Scholars Engineering Equity Seminar
- ENGR 385: Advanced Technical Communication and Professional Development
- ENGR 393: Clark Leadership & Innovation Seminar
- HHD 101: Peer-Assistant Workshop
- HPA 471: Data Visualization for Health Services Organizations
- HPA 472: Advanced Data Analysis in Health Administration
- IST 499: Foreign Studies
- JAPNS 10: Easy Japanese through Anime
- LLED 260: A Critically Conscious Approach to Non-Fiction Literature for Children & Adolescents
- MUSIC 439: Sound Design For Game Audio
- PNG 460: Subsurface Storage Engineering
- VBSC 300: Veterinary Medical Terminology and Diagnostics
- VBSC 340N: Introduction to One Health
- VBSC 341: Wicked Problems in One Health

Courses Added: Effective Fall 2025

- CRIM 494H: Research Project
- LARCH 247N: Restoring the earth - Designing landscapes for ecological restoration
- MATH 225: Mathematical Foundations for Machine Learning

Courses Dropped: Effective Fall 2025

- SC 306: BS MBA Undergraduate Seminar

Course Changes: Effective Summer 2025

ANTH 380: Anthropology Museum Studies (3 Credits)
Old Listing Effective Through Spring 2025:

Introduction to the history, significance, and operation of anthropology museums. ANTH 380 Museum Studies (3) This course introduces students to the operation of anthropology museums and to the growing field of museum studies. The course explores the historical setting within which these institutions evolved and the role of museums in the development of anthropology. Students will learn about the primary functions of museums through individual and group projects. Other topics to be covered include museum organization and administration, collection management, curation and conservation, research and education, public relations and financing, and ethical and legal issues. Students will get hands-on experience with the planning and

implementation of a display in the Matson Museum of Anthropology. In addition, students will learn about museum careers, museum developments in other countries, and contemporary controversies, such as repatriation and the shifting role of museums in contemporary society. The course will provide the student with an introduction not only to the behind-the-scenes nuts-and-bolts of daily museum operations but also to the institutional role of museums as the preservers, interpreters, and communicators of humanity's cultural heritage. Students are evaluated based on two papers, work on Matson Museum exhibits, and participation in class discussions. This course fulfills a 3-credit requirement for additional courses for the anthropology major. This course expands on the history of anthropology and professional employment in the field that is presented in introductory courses.

Changes Effective Summer 2025:

- Changed Course Number to 480
- Added Prerequisites
- Changed Course Description

BMB 445W: Laboratory in Molecular Genetics I (2 Credits) [W]
Old Listing Effective Through Spring 2025:

Laboratory in molecular techniques in gene analysis and microbial genetics, emphasizing in vitro methodologies. BMB 445W Laboratory in Molecular Genetics I (2) The objectives of BMB 445W are to provide advanced Biochemistry and Microbiology students with instruction in (1) techniques commonly used in modern research and clinical laboratories in this field, (2) evaluation of the quality of experimental data, including appropriate analysis, and (3) presentation of results of laboratory work in written form. Experiments are focused on key techniques and procedures such as DNA isolation, polymerase chain reaction, Southern hybridization analysis, cloning, and DNA sequencing. Students are evaluated via written lab reports and written examinations that assess the understanding of principles and methodology. BMB 445W is an extension of the nucleic acid section of BMB 442, which is a prerequisite for BMB 445W.

Enforced Prerequisite at Enrollment: BMB 442 and (MICRB 201 or MICRB 201H)

Recommended Preparations (MICRB 202 or MICRB 203) and BMB 400

Changes Effective Summer 2025:

- Changed Course Title
- Changed Credits
- Changed Course Description

BMB 448: Model Systems and Approaches in Cell Biology Inquiry (2 Credits)
Old Listing Effective Through Spring 2025:

Advanced laboratory that uses inquiry-based approaches to analyze organelles, genetic mechanisms, and metabolic processes in eukaryotic organisms.

Enforced Prerequisite at Enrollment: (BMB 251 or MICRB 251 or BIOL 230W or BMB 251H or BIOL 230M) and (MICRB 202 or MICRB 203) Recommended Preparations: BMB 442

Changes Effective Summer 2025:

- Changed Credits

BMB 491: Undergraduate Research in Cellular Dynamics II: Communicating Scientific Findings (3 Credits) [GWS]
Old Listing Effective Through Spring 2025:

BMB 491 is designed to be a continuation of BMB 490. Through BMB 490/491, students will complete a fast-tracked start-to-finish research project and in doing so will learn to perform, explain, apply, and interpret good science. In BMB 491, students focus on effectively communicating scientific findings and preparing their data for publication. Students will use a variety of media to communicate science across different audiences. They will prepare written, oral, and visual presentations while learning to adapt content and style for different contexts. Students will complete major projects in stages, guided by weekly exercises and lectures on content, structure, and formatting for different types of scientific writing. Students will also learn how to assemble figures and visual aids to communicate their approaches and findings. Readings and figures from the scientific literature will provide opportunities to evaluate methods of visual and written communication, while continuing to promote a deeper understanding of cell structure and function. Building expertise across BMB490/491 in an area of cell and molecular biology allows students to critically evaluate the content and style of published articles, and to build conclusions about their own research results. Students will also engage in extensive peer review and will be expected to incorporate feedback into improving their writing and presentation skills. Throughout this course, students will gain an appreciation for the importance of effective communication in science, and will build the skills necessary to logically, accurately, ethically, and persuasively communicate. These skills will be extremely valuable in research-related careers, but also apply to any position where students act as consumers, producers, advocates, or interpreters of science.

Enforced Prerequisite at Enrollment: BMB 490

Changes Effective Summer 2025:

- Removed General Education Writing/Speaking Attribute (GWS)

BME 440: Biomedical Engineering Professional Seminar (1 Credit)
Old Listing Effective Through Spring 2025:

Seminar giving students exposure to professionals who apply engineering and related fields to biology and medicine. BME 440 Biomedical Engineering Professional Seminar (1) A senior seminar introducing students to professionals in the field of biomedical engineering and disciplines that are critical to the field (e.g. ethics, regulatory affairs, entrepreneurship). This course is designed to prepare students for the subsequent capstone design course and allow them to consider areas where innovation and design in biomedical engineering are needed. Discussion with presenters will allow students to explore the promises and limitations of the clinical applications of biomedical engineering and to explore possible career paths. Guest speakers may include representatives and alumni from the medical device industry, biomedical entrepreneurs, medical clinicians, professionals from relevant regulatory agencies, and professionals in bioethics.

Enforced Prerequisite at Enrollment: Seventh semester standing in BME_BS

Changes Effective Summer 2025:

- Changed Abbreviated Title
- Changed Prerequisite

CAS 340: Communication and Civility (3 Credits)
Old Listing Effective Through Spring 2025:

Communication behaviors contributing to civil and uncivil discourse; their implications in business, public life, across cultures and in interpersonal relationships.

Changes Effective Summer 2025:

- Changed Course Number to 240N
- Added Recommended Preparation
- Changed Course Description
- Added Bachelor of Arts: Humanities Attribute
- Added Bachelor of Arts: Social and Behavioral Sciences Attribute
- Added General Education Inter-Domain, Humanities (GH), and Social & Behavioral Sciences (GS) Attributes

COMM 419: World Media Systems (3 Credits) [BA] [US] [IL]
Old Listing Effective Through Spring 2025:

Comparative study of modern mass systems and the evolution and structure of specific countries' systems. COMM 419 World Media Systems (3) (US;IL)(BA) This course meets the Bachelor of Arts degree requirements. This course is a comparative study of modern mass media systems with focus on the ways in which two or more countries' media have evolved and are structured by the political, economic, social, and cultural environments within which they exist. Students will be exposed to the theories and practices of media systems - as explained in such normative expositions as the four theories of the press and other contemporary iterations. One objective of the course is for students to gain a better appreciation of the structure and location of the media system in the United States vis-à-vis greater awareness of media systems in other political contexts where media cultures may vary from the U.S. matrix. Across the board of sampled countries'; media systems, students will be exposed to the ways in which each country's media have developed, are shaped, and are continually shaped by factors that include history, political cultures, evolving legal regimes, media regulations, finances, media economics, new technologies, institutional arrangements, citizens' access to information, or lack thereof.Another objective of this course is to equip students with a toolbox and framework with which they can replicate comparative media systems analyses in other countries and regions of interest as they contemplate study abroad and/or long-term career (employment, graduate studies) engagements. To achieve foregoing objectives students will be exposed to readings in theories of media systems and to academic articles using comparative methodologies to examine structural evolution of media in tandem with countries transformations over time. Students will analyze historical or contemporary media systems' developments through careful comparisons and applying critical thinking skills. In the process, students develop analytical skills useful in contending with academic and professional environments.

Enforced Prerequisite at Enrollment: COMM 410

Changes Effective Summer 2025:

- Changed Prerequisites
- Changed Course Description

COMM 491: International Telecommunications (3 Credits)
Old Listing Effective Through Spring 2025:

Impact of globalization, regulation, and new technologies on telecommunications in different countries and regions. COMM 491 International Telecommunications (3) This course will provide a forum for students to investigate and debate ongoing or anticipated conflicts in international telecommunications. Students will learn how international bodies such as the ITU, WTO, WIPO, and United Nations influence telecommunications. The course also will examine how various nations have organized and reorganized the telecommunications sector. In this portion, we will consider such developments as privatization, liberation, deregulation and globalization. Students will explore how technology, culture, and law interact within a nation or region to shape the development and structure of its telecommunications industries. Students will study how media and communications firms and regulators in a given nation respond to technological change and how a nation's specific geographic, cultural, and political environment shapes its response. Students will also examine how the nation's regulatory scheme and the structure of its telecommunications industries impact freedom of expression, political discourse, and commerce.

Enforced Prerequisite at Enrollment: COMM 180

Changes Effective Summer 2025:

- Changed Course Description

ENGL 209: Journal or Magazine Practicum (1-6 Credits: Maximum of 8 Credits) [BA]
Old Listing Effective Through Spring 2025:

A practicum in the editing and publishing of a magazine or journal.

Changes Effective Summer 2025:

- Changed Credits
- Changed Course Description

GD 405: Minor Advanced Studio (3 Credits)
Old Listing Effective Through Spring 2025:

This class introduces the concepts, technologies, and languages used to design and build publications, objects, and complex collaborative digital communications. GD405 provides Graphic Design Minors with an advanced-level design studio, appropriate in rigor, and in keeping with the expectations of the Minor in Graphic Design degree. This will prepare the successful student for the self-guided thesis environment of the Minor in Graphic Design Capstone Course (GD406). Within this advanced studio course, students will continue to develop core professional competencies in their quest for mastery of industry tools and techniques for actual and virtual domains. It will apply the student's existing knowledge of design methodology to the completion of project-based studio coursework. Through research, ideation, and the creation of final designs, students will be given continued experiences in printed mediums, be introduced to the design of physical artifacts, and exposed to the complexities of digital visual communication in emerging mediums. These may include complex long-format publications, commercial product packaging, websites, and digital interfaces. Students will develop an understanding of the graphic designer as a professional communicator, and develop the work habits and attitudes found within this design profession.

Enforced Prerequisite at Enrollment: GD 200 and GD 201

Changes Effective Summer 2025:

- Changed Prerequisites

JAPNS 210: Extensive Reading in Japanese (1.5 Credits: Maximum of 12 Credits) [BA] [IL]
Old Listing Effective Through Spring 2025:

This course consists of reading Japanese books without translation or grammar instruction in and outside of class. Students will choose books from a selection provided by the instructor, beginning at a lower level and moving gradually to higher levels under the instructor's supervision. Books may include an audio component. The instructor will select appropriate reading materials and organize them by levels, then constantly monitor students' reading behavior, occasionally giving suggestions and regularly consulting with students. The idea of this class is to learn incidentally, by encountering new words and grammatical patterns that can be understood based on context, and by reinforcing existing knowledge through increased familiarity. The emphasis is on learning the way of reading that allows you to enjoy the content of authentic but carefully selected reading materials. The course will help students develop a habit of reading at a designated time and place. Using language skills acquired in the classroom as a real communication tool will encourage use of Japanese beyond the classroom.

PreRequisite: JAPNS002

Changes Effective Summer 2025:

- Changed Credits

MUSIC 325: Music Entrepreneurship (3 Credits)
Old Listing Effective Through Spring 2025:

This course teaches students how to use entrepreneurship as a tool in service to their career goal of becoming a music professional. For students who create their own music in some capacity (composing, arranging, performing) or non-creators who desire to support the production and consumption of music in some way, this course provides a solid understanding of entrepreneurial theory and shows how to apply it to the specific goals and interests of each student. This course takes an in-depth look at how the music industry works and helps you, the student, to create a career in music.

Changes Effective Summer 2025:

- Changed Course Number to 423
- Added Bachelor of Arts: Arts Attribute

PHIL 124: Philosophy of Religion (3 Credits) [BA] [GH]
Old Listing Effective Through Spring 2025:

This course surveys perennial philosophical questions connected with religion: What is God, deity, or divinity? What is the nature and significance of religious experience? Is it rational to hold religious beliefs? How persuasive are arguments about the existence of God? How compatible is religion with modern science? What are the meanings of miracles, immortality, and creation? In what ways might morality depend on religion? What role ought religion to play in society and the public sphere? What lesson should we draw from profound religious experiences? Ought religious tolerance to be limited at all? Through the reading and discussion of relevant historical and contemporary texts, students will be encouraged to reflect on such questions from a variety of perspectives.

PreRequisite: third-semester standing

Cross-listed Courses: RLST 129

Changes Effective Summer 2025:

- Removed Prerequisites

PHIL 134: Food, Values, and Health (3 Credits) [BA] [GH]
Old Listing Effective Through Spring 2025:

This course studies the ethical and social issues connected to food, personal and cultural eating habits, body image and ideas of health, and agricultural practices and industrialized food production. We will discuss the following sorts of questions: In what ways are cooking and eating central to our human identity? What do judgments about being anorexic, overweight, or eating unhealthily mean and do? How strong are the arguments for vegetarianism, veganism, or raw-food-ism? Ought we to eat as our Paleolithic ancestors did? If the future holds engineered meat, GMO fruit, and Soylent shakes, what are we to think? Should food-companies be allowed to advertise to children? Is alcohol more like food, like medicine, or like drugs? Students will pursue answers to such food-ethical questions by learning relevant moral and social theory, discussing past and contemporary approaches to these issues, and analyzing case studies. We will pay particular attention to food as a symbol with psychological, social, and spiritual meanings and effects.

Cross-listed Courses: FDSC 134

Changes Effective Summer 2025:

- Removed FDSC 134 as Cross-listed Course

SC 306W: BS MBA Undergraduate Seminar (2 Credits) [WAC]
Old Listing Effective Through Spring 2025:

This course is designed for students enrolled in the Science BS/MBA IUG degree program. It will provide an opportunity for students to become familiar with key MBA common terms and concepts that will be useful for their required co-ops, internships, and their transition into work in the Smeal MBA part of the degree program. During the course, instructors will introduce or reinforce learning about hard skills of supply chain management, finance, business planning and marketing, and soft skills associated with leadership, organizational dynamics and modern management. The course will improve student ability to formulate and present strategies and communicate effectively as a leader and team member. The course will expand the number of occasions for the BS/MBA class cohort to experience inter-class interaction and it will provide mutual support opportunities. In order to facilitate these inter-class interactions, it is designed to be repeatable so students in later years of the program can work with the students just beginning the program. The course will augment the integrative learning that was established in first year seminars and extracurricular BS/MBA enrichment programs. The course is designed to facilitate continued student development as self-directed learners. The course will advance student perspectives of professional and career development.

Changes Effective Summer 2025:

- Changed Credits
- Changed Course Description

SPAN 305: Spanish for Social Services (3 Credits)
Old Listing Effective Through Spring 2025:

Provides practical language applications for students going to social work, psychology, and the legal and medical professions. SPAN 305 Spanish for Social Services (3) SPAN 305 Spanish for Social Services (3) provides practical language applications for students going into social

work, psychology, and the legal and medicalprofessions.At the same time, there is an emphasis on the wide range of historic, linguistic and cultural influences that make up the Hispanic community in the US today.

Prerequisite SPAN 215 or 253W

Changes Effective Summer 2025:

- Changed Course Description
- Added United States Cultures (US) Attribute

SPAN 314: Spanish Sounds (3 Credits)
Old Listing Effective Through Spring 2025:

Spanish phonetics and phonemics; systematic means of correcting pronunciation defects; other audio-lingual applications.

Prerequisite SPAN 215

Changes Effective Summer 2025:

- Changed Course Description
- Added Bachelor of Arts: Social and Behavioral Sciences Attribute

SPAN 316: Building Words and Sentences in Spanish (3 Credits)
Old Listing Effective Through Spring 2025:

SPAN 316 Building words and sentences inSpanish.Analysis of Spanish work structure and its relationship to syntacticstructures.Building Words and Sentences in Spanish (3) "Building words and sentences in Spanish" is an introduction to the study of Spanish morphology and syntax. In linguistics, morphology is the study of the morphemes (e.g. affixes, words, roots) of language and how they combine together to form words. Syntax is the study of how words combine together to form phrases and sentences. Because this course is for Spanish majors and minors, the focus in this course is on the structure of words, phrases, and sentences in Spanish, how Spanish compares to other languages, and how morphology and syntax vary across Spanish dialects. Special focus will be made on explaining the kinds of errors typical of English-speaking learners of Spanish as a second language, and a primary goal of the course is for students to improve their proficiency in using Spanish morphosyntax. The course is taught in Spanish.

Prerequisite SPAN 215

Changes Effective Summer 2025:

- Changed Course Description
- Added Bachelor of Arts: Social and Behavioral Sciences Attribute

SPAN 355: Topics in the Cultures of Latin America (3 Credits) [BA]
Old Listing Effective Through Spring 2025:

This course offers a comparative study of the literatures, artistic manifestations, intellectual traditions, and cultural productions of the Latin American region. This course offers a comparative study of the literatures, artistic manifestations, intellectual traditions, and cultural productions of the Latin Americanregion.Throughout the course, we will reflect on the (im)possibility of characterizing a vast region by taking into account ongoing factors its broader history and culture, as well as national and local particularities. Topics will vary by semester and may include: literary and artistic periods and movements, (post)coloniality and decoloniality, the politics of race, gender, and sexuality, urban and rural sociopolitical movements, (self-)representations in old and new media, discourses of the political (populisms, revolutions, dictatorships, and

neoliberalism), and migration studies. Students will engage with literary texts, historic documents, art, music, and other materials in order to understand different kinds of writing and forms of representation. While most materials will be in Spanish, the course may also include works in translation from Brazil, as well as the English- and/or French-speaking Caribbean.

PreRequisite: SPAN 200 and SPAN 253W

Changes Effective Summer 2025:

- Changed Course Description
- Added Bachelor of Arts: World Cultures Attribute
- Added International Cultures (IL) Attribute

SPAN 356: Topics in the Cultures of the Americas (3 Credits) [BA]
Old Listing Effective Through Spring 2025:

This course offers a comparative study of the literatures and cultures of the Americas, bringing Latin America into dialogue with the United States (and in some instancesCanada).This course offers a comparative study of the literatures and cultures of the Americas, bringing Latin America into dialogue with the United States (and, in some instances, Canada). Throughout the course, we will explore the (dis) continuities that both connect and divide the hemisphere, and we will trace the movement of people, artistic practices, and ideas across borders while paying attention to the distinctive aspects of national and local cultures. Topics will vary by semester and may include: empire and colonialism, the literary and cultural legacies of slavery, the figure of the "native," crime literature or science fiction in the Americas, theater of the Americas, literatures and cultures of the Spanish-American War, media and the U.S./Mexico border, and cultures of the Caribbean diaspora. Although the course may cover English-language materials, or works in translation from Brazil and/or the French-speaking Caribbean, most of the texts/recordings/films will be in Spanish, as will all assignments written by students.

PreRequisite: SPAN 200 and SPAN 253W

Changes Effective Summer 2025:

- Changed Course Description
- Added Bachelor of Arts: World Cultures Attribute
- Added International Cultures (IL) Attribute

SPAN 420: Spanish for Business and International Trade (3 Credits) [BA]
Old Listing Effective Through Spring 2025:

Spanish 420, Spanish for Business and International Trade, is an introduction to business administration (organizational structure, human resources, marketing, accounting, cross-cultural etiquette, business ethics, etc.) within the context of the Spanish language and Hispanic cultures against the backdrop of the global economy. Participants will broaden and deepen their ability to apply their Spanish skills in a professional setting by reading and evaluating current business articles, discussing and analyzing business issues in various Hispanic countries, examining the intersection of business and culture in the Spanish-speaking world, viewing short videos, preparing a resume in Spanish, and participating in other written and oral activities. To complement the core content, various assignments also allow students to focus on their individual majors.

PREREQUISITES: SPAN 100A OR SPAN 200 AND SPAN 215 OR SPAN 253

Changes Effective Summer 2025:

- Changed Course Description
- Added International Cultures (IL) Attribute

SPAN 472: The Contemporary Spanish American Novel (3 Credits) [BA]
Old Listing Effective Through Spring 2025:

The regionalist and the social context in which such works have been produced in the 20th and 21st centuries. novel since 1910, together with the social background.

Prerequisite: (SPAN 100A or SPAN 200) and SPAN 253W

Changes Effective Summer 2025:

- Changed Course Description
- Added International Cultures (IL) Attribute

SPAN 476: Masterpieces of Spanish American Literature (3 Credits) [BA]
Old Listing Effective Through Spring 2025:

Reading, analysis, and discussion of selected major works representative of Spanish American prose and poetry.

Prerequisite: (SPAN 100A or SPAN 200) and SPAN 253W

Changes Effective Summer 2025:

- Changed Course Description
- Added International Cultures (IL) Attribute

SPAN 479: U.S. Latina/o Culture en Espanol (3 Credits) [US] [GH]
Old Listing Effective Through Spring 2025:

This course is conducted in Spanish and will analyze some of the central themes that shape the diverse Latina/o experiences in the United States. Some of the main topics that the course will address include: the politics of labeling; definitions of displacements; the politics of language; imaginary homelands and geographic spaces; and conceptualizations of race, gender, and sexuality. These themes will be seen through the lens of Latina/o literature and film. The main objective of this course is to help students think critically about the conceptual, theoretical, historical, and social issues that inform the Latina/o experience in the United States.

Prerequisite: (SPAN 100A or SPAN 200) and SPAN 253W

Cross-listed Courses: LTNST 479

Changes Effective Summer 2025:

- Added Bachelor of Arts: Humanities Attribute
- Added Bachelor of Arts: World Lang (12th Unit) Attribute
- Added Bachelor of Arts: World Language (All) Attribute
- Added Exceeds 12th Unit of World Language Attribute

SPAN 490: Masterpieces of Spanish Prose (3 Credits) [BA]
Old Listing Effective Through Spring 2025:

Reading, analysis, and discussion of selected masterpieces of Spanish novels, short stories, etc.

Prerequisite: (SPAN 100A or SPAN 200) and SPAN 253W

Changes Effective Summer 2025:

- Changed Course Description
- Added International Cultures (IL) Attribute

SPAN 491: Masterpieces of Spanish Drama and Poetry (3 Credits) [BA]
Old Listing Effective Through Spring 2025:

Reading, analysis, and discussion of selected masterpieces of Spanish drama and poetry.

Prerequisite: (SPAN 100A or SPAN 200) and SPAN 253W

Changes Effective Summer 2025:

- Changed Course Description
- Added International Cultures (IL) Attribute

SPLED 498: Special Topics (1-9 Credits: Maximum of 9 Credits)
Old Listing Effective Through Spring 2025:

Formal courses given infrequently to explore, in depth, a comparatively narrow subject which may be topical or of special interest.

Changes Effective Summer 2025:

- Changed Course Description

Course Changes: Effective Fall 2025

BRASS 130: Trumpet: Performance I (3 Credits)
Old Listing Effective Through Summer 2025:

Individual instruction in trumpet one hour per week. For B.Mus. trumpet performance majors.

Changes Effective Fall 2025:

- Changed Course Description
- Changed Credits

BRASS 131: French Horn: Performance I (3 Credits)
Old Listing Effective Through Summer 2025:

Individual instruction in French horn one hour per week. For B.Mus. French horn performance majors.

Changes Effective Fall 2025:

- Changed Course Description
- Changed Credits

BRASS 132: Trombone: Performance I (3 Credits)
Old Listing Effective Through Summer 2025:

Individual instruction in trombone one hour per week. For B.Mus. trombone majors.

Changes Effective Fall 2025:

- Changed Course Description
- Changed Credits

BRASS 133: Euphonium: Performance I (3 Credits)
Old Listing Effective Through Summer 2025:

Individual instruction in euphonium/baritone one hour per week. For B.Mus. euphonium/baritone majors.

Changes Effective Fall 2025:

- Changed Course Description
- Changed Credits

BRASS 134: Tuba: Performance I (3 Credits)
Old Listing Effective Through Summer 2025:

Individual instruction in tuba one hour per week. For B.Mus. tuba majors.

Changes Effective Fall 2025:

- Changed Course Description
- Changed Credits

BRASS 180: Trumpet: Performance II (3 Credits)
Old Listing Effective Through Summer 2025:

Individual instruction in trumpet one hour per week. For B.Mus. trumpet performance majors.

Changes Effective Fall 2025:

- Changed Course Description
- Changed Credits

BRASS 181: French Horn: Performance II (3 Credits)
Old Listing Effective Through Summer 2025:

Individual instruction in French horn one hour per week. For B.Mus. French horn performance majors.

Changes Effective Fall 2025:

- Changed Course Description
- Changed Credits

BRASS 182: Trombone: Performance II (3 Credits)
Old Listing Effective Through Summer 2025:

Individual instruction in trombone one hour per week. For B.Mus. trombone majors.

Changes Effective Fall 2025:

- Changed Course Description
- Changed Credits

BRASS 183: Euphonium: Performance II (3 Credits)
Old Listing Effective Through Summer 2025:

Individual instruction in euphonium/baritone one hour per week. For B.Mus. euphonium/baritone majors.

Changes Effective Fall 2025:

- Changed Course Description
- Changed Credits

BRASS 184: Tuba: Performance II (3 Credits)
Old Listing Effective Through Summer 2025:

Individual instruction in tuba one hour per week. For B.Mus. tuba majors.

Changes Effective Fall 2025:

- Changed Course Description
- Changed Credits

BRASS 230: Trumpet: Performance III (3 Credits)
Old Listing Effective Through Summer 2025:

Individual instruction in trumpet one hour per week. For B.Mus. trumpet performance majors.

Changes Effective Fall 2025:

- Changed Course Description
- Changed Credits

BRASS 231: French Horn: Performance III (3 Credits)
Old Listing Effective Through Summer 2025:

Individual instruction in French horn one hour per week. For B.Mus. French horn performance majors.

Changes Effective Fall 2025:

- Changed Course Description
- Changed Credits

BRASS 232: Trombone: Performance III (3 Credits)
Old Listing Effective Through Summer 2025:

Individual instruction in trombone one hour per week. For B.Mus. trombone majors.

Changes Effective Fall 2025:

- Changed Course Description
- Changed Credits

BRASS 233: Euphonium: Performance III (3 Credits)
Old Listing Effective Through Summer 2025:

Individual instruction in euphonium/baritone one hour per week. For B.Mus. euphonium/baritone majors.

Changes Effective Fall 2025:

- Changed Course Description
- Changed Credits

BRASS 234: Tuba: Performance III (3 Credits)
Old Listing Effective Through Summer 2025:

Individual instruction in tuba one hour per week. For B.Mus. tuba majors.

Changes Effective Fall 2025:

- Changed Course Description
- Changed Credits

BRASS 280: Trumpet: Performance IV (3 Credits)
Old Listing Effective Through Summer 2025:

Individual instruction in trumpet one hour per week. For B.Mus. trumpet performance majors.

Changes Effective Fall 2025:

- Changed Course Description
- Changed Credits

BRASS 281: French Horn: Performance IV (3 Credits)
Old Listing Effective Through Summer 2025:

Individual instruction in French Horn one hour per week. For B.Mus. French Horn performance majors.

Changes Effective Fall 2025:

- Changed Course Description
- Changed Credits

BRASS 282: Trombone: Performance IV (3 Credits)
Old Listing Effective Through Summer 2025:

Individual instruction in trombone one hour per week. For B.Mus. trombone majors.

Changes Effective Fall 2025:

- Changed Course Description
- Changed Credits

BRASS 283: Euphonium: Performance IV (3 Credits)
Old Listing Effective Through Summer 2025:

Individual instruction in euphonium/baritone one hour per week. For B.Mus euphonium/baritone majors.

Changes Effective Fall 2025:

- Changed Course Description
- Changed Credits

BRASS 284: Tuba: Performance IV (3 Credits)
Old Listing Effective Through Summer 2025:

Individual instruction in tuba one hour per week. For B.Mus. tuba majors.

Changes Effective Fall 2025:

- Changed Course Description
- Changed Credits

DS 200: Introduction to Data Sciences (4 Credits)
Old Listing Effective Through Summer 2025:

The course introduces students to data sciences, an emerging discipline focused on the knowledge and skills needed to harness the power of data to advance science and engineering, address complex national and global challenges, inform public policy, and improve human lives. It demonstrates how the discipline of data science integrates knowledge and skills in computer sciences, statistics, and informatics (with exposure to application domains such as life science, health science, cyber security, astronomy, etc). Through a combination of lectures, hands-on labs, and case studies, students are introduced to the "big picture" of data sciences including elements of understanding data through exploratory data analysis, testing hypotheses against data, building predictive models, all using real-world examples. The course also introduces students to opportunities to specialize in Applied Data Sciences (with an emphasis on data sciences applications in the real world), Computational Data Sciences (with an emphasis on well-engineered data analytics systems), and Statistical Data Sciences (with an emphasis on advanced statistical theory and methods).

Changes Effective Fall 2025:

- Added Prerequisites
- Changed Course Description
- Added General Education Quantification (GQ) Attribute

DS 402: Emerging Trends in the Data Sciences (3 Credits: Maximum of 9 Credits)
Old Listing Effective Through Summer 2025:

This course exposes and trains students in the analysis of emerging trends in data sciences.
DS 402 Emerging Trends in the Data Sciences (3) Data sciences is a rapidly evolving field affected by innovations in a variety of technical domains, including data generation, capture, storage, and processing. Staying abreast of new developments can be a daunting task but is critical for success. This course provides an in-depth analysis of a particular innovation, but starts with developing generally applicable skills for analyzing new technologies. In particular, the analytic framework considers the innovation's technical aspects and potential for widespread adoption, but also its social, organizational and policy implications. As a course focused on a new data sciences technology or analytic innovation, it is repeatable. As such, the course enables students to be exposed to the cutting edge of data sciences, supporting a forward looking view of the field for students across the university.

Enforced Prerequisite at Enrollment: DS 220

Changes Effective Fall 2025:

- Changed Credits

DS 441: Information Retrieval and Organization (3 Credits)
Old Listing Effective Through Summer 2025:

The practices and foundations of access to textual and nontextual information using the principles of information retrieval and web search. Introductory course for for undergraduate students in the last year of their academic program and graduate students covering the practices, issues, and theoretical foundations of organizing and analyzing information and information content for the purpose of providing access to textual and nontextual information resources. Introduces students to the principles of information storage and retrieval systems and databases. IST 441 Information Retrieval and Organization (3) This is an introductory course for Information Sciences and Technology senior and graduate students covering the practices, issues, and theoretical foundations of organizing and analyzing information and information content for the purpose of providing access to textual and non-textual information resources. This course will introduce students to the principles of information storage and retrieval systems and databases. Students will learn how effective information search and retrieval is interrelated with the organization and description of information to be retrieved. Students will also learn to use a set of tools, such as search engines, and procedures for organizing information. They will become familiar with the techniques involved in conducting effective searches of information resources.

Enforced Prerequisite at Enrollment: C or better in MATH 141 and DS 220 and (IST 230 or CMPSC 360 or MATH 311W)

Changes Effective Fall 2025:

• Changed Course Description

ETI 461: Database Management and Administration (3 Credits)
Old Listing Effective Through Summer 2025:

A study of advanced topics in database management systems that are fundamental to effective administration of modern enterprise information systems. The objective of the course is to enable a student to comprehend a range of issues in modern database management and administration. The students will learn advanced SQL, database system development lifecycle topic that include: database planning, requirements and design, database selection and application design, prototyping, implementation, testing operational and maintenance; database performance tuning concepts, monitoring the system for improved performance, and DBMS performance tuning; database transaction management covering transactions and the ACID properties, concurrency control techniques, and database recovery management; query processing and optimization techniques via query decomposition and optimization options; introduction to distributed processing and distributed database concepts, components and characteristics of DDBMS, and distributed database design; web connectivity technologies and XML; introduction to Business intelligence and data warehouses; introduction to Big data, NOSQL and cloud databases; and database security and database administration.

Enforced Prerequisite at Enrollment: IST 210 and IST 242

Changes Effective Fall 2025:

• Changed Prerequisites

GD 301: Experience Design Process + Methods (4-4 Credits: Maximum of 4 Credits)
Old Listing Effective Through Summer 2025:

GD 301, Experience design process and methods, is an advanced graphic design studio class that provides graphic design students with an in-depth study of the intricate relationship between the professional graphic designer and digital technology. Students will advance their knowledge of design software applications and will be introduced to programming languages that will assist them throughout the design process. From research and ideation to the creation of comprehensive studies and final designs, students will be given the tools that are critical to the completion of a variety of graphic design projects.

Changes Effective Fall 2025:

• Changed Abbreviated Title
• Added Prerequisites

GD 315: Humanizing Data (4 Credits)
Old Listing Effective Through Summer 2025:

Humanizing data is an advanced-level studio course for majors and minors in graphic design, analyzing and visualizing data though aesthetic and humanistic approaches.

Enforced Prerequisite at Enrollment: GD 115N

Changes Effective Fall 2025:

• Changed Prerequisites
• Changed Course Description

GEOG 361: Cartography--Maps and Map Construction (3 Credits) [BA]
Old Listing Effective Through Summer 2025:

The art and science of creating small-scale maps as a medium for communication and research. GEOG 361GEOG 361 Cartography - Maps and Map Construction (3)(BA) This course meets the Bachelor of Arts degree requirements. Mapping is crucial to exploring and understanding distributions of geographic phenomena. It is also an important phase of many database-intensive analyses because a map is often the best way to visualize results and show them to others. Emphases in this course will be on designing and producing both thematic and reference maps that use symbols and visual hierarchies which allow the content of the maps to be readily understood. In addition to principles of graphic design, students learn about map projections, generalization, and data classification, with the objective of becoming proficient mapmakers. Hands-on computer work for lab sections will involve working with varied digital data sources using GIS software. Maps are often built from existing data created by government mapping agencies, stored as geographic information systems (GIS) databases, and based on remotely-sensing imagery. The prerequisite for GEOG 361 is the 100-level mapping course covering basic principles of these technologies and data sources. The course is typically offered once a year. Evaluation is based on written exams and mapping projects that students produce to map location information and represent social and environmental data.

PreRequisite: GEOG 160

Changes Effective Fall 2025:

• Changed Credits
• Changed Prerequisites
• Changed Course Description
• Removed Bachelor of Arts: Social and Behavioral Sciences Attribute

GEOG 362: Image Analysis (3 Credits) [BA]
Old Listing Effective Through Summer 2025:

Introduction to the basic principles of remote sensing, and the analysis of aerial and satellite data. GEOG 362 GEOG 362 Image Analysis (3)(BA) This course meets the Bachelor of Arts degree requirements. Geography 362 is a course designed to introduce students to the field of remote sensing. Modern remote sensing is a multi-disciplinary and many-faceted subject encompassing knowledge from a broad array of areas. Remote sensing has steadily grown in importance since the early 1970s and continues to expand as sensing technology improves, as imagery becomes cheaper, as coverage becomes more widespread and as good software for processing the data become readily available. This course is not meant to be an exhaustive treatment of remote sensing. Rather, it is designed to provide an overview of the field.The field of remote sensing is vast and includes several inter-related themes. Remote Sensing as a science primarily involves the extraction of information contained within energy. The engineering component of remote sensing involves the design and construction of instruments and systems capable of capturing and recording energy from a target. Remote Sensing as a vital tool is expressed in myriad applications, from land cover change analysis to weather forecasting.This course will be administered in two parts -The first seven weeks of the semester will focus on three broad topics (Fundamental Principals of Radiative Transfer and Energy-Matter, Remote Sensing Systems, and Applications). This part of the course will expect student to grasp the major laws describing the energy-matter interactions. Recitations will be devoted to reviewing homework problems designed to solidify understanding of radiation concepts

central to the construction of remote sensing imagery. -The remainder of the semester will be devoted to image analysis with an emphasis on digital remote sensing, i.e. analyzing data in digital form using computer software. This aspect of the course will have a practical focus on using imagery to analyze land cover and to construct land cover maps, with the expectation that students will be able to become proficient in the handling and processing of remote sensing imagery. Consequently, laboratory work will play a major role in this component of the course.

PreRequisite: GEOG 160

Changes Effective Fall 2025:

- Changed Course Title
- Changed Abbreviated Title
- Changed Credits
- Changed Course Description
- Removed Bachelor of Arts: Social and Behavioral Sciences Attribute

GEOG 363: Geographic Information Systems (3 Credits)
Old Listing Effective Through Summer 2025:

This course describes and explains the principles of Geographic Information Systems (GIS). Building on the overall introduction in the prerequisite course on the special characteristics of spatial data and how our earth is measured an mapped, Geography 363 focuses on ho to use data to develop solutions for geographic representation and analysis tasks using GIS software. Students learn the basics of GIS data acquisition, manipulation, and analysis. Students will learn to gather or create relevant spatial data, clean/recertify/bring the data into the GIS, perform GIS operations, visualize and communicate results in an informative way, and sufficiently answer basic research questions.

Upon completion of this course, students will be able to:
1. Understand Geographic Information Science principles.
2. Handle geographic data for a variety of applications.
3. Find, use and evaluate GIS datasets.
4. Describe capabilities and limitations of GIS methods and models.
5. Confidently use capabilities of the ArcMap GIS software package.
6. Demonstrate ability to design and carry out spatial analyses using GIS.

7. Communicate the results of geographic analyses to others, both in oral & written form.
8. Acquire skills to use GIS in a career, or work in a GIS-related career.
9. Solve spatial problems.
10. Give advice for what problems can be solved and what techniques can be used.

Prerequisite: GEOG 260 or GEOG 160

Changes Effective Fall 2025:

- Changed Prerequisites
- Changed Course Description

GEOG 364: Spatial Analysis (3 Credits) [BA]
Old Listing Effective Through Summer 2025:

Geographic measurement, scaling, and classification; analysis of spatial pattern and structure; geographic covariation and autocorrelation. GEOG 364GEOG 364 Spatial Analysis I (3)(BA) This course meets the Bachelor of Arts degree requirements. Geography 364 is an introduction to spatial analysis that focuses on statistical methods for geographers. You will have an opportunity in this course to: learn how tousestatistics in your

own work; learn how toconsumestatistics in everyday life The statistical methods you will learn to use are simple descriptive statistics that we use to summarize complex data, as well as the associated charts, diagrams and maps. From there, we will move on to look at chance and probability theory, and simple inferential statistics.Throughout the course, we will be concerned with “everyday statistics”, primarily as it relates to geography. Contemporary media are saturated with statistics, from reports of climatic change, through latest presidential election polls, to batting averages and yards-gained statistics in sports. A lot of the presentation of these statistics is lazy or inaccurate, and often misleading (whether, deliberately or not), and a major theme of this course will be to look at the issues involved.During most lectures we will spend some time working with sample problems, and to discuss practical applications. These activities are meant to build a deeper understanding of the subject matter but it also relies heavily on your active participation. You will often have work to prepare before lectures or other types of lecture homework.Labs will give you experience with statistics functions in Excel before moving onto SPSS as well as other statistical software, and also with mapping statistical data using GIS software.

PreRequisite: STAT 200 and 6 credits in social science

Changes Effective Fall 2025:

- Changed Credits
- Changed Prerequisites
- Changed Course Description
- Removed Bachelor of Arts: Social and Behavioral Sciences Attribute

GEOG 365: Introduction to GIS Programming (3 Credits)
Old Listing Effective Through Summer 2025:

The rate at which geospatial data are being generated exceeds our ability to analyze them. These developments are quickly leading toward a data-rich but knowledge-poor environment. New challenges arise from an unprecedented access to massive amounts of data. Specialized algorithms are needed to address these scientific and computational challenges and provide innovative and effective solutions to analyze these large, often multi-modal, spatio-temporal datasets generated by high-resolution sensors or computational models. Traditional computational frameworks are specialized to serve a single science application, and are not flexible to drive diverse models on changing computational platforms. GEOG 365 addresses this new challenge by introducing specialized algorithms and data structures to analyze and visualize large and rapidly changing Earth science data. The emphasis of this course is on specialized data miningalgorithms suitable for spatial data and spatio-temporal data with geoscience and Earth science applications. This course teaches how to automate GIS tasks using scripting languages. Automation can make work easier, faster, and more accurate, and knowledge of a scripting language is a highly desired skill in GIS analysts. This course dedicates time to programming fundamentals so that the skills learned can be applied to languages. Increased ability to adapt to new technologies and programming languages will be the greatest benefit students gain from this course. Course Objectives and Learning Outcomes By the end of this course, students should be able to:- Design and implement solutions using scripting languages to automate geoprocessing tasks.- Demonstrate an understanding of programming concepts, methods, and approaches such as debugging, error checking, and documentation.- Demonstrate an awareness of advanced concepts such as external libraries.- Be aware of and able to integrate content, examples, and libraries.

PREREQUISITES: GEOG 260 OR GEOG 160

Changes Effective Fall 2025:

- Changed Course Title
- Changed Abbreviated Title
- Changed Prerequisites
- Changed Course Description

GEOG 444: African Resources and Development (3 Credits) [BA]
Old Listing Effective Through Summer 2025:

Ecological and cultural factors in the geography of Africa; natural resources and development. GEOG 444 / AFR 444 African Resources and Development (3) (BA) This course meets the Bachelor of Arts degree requirements. This course is designed to analyze the ecological, economic, political and cultural factors, which influence development in sub-Saharan Africa. The traditional system, colonialism, modernization, post-colonial philosophies are four conceptual artifacts used to address some of these issues. Within these broad frameworks, the course focuses on existing debates surrounding key development ideologies and narratives in the region, including, poverty, conservation, population, debt, food security, land reform, foreign intervention and global politics. The topics and texts for the course are chosen carefully to provide general factual material as well as exposure to the major discourses surrounding the region's development. The views of many Americans concerning Africa are often both unitary (Africa is a country) and unidimensional (Africa is a place of conflict, poverty, corruption and crisis). Assuming that a number of students are likely to join the class with this general background, the main objectives of the course will be :
(i) to provide a broad geographic and historical tutorial to dispel myths and stereotypes about the region;
(ii) to explore the literature, which analyzes the historical, geographic and political factors that underlie the region's present status in the global economy; and
(iii) to gain insights into the intellectual and ideological dimensions of the "raging" debates surrounding issues like environment, conservation, population, corruption, and poverty in the region. By the end of the semester, students should have acquired the skills to accomplish the following goals:
*develop a "mental map" of the broad physiographic, ecological, economic and political zones (blocs) in the region;
*be able to discriminate between stereotype and reality on information pertaining to the region;
*be able to interpret and analyze the internal (national, regional) dynamics of the region's development;
*be able to interpret and analyze the global factors, which influence the environment, economy, and politics of the region;
*develop an informed background on the ideological narratives that guide policy in the region, for example, population, sustainable development, post-colonialism, "empire" (whether, American, European, Indian, Chinese, South African?).

PreRequisite: GEOG 010 or GEOG 020 or GEOG 030 or GEOG 123 or GEOG 124 or GEOG 130 or EARTH105 or AFR 105 or AFR 110

Cross-listed Courses: AFR 444

Changes Effective Fall 2025:

- Changed Course Title
- Changed Abbreviated Title
- Changed Prerequisites

- Changed Course Description
- Added International Cultures (IL) Attribute

GEOG 462: Advanced Observation of Earth and Its Environment (3 Credits)
Old Listing Effective Through Summer 2025:

Recommended Preparations: (GEOG 365 AND GEOG 464) OR prior exposure to R programming language This course will provide the requisite materials to understand and apply techniques of remote sensing to study Earth and its environment using the R programming language. Every day numerous satellites from different countries acquire and transmit multispectral high resolution data of Earth and its environment. Such data are used for a variety of operational and research applications, such as weather forecasting, national security, natural hazards, navigation, land use and land cover, surface temperature, climate change, urban planning and many others. Massive amounts of data are received, processed, stored and distributed by several centers around the world, giving an unprecedented access to global high resolution information. Such information can give new insights to study the complementary nature of different parameters of Earth's environment. The first part of the course discusses the R programming language to analyze data, generate maps and plots and general remote sensing methodologies, products availability and characteristics, data types and formats. The second part of the course discusses remote sensing applications for specific tasks including natural hazards, global change, seasonal and interannual studies. Current research issues will be illustrated, including examples pertaining to the atmosphere, land masses, and oceans, and concluding with a survey of some problems that are at the current frontiers of remote sensing.

PreRequisite: Recommended Preparations: (GEOG 365 AND GEOG 464) OR prior exposure to R programming language Prerequisite: GEOG 362 or FOR 455 or METEO 477 or EE 477

Changes Effective Fall 2025:

- Changed Abbreviated Title
- Changed Course Description

GEOG 463: Geospatial Information Management (3 Credits)
Old Listing Effective Through Summer 2025:

This course examines geospatial data representations and algorithmic techniques that apply to spatially-organized data in digital form.

PreRequisite: GEOG 363

Changes Effective Fall 2025:

- Changed Course Description
- Removed Bachelor of Arts: Social and Behavioral Sciences Attribute

GEOG 464: Advanced Spatial Analysis (3 Credits) [BA]
Old Listing Effective Through Summer 2025:

Skills and knowledge for applying quantitative methods to analyze information with spatial distributions. GEOG 464GEOG 464 Analysis and GIS (3)(BA) This course meets the Bachelor of Arts degree requirements. Geography 464 is a course in methods for analyzing spatial data-- methods that can and should be used when the geographic arrangement of a set of measured observations is thought to be of significance in explaining the values of those measurements. The methods of spatial analysis looked at in this course can be distinguished from

conventional statistical analysis techniques, and also from many of the analysis functions programmed into many GIS packages. In fact several spatial analysis methods considered in this course the result of attempts to alter and extend conventional statistical techniques to take account of locational similarity and distance measurements (which is why Geography 364 or an equivalent primer in introductory statistical methods is a prerequisite). This means that the techniques that will be introduced in the course are often quite complex mathematically or statistically. Having said this, the overall goal of the course is to provide sufficient conceptual understanding and practical experience so that students become competent in selecting and applying methods appropriate to a variety of frequently-encountered analytical situations.

PreRequisite: GEOG 364

Changes Effective Fall 2025:

- Changed Abbreviated Title
- Changed Course Description
- Removed Bachelor of Arts: Social and Behavioral Sciences Attribute

GEOG 485: GIS Programming and Software Development (3 Credits) [BA]
Old Listing Effective Through Summer 2025:

The course focuses on solving geographic problems by modifying and automating generic Geographic Information System (GIS) software through programming. In GEOG 485, students use the Python programming language to write and modify scripts that add functionality to desktop GIS tools and to automate geospatial analysis processes. No previous programming experience is assumed. Core topics covered in this class include object-oriented programming, component object model technologies, object model diagrams, loops, if-then constructs, and modular code design, and situates these topics in the geospatial workflow through their integration with maps, layers, spatial data tables, and spatial analysis methods. Students who successfully complete the course can automate repetitive GIS tasks, customize GIS interfaces, and share their geospatial software development work with others.

PREREQUISITE : Permission of instructor or admission to the program

Changes Effective Fall 2025:

- Changed Prerequisites
- Changed Course Description
- Added Recommended Preparation
- Removed Bachelor of Arts: Social and Behavioral Sciences Attribute

HM 235: Hospitality Financial Accounting (3 Credits)
Old Listing Effective Through Summer 2025:

Accounting, in many respects, is the language of business and translates business transactions into quantifiable information. The purpose of this course is to provide the tools as to how to use and understand this language for making informed business decisions. Areas of focus include how to analyze and record business transactions, compiling and analyzing three of the four major financial statements, banking procedures and control of cash, various issues related to the payment of employees and the introduction of how to analyze financial statements. Regardless of the functional area in the hospitality industry in which students choose to work, they will be most likely be required to understand how accounting impacts the various financial statements, and how to use financial information to make informed business decisions. Therefore, an understanding of the importance of accounting

information to make informed business decisions is vital to students' future success.

Enforced Prerequisite at Enrollment: a grade of C or better required in HM 201

Changes Effective Fall 2025:

- Changed Prerequisites
- Changed Course Description

HM 490: Strategic Hospitality Management (3 Credits)
Old Listing Effective Through Summer 2025:

The purpose of this capstone course is to integrate previous course work to enhance students' analytical and critical thinking skills, managerial decision making skills, and an awareness of emerging trends in the hospitality industry. In particular, this course will integrate content in the areas of hospitality marketing, human resource management, organizational behavior, finance, accounting, and hospitality operations. The course offers a blend of theory and practical application of models of competitive strategy. The central questions that drive the course are: 'How do hospitality companies make strategic decisions, and how does strategy enhance the effectiveness of hospitality enterprises?' During the first half of the semester, the course will focus on the model of strategy formulation, from developing company vision and mission and setting objectives, through conducting an environmental scan, SWOT analysis, strategic analysis, and strategic choice. During the second half of the course, the focus will shift to corporate social responsibility, ethics, international strategic decision making, global hospitality management, and emerging trends in the industry.

Enforced Prerequisite at Enrollment: HM 242 and a grade of C or better in HM 336 and HM 365

Changes Effective Fall 2025:

- Changed Prerequisites
- Changed Course Description

HONOR 494M: **SPECIAL TOPICS** (1-2 Credits) [H] [WAC]
Old Listing Effective Through Summer 2025:

HONOR 494M Interdisciplinary Writing and Thesis Formulation (2)This course is a seminar to help students understand various approaches to interdisciplinary analysis. The course helps students learn about writing as an interpretive process. The course helps students with the formulation of their honors thesis projects and proposals.

PreRequisite: admission to an honors program belonging to the Penn State Honors Consortium

Changes Effective Fall 2025:

- Changed Course Title
- Changed Abbreviated Title
- Changed Credits
- Changed Course Description

IE 305: Product Design, Specification and Measurement (3 Credits)
Old Listing Effective Through Summer 2025:

Principles of product design and specifications and methods for product verification. IE 305 Product Design, Specification and Measurement (3)Product Design, Specification and Measurements a first level junior

course in manufacturing, required for all the baccalaureate students in the Department of Industrial and Manufacturing Engineering. It exposes students to the principles required for designing a product and developing the specifications for its components and the methods for product verification and checking conformance to specifications. Students taking this course should be familiar with introduction to engineering design and should have graphical communication skills.

Enforced Prerequisite at Enrollment: EDSGN 100

Changes Effective Fall 2025:

- Changed Prerequisites
- Added Concurrents
- Changed Course Description

IST 301: Information and Organizations (3 Credits)
Old Listing Effective Through Summer 2025:

Overview of organizational structures and functions. Includes information processing and analytic perspectives of organizations. IST 301 Information and Organizations (3) This course provides students the opportunity to learn and experience: 1. Applicable organization and the ways in which IT can alter and enable these activities. 2. A series of analytic techniques that students can use to investigate the effects of new IT on work and organization. 3. Examples and problems set in and drawn from a range of domains including military, medical, high technology, business and government.This course is designed around a series of ill-structured, contemporary problems that require students to develop responses by applying analytic techniques and theories of work and organization. At the end of the course, students will be able to: 1. Apply theories of work and organization as analytic techniques. 2. Conduct organizational and inter-organizational process analyses. 3. Map information flows among organizational units and actors.

Enforced Prerequisite at Enrollment: IST 210 and IST 220

Changes Effective Fall 2025:

- Changed Course Abbreviation to ETI

IST 302: IT Project Management (3 Credits)
Old Listing Effective Through Summer 2025:

Exploration and application of the basic concepts, methodologies, and tools of project management in the field of information sciences and technology. IST 302 IT Project Management (3) This course is designed to introduce and explore the basic concepts and practices of project management and help students understand how to plan and manage IT projects successfully. Throughout the course, students will be asked to utilize course concepts, methodologies, and tools while utilizing technology applications and addressing real-world problems. Students will learn the skills necessary to define project scope, create workable project plans, and manage projects with quality, budget, and schedule in mind. The course is structured around the key phases of project lifecycle, including initiating a project, developing project plans, executing and managing a project, and closing out a project. In addition, students will be taught how to identify and address the change management and political issues associated with project management.

Enforced Prerequisite at Enrollment: IST 210 and IST 220

Changes Effective Fall 2025:

- Changed Course Abbreviation to ETI
- Changed Prerequisites

IST 311: Object-Oriented Design and Software Applications (3 Credits)
Old Listing Effective Through Summer 2025:

Introduction to object-oriented applications including applications in an Object Oriented Design (OOD) language or OOD languages. IST 311 Object-Oriented Design and Software Applications (3) IST 311 is among the courses making up the Application Design & Development option in the Baccalaureate degree in Information Sciences and Technology. This course is normally taken in the 5th or 6th semester. It is the first upper-division course in the option sequence. The course is intended to provide students with a background in object-oriented design and object-oriented application development. Students will learn the fundamentals of object-oriented analysis, design, and modeling. They will apply design concepts and develop the skills necessary to bring an idea through the different phases of the application development lifecycle. The course normally involves students working on teams to design and develop working application prototypes. Upon completion of this course, students will be able to apply object-oriented design principles using object-oriented modeling and programming languages, show how object-oriented principles increase the quality of complex applications, and begin development of the team skills necessary when developing complex systems.

Enforced Prerequisite at Enrollment: C or better in IST 242 or CMPSC 221

Changes Effective Fall 2025:

- Changed Course Abbreviation to HCDD
- Changed Prerequisites

IST 331: Foundations of Human-Centered Design (3 Credits)
Old Listing Effective Through Summer 2025:

Interdisciplinary survey of topics and methods related to the human-centered design use and usability of information systems. IST 331 Foundations of Human-Centered Design: User and System Principles (3) This course provides a focused introduction to one of the most complicated parts of information systems design: users and the contexts in which they live, work, and play. The course provides a balance between theory and practice, which are tightly intertwined in this area. Students will learn how to use social science theories about human capabilities and group behavior to predict whether an information system will be usable and useful, and they will learn about the opportunities and challenges that are associated with a wide range of emerging technologies. Students will also gain skills in designing and evaluating information systems that meet the needs of a target audience. Because the information technology design space evolves rapidly, much of the technology-related content covered in this course will evolve from year to year; however the focus throughout will be understanding and responding to the needs, capabilities and preferences of the users of interactive information systems. The format of the class may include lectures, readings, in-class or online discussions, projects, or case studies. Assessment of student performance may include short assignments, quizzes, exams, or in-depth projects.

Enforced Prerequisite at Enrollment: C or better in IST 240 or IST 242 or CMPSC 122 or CMPSC 132

Changes Effective Fall 2025:

- Changed Course Abbreviation to HCDD

IST 361: Application Development Design Studio II (3 Credits)
Old Listing Effective Through Summer 2025:

Second of two design and development studio courses for IST and SRA students. IST 361 Application Development Design Studio II (3) This studio course will provide opportunities for students to practice technical skills acquired in their previous design and development courses to date, specifically, in IST 140, Introduction to Application Development; IST 242, Intermediate and Object-Oriented Application Development; and IST 311, Object-Oriented Design and Software Applications. The course will follow the general format of experiential studios in the arts and architecture. It will be primarily largely problem-based and project oriented. Peer and instructor design critiques will be the primary feedback and assessment mechanisms. Students in the IST Software Design Studios will be expected to complete deliverables in each phase of the systems development lifecycle (i.e. problem definition, requirements analysis, design, development, test) regardless of the development paradigm employed (plan-based, agile, etc). A key objective of this design studio will be to provide application development opportunities where students can apply knowledge and practice techniques gained from their foundation and first upper-division courses. Projects may be undertaken by individuals, pairs, or larger groups but each studio participant will be responsible for producing significant individual project deliverables. Project ideas may come from the student or from the instructor; however, projects related to students' other course deliverables will require the agreement of both instructors. Students will be required to maintain a design and development journal. This journal will be the analog of an engineering notebook or artist's sketchbook and should contain a running account of the students design and development ideas, explorations, rationale, and other notes. The IST design and development studios are a forum for serious students to engage with the concepts, process, tools, and materials used to envision and build software applications. Both collaboration and individual performance will be emphasized, as will experimentation, risk-taking, and enthusiasm for the process of designing and building working software applications. Students will be expected to improvise and then respond constructively to feedback from instructors and peers.

Enforced Prerequisite at Enrollment: C or better in IST 311

Changes Effective Fall 2025:

- Changed Course Abbreviation to HCDD
- Changed Prerequisites

IST 411: Distributed-Object Computing (3 Credits)
Old Listing Effective Through Summer 2025:

Introduction to distributed-object computing and its use in client/server and real-world computing applications. This course presents the fundamental concepts of distributed-object computing, including client/server computing which is an important platform for real-world computing systems. The course focuses on design, development, and deployment of distributed systems. Students will also consider issues of managing distributed systems and the relationships between organizational processes and information-system architectures. IST 411 is an elective course for the Baccalaureate degree program in Information Sciences and Technology. Students completing the Systems Development Option may take this course to fulfill option requirements. Upon completion of this course, students will have a broad understanding of the fundamental concepts of distributed objects and distributed-

computing architectures, have the ability to apply these concepts to real-world applications, and be able to design, develop, deploy, and maintain distributed applications.

Enforced Prerequisite at Enrollment: C or better in IST 311

Changes Effective Fall 2025:

- Changed Course Abbreviation to HCDD
- Changed Prerequisites

IST 412: The Engineering of Complex Software Systems (3 Credits)
Old Listing Effective Through Summer 2025:

Introduction to the engineering of complex software systems including software system specification, design and implementation, integration and test, and evolution. IST 412 The Engineering of Complex Software Systems (3) This course presents the fundamental concepts of the engineering of complex software systems, including iterative and agile development strategies. The course gives students insight into the full software development cycle, including design, implementation, test and quality assurance, deployment, maintenance, and project estimation and management. IST 412 is an elective course for the Baccalaureate degree program in Information Sciences and Technology. Students completing the Systems Development Option may take this course to fulfill option requirements. Upon completion of this course, students will have a broad understanding of the fundamental concepts of complex system software engineering and be able to apply these concepts to managing and developing a complex software project over the full software development cycle.

Enforced Prerequisite at Enrollment: C or better in IST 311

Changes Effective Fall 2025:

- Changed Course Abbreviation to HCDD
- Changed Prerequisites

IST 413: Usability Engineering (3 Credits)
Old Listing Effective Through Summer 2025:

This course addresses activities in the system development process that ensure usability. It considers the emerging concept of usability, requirements gathering and analysis, activity design, information design, interaction design, documentation design, user testing and usability evaluation. IST 413 Usability Engineering (3) The modern system development process includes concurrent engineering of usability - features of a system that make it approachable, learnable, as well as easy and satisfying to use. Topics in the course include the emerging concept of usability, requirements gathering and analysis, the use of scenarios and claims to describe and analyze both current human practices and envisioned practices, activity design, information design, interaction design, documentation design, and user testing, including techniques for formative and summative usability evaluation.

Enforced Prerequisite at Enrollment: C or better in IST 331 or HCDD 331

Changes Effective Fall 2025:

- Changed Course Abbreviation to HCDD
- Changed Prerequisites

IST 420: Fundamentals of Systems and Enterprise Integration (3 Credits)
Old Listing Effective Through Summer 2025:

Introductory course on integration of information technology into different venues, including the planning, development, and implementation of the integration. IST 420 Fundamentals of Systems and Enterprise Integration (3) IST 420 focuses on introducing the student to the role of information systems and technologies in achieving a variety of system goals. Emphasis will be placed on the theories and skills required for planning, developing, implementing, and managing the integration of information technology and different systems. IST 420 is required of all Information Sciences and Technology (IST) undergraduates who have chosen the Information Technology Integration Option in their baccalaureate degree. It is the prerequisite for IST 421 which is also required for the Option. Upon completion of the course, the student will be able to recognize information technology integration. They will also understand the 'business processes and information value chain' within a system, and be able to foster an understanding of the role of IT in system integration. Students will be periodically assessed through examinations, case studies, individual and group assignments and projects, and other performance indicators where appropriate.

Enforced Prerequisite at Enrollment: C or better in IST 240 or IST 242 and C or better in IST 301 and C or better in IST 302

Changes Effective Fall 2025:

- Changed Course Abbreviation to ETI
- Changed Prerequisites

IST 421: Advanced Enterprise Integration: Technologies and Applications (3 Credits)
Old Listing Effective Through Summer 2025:

Advanced course on the integration of information technology into systems applications. IST 421 Advanced Enterprise Integration: Technology and Applications (3) IST 421 expands the knowledge gained in IST 420 on the theories and skills required for planning, developing, implementing, and managing information systems. IST 421 is required of all Information Sciences and Technology (IST) undergraduates who have chosen the Information Technology: Integration and Application Option in their Baccalaureate degree. Upon completion of the course, the student will have expanded knowledge of information technology and systems integration issues across multiple application settings. They will also have a deeper understanding of the specific information technology (both hardware and software) that can serve as the foundation for designing systems within an organization, and have experience that fosters an understanding of the role of IT achieving system performance goals.

Enforced Prerequisite at Enrollment: C or better in IST 420

Changes Effective Fall 2025:

- Changed Course Abbreviation to ETI
- Changed Prerequisites

IST 422: Enterprise Architecture Foundations (3 Credits)
Old Listing Effective Through Summer 2025:

Theoretical foundations and practice of enterprise architecture. IST 422 Enterprise Architecture Foundations (3) Enterprise Architecture is the overall framework and set of strategic objectives for the usage of technology over time across an organization. Enterprise Architecture can also be described as the top-down, strategy-driven, integrating framework that brings together and manages the business model, applications and technology. Its primary goal is to facilitate improvement and deliver business-aligned information systems. This course presents the key components and processes involved in the effective creation and governance of enterprise architectures. Students will acquire knowledge about the key foundational aspects of enterprise architecture, learn what decisions need to be made and how to make them, and be able to explain and justify their recommendations.

Enforced Prerequisite at Enrollment: IST 301

Changes Effective Fall 2025:

- Changed Course Abbreviation to ETI
- Changed Prerequisites

IST 423: Enterprise Information Management and Storage Architecture (3 Credits)
Old Listing Effective Through Summer 2025:

Provide in-depth study of the concepts, issues, and technologies associated with the complex world of enterprise information and storage architecture. IST 423 Enterprise Information Management and Storage Architecture (3) This course is designed to introduce students to enterprise information storage and management concepts, issues, trends, and technologies. As an upper-division course, the focus will center on applying design concepts and associated technologies to real-world problems in the area of enterprise information storage and management . Existing partnerships with leading information management firms will be leveraged to provide real-world exposure to the complex enterprise information storage and management issues facing all organizations today. This course also focuses increasingly on the critical areas of information security and the emerging field of information storage virtualization. The course will mix technical details, applied value, and organizational insights of enterprise information storage and management through the use of labs, case studies, real-life problems, and team projects. This is a unique course that has generated great industry interest.

Enforced Prerequisite at Enrollment: IST 301

Changes Effective Fall 2025:

- Changed Course Abbreviation to ETI
- Changed Prerequisites

IST 424: Architectural Modeling of Organizations (3 Credits)
Old Listing Effective Through Summer 2025:

Theoretical foundations and practice of enterprise modeling. IST 424 Architectural Modeling of Organizations (3) Enterprise Architecture is the overall framework and set of strategic objectives for the usage of technology over time across an organization. Enterprise Architecture can also be described as the top-down, strategy-driven, integrating framework that brings together and manages the organization model, applications and technology. Its primary goal is to facilitate improvement and deliver organization-aligned information systems. Effective modeling is crucial for successful EA. This course provides an exposure to the foundational concepts and practices of effective enterprise modeling for EA. Students will acquire knowledge about the key foundational knowledge in modeling different layers of the enterprise, learn what decisions need to be made and how to make them, and be able to explain and justify their models and recommendations. This course explores the use and effectiveness

of architectural modeling to describe an organization and to integrate and manage IT resources strategically from an enterprise perspective. Hands-on exercises and cases studies are used to illustrate the role and effect of enterprise architecture concepts and methodologies. Emphasis is placed on understanding different architectural approaches, standards, and styles. Students will use enterprise architectural tools to develop descriptive models and understand how to integrate and manage IT within and between organizations. For each general topic area, core readings are used to define standard vocabulary, concepts and relations, methods and criteria for evaluation, and implications for enterprise architecture. Students participate in class discussions as well as complete written assignments that focus on solidifying the understanding of the course content. Students also complete a team modeling project that is motivated by, and whose outcomes are discussed with respect to, one or more theoretical frameworks covered in the course.

Enforced Prerequisite at Enrollment: IST 301

Changes Effective Fall 2025:

- Changed Course Abbreviation to ETI
- Changed Prerequisites

IST 432: Legal and Regulatory Environment of Information Science and Technology (3 Credits)
Old Listing Effective Through Summer 2025:

Legal environment of information technology, constitutional/political issues, intellectual property, management, e-commerce, privacy, access, computer contracting, cyberspace regulation. IST 432 Legal and Regulatory Environment of Information Science and Technology (3) The new information technologies are creating a global economy heavily dependent upon networked information, hardware, software, and electronic commerce, which calls for adaptation of existing legal and business practices. In many cases, the new technologies pose problems that existing laws or legislation are inadequate to cope with; but the complexity of the environment makes new solutions elusive. This course examines the legal, regulatory, and political environment within which intellectual property rights and examination of contracting issues, licensing of information and products, data protection, patents, cyberspace regulation, and implications for personal privacy. It also focuses on where technology is making regulation difficult by challenging previous concepts upon which our legal and regulatory systems depend.

Enforced Prerequisite at Enrollment: IST 301 or SRA 231

Changes Effective Fall 2025:

- Changed Prerequisites

IST 446: An Introduction to Building Computer/Video Games (3 Credits)
Old Listing Effective Through Summer 2025:

An interdisciplinary course that introduces students to process and techniques involved in developing a video or computer game. IST 446 An Introduction to Building Computer/Video Games (3) The course is project driven. Students will form teams and collaborate with one another to develop an interactive immersive experience. During the course, students will be exposed to several techniques for building graphical 3D worlds, animating characters, moving the camera and lights in real-time, and building intelligent characters (using state machine-based architectures). They will also learn different techniques of interactive

storytelling, such as linear narrative, branching narrative, and adaptive narrative. Furthermore, they will be introduced to several tools that will aid in realizing their own projects and ideas, such as graphic engines (e.g. Wildtangent), and game engines (e.g. Unreal Tournament).The course is heavily project driven. Students will, in the first half of the course, learn the tools used in the development of interactive 3D environments. They will submit 2 individual assignments using these tools to develop a simple interactive environment. These individual assignments will be graded and critiqued.In the second half of the course, students will work on a game idea from generation to actual implementation. Students will be grouped in teams of three to develop a project, integrating concepts they learned through the class. They will use one or more of the tools they learned to build this project. Projects will be continuously evaluated and critiqued during game tuning sessions. In addition, projects will be formally evaluated through two prototypes that are critiqued by the class and the instructor. The students will continuously revise their designs and projects through the semester. The final version of the system is due by the end of the semester.

Enforced Prerequisite at Enrollment: C or better in IST 311 and IST 331

Changes Effective Fall 2025:

- Changed Course Abbreviation to HCDD
- Changed Prerequisites

IST 451: Network Security (3 Credits)
Old Listing Effective Through Summer 2025:

Fundamental issues and concepts of network security, network security technologies and protocols, and emerging technologies in network security. IST 451 Network Security (3) Information technology has become a key component to support critical infrastructure services in various sectors of our society. In an effort to share information and streamline operations, organizations are creating complex networked systems and opening their networks to customers, suppliers, and other business partners. Increasing network complexity, greater access, and a growing emphasis on the Internet have made information/network security a major concern for organizations.IST 451 focuses on network security. The course will provide the students with a comprehensive understanding of the fundamental issues and concepts of network security, and the mainstream network security technologies and protocols that are widely used in the real world. The course will also address emerging technologies in network security.A major component of the course will be several team-based hands-on attack-defense projects. Each project has two phases: the attack phase and the defense phase. A group may be asked to defend against the attacks enforced by another group. This course will incorporate collaborative and action-learning experiences wherever appropriate. Emphasis will be placed on developing and practicing writing and speaking skills through application of the concepts, theories and technologies that define the course.

Enforced Prerequisite at Enrollment: C or better in IST 220 and SRA 221

Changes Effective Fall 2025:

- Changed Course Abbreviation to CYBER
- Changed Prerequisites

IST 454: Computer and Cyber Forensics (3 Credits)
Old Listing Effective Through Summer 2025:

Fundamental issues and concepts of computer forensics; aspects of computer and cyber crime; methods to uncover, protect, exploit, and

document digital evidence; tools, techniques, and procedure to perform computer and cyber crime investigation. IST 454 Computer and Cyber Forensics (3) Computer and communication technologies have become the key components to support critical infrastructure services in various sectors of our society. In an effort to share information and streamline operations, organizations are creating complex networked systems and opening their networks to customers, suppliers, and other business partners. Increasing network complexity, greater access, and a growing emphasis on the Internet have made information and network security a major concern for organizations.IST 454 focuses on computer and cyber forensics. Students will learn different aspects of computer and cyber crime and ways in which to uncover, protect, exploit, and document digital evidence. Students will be exposed to different types of tools (both software and hardware), techniques and procedure, and be able to use them to perform rudimentary forensic investigations.A major component of the course will be several hands-on exercises and a final team-based project. This course will incorporate collaborative and action-learning experiences wherever appropriate. Emphasis will be placed on developing and practicing writing and speaking skills through application of the concepts, theories and technologies that define the course.Integrated throughout are perspectives of computer and related legal process, including computer crimes from state and federal law, methods of interaction with law enforcement and prosecutors, admissibility of expert witness testimony and the use of forensic reports in civil, regulatory and internal investigations.

Enforced Prerequisite at Enrollment: C or better in IST 220 or SRA 221

Changes Effective Fall 2025:

- Changed Course Abbreviation to CYBER
- Changed Prerequisites

IST 456: Information Security Management (3 Credits)
Old Listing Effective Through Summer 2025:

Contemporary Security Issues; security management processes, architecture and models; risk analysis and management; security planning, analysis and safeguards; security policies development and administration; contingency planning, incidence handling and response; and security standards and certification processes. IST 456 Information Security Management (3) Communication technologies have become a key component to support critical infrastructure services in various sectors of our society. In an effort to share information and streamline operations, organizations are creating complex networked systems and opening their networks to customers, suppliers, and other business partners. Increasing network complexity, greater access, and a growing emphasis on the Internet have made information systems and network security a major concern for organizations. IST 456 focuses on security and risk management. Students will learn contemporary security issues; security management processes, architecture and models; risk analysis and management; security planning, analysis and safeguards; security policies development and administration; contingency planning, incidence handling and response; and security standards and certification processes.A major component of the course will be several case studies and a final team-based project. This course will incorporate collaborative and action-learning experiences wherever appropriate. Emphasis will be placed on developing and practicing writing and speaking skills through application of the concepts, theories and technologies that define the course.

Enforced Prerequisite at Enrollment: C or better in IST 220 and SRA 221

Changes Effective Fall 2025:

- Changed Course Abbreviation to CYBER
- Changed Prerequisites

JAPNS 199: Foreign Study--Basic Japanese (1-8 Credits: Maximum of 8 Credits) [IL]
Old Listing Effective Through Summer 2025:

Small group instruction in spoken and written modern Japanese at the introductory level.

Changes Effective Fall 2025:

- Changed Course Title
- Changed Course Description

JAPNS 299: Foreign Study--Intermediate Japanese (1-12 Credits: Maximum of 12 Credits) [IL]
Old Listing Effective Through Summer 2025:

Small group instruction in spoken and written modern Japanese at the intermediate level.

Changes Effective Fall 2025:

- Changed Course Title
- Changed Course Description

JAPNS 499: Foreign Study--Advanced Japanese (1-15 Credits: Maximum of 15 Credits) [IL]
Old Listing Effective Through Summer 2025:

Small group instruction in spoken and written modern Japanese at the advanced level.

Changes Effective Fall 2025:

- Changed Course Title
- Changed Course Description

KINES 89: Wilderness Experience (3 Credits) [GHW]
Old Listing Effective Through Summer 2025:

KINES 89 is a wilderness orientation program that is offered for incoming students to assist in their transition to life at Penn State. This course includes multiple days of backpacking in various locations. Through these activities students learn the various skills associated with backpacking and wilderness living which they can continue to use across the lifespan. Students are placed into small groups of eight to ten students with Penn State students and graduate students who mentor and lead the backpacking experience. Small group discussions are threaded throughout the course and focus on student life at Penn State. This class emphasizes teamwork, group living skills, nutritional strategies, living in the elements, wilderness ethics, and health and wellness by introducing students to the craft of backpacking, an activity that students can continue throughout their lifetime. Through this aspect of the course the aim is to help students develop skills to successfully manage their time and stress in order to better balance the physical, social and academic aspects of their lives. Throughout the class these various topics are addressed. Equipment for all activities is provided. Incoming students with all levels of experience may take this course. Both course travel and engagement in and completion of all other course content are required.

Changes Effective Fall 2025:

- Changed Credits
- Added RPTM 89 as Cross-listed Course

MATH 403H: Honors Classical Analysis I (3 Credits) [H] [BA]
Old Listing Effective Through Summer 2025:

Development of a thorough understanding and technical mastery of foundations of classical analysis in the framework of metric spaces. MATH 403H Honors Classical Analysis I (3)The central aim of this course is to develop thorough understanding and technical mastery of foundations of classical analysis in the framework of metric spaces rather than multidimensional Euclidean spaces. This level of abstraction is essential since it is in the background of functional analysis, a fundamental tool for modern mathematics and physics. Another motivation for studying analysis in this wider context is that many general results about functions of one or several real variables are more easily grasped at this more abstract level, and, besides, the same methods and techniques are applicable to a wider class of problems, e.g. to the study of function spaces. This approach also brings to high relief some of the fundamental connections between analysis on one hand and (higher) algebra and geometry on the other. This course is a sequel to Math 312H; it is highly recommended to all mathematics, physics and natural sciences majors who are graduate school bound, and is a great opportunity for all Schreyer Scholars. The following topics will be covered: Metric spaces (topology, convergence, Cauchy sequences and completeness); Maps between metric spaces (continuous maps and homeomorphisms, stronger continuity properties:uniform continuity, Hoelder and Lipschitz continuity, contraction mapping principle, points of discontinuity and the Baire Category Theorem); Compact metric spaces (continuity and compactness, connectedness, total boundedness, coverings and Lebesgue number, perfect metric spaces, characterization of Cantor sets, fractals); Function spaces (spaces of continuous maps, uniform continuity and equicontinuity,Arzela-Ascoli Theorem, uniform approximation by polynomials. Stone-Weierstrass Theorem).

Enforced Prerequisite at Enrollment: MATH 311M and MATH 312H

Changes Effective Fall 2025:

- Changed Course Description
- Changed Prerequisites

MIS 301: Business Analytics (3 Credits)
Old Listing Effective Through Summer 2025:

MIS 301 investigates use of databases, basic data mining tools, social networking software, and advanced level of spreadsheet management for analysis of large amounts of data. Learning methods emphasize active learning in the application of methods and tools to real data and the presentation of the results. Topics may include methods for analyzing not only structured data, but also unstructured data from the web, emails, blogs, social networks, click streams, etc. Finally, techniques for visualizing, presenting and communicating information in a useful way will be presented.

Enforced Prerequisite at Enrollment: (SCM 200 or STAT 200) Concurrent Courses: (MATH 110 or MATH 140) and (MIS 204 or MIS 250)

Changes Effective Fall 2025:

- Changed Concurrents
- Changed Course Description

NUTR 400: Introduction to Nutrition Counseling (2 Credits)
Old Listing Effective Through Summer 2025:

This course introduces students to the principles and issues present in the nutrition counseling relationship. Topics will include techniques designed to promote and support nutrition behavior change such as motivational interviewing, cognitive behavior change, working with resistance, transference, countertransference, how to conduct a nutrition counseling session, ADIME charting, coding, and billing issues. Students will learn how to give advise effectively, improve their listening and self-reflection skills as they progress through the course. Challenging situations such as eating disorders, dual diagnosis, and obesity will be explored through role-playing and simulation. The dietitian's role within the healthcare team, skill development through practical application and an introduction to Interprofessional interactions will be emphasized.

Enforced Prerequisite at Enrollment: NUTR 358 Concurrent Courses: NUTR 446

Changes Effective Fall 2025:

- Changed Credits
- Changed Course Description

NUTR 425: Global Nutrition Problems: Health, Science, and Ethics (3 Credits) [IL]
Old Listing Effective Through Summer 2025:

This course is a survey of topics with a focus on an examination of the underlying reasons for malnutrition in developing countries and the nutrition-related health problems facing developing country populations, particularly women and children. The topics will range from climate change, clean water supply, and health, to micronutrient deficiencies during pregnancy and child development. Identification of ethical issues and the underlying values/principles of situations relevant to the lives of poor people in developing countries will be discussed, including the right to food in the context of humanitarian aid. Discussion of interventions and current solutions involving multi-country cooperation and agencies meant to alleviate these problems will be explored.

Enforced Prerequisite at Enrollment: NUTR 175Z or NUTR 175

Changes Effective Fall 2025:

- Changed Prerequisites
- Changed Course Description

NUTR 445: Energy and Macronutrient Metabolism (3 Credits)
Old Listing Effective Through Summer 2025:

This course is designed to provide a foundation in the chemistry and metabolism of the macronutrients. Building on a knowledge base in biochemistry, physiology, and nutrition, this course will focus on the metabolism of proteins, carbohydrates, and lipids, and the integration of these metabolic pathways. The course provides the student with a sufficient application of biochemical processes, cellular molecules and their metabolism to serve as a basis for an advanced study of nutrition.

Enforced Prerequisite at Enrollment: BMB 211 and NUTR 251 and NUTR 211R and BIOL 161 and BIOL 162 and BIOL 163 and BIOL 164

- Changed Prerequisites

PERCN 130: Percussion: Performance I (3 Credits)
Old Listing Effective Through Summer 2025:

Individual instruction in percussion one hour per week. For B.Mus percussion majors.

Changes Effective Fall 2025:

- Changed Credits
- Changed Course Description

PERCN 180: Percussion: Performance II (3 Credits)
Old Listing Effective Through Summer 2025:

Individual instruction in percussion one hour per week. For B.Mus. percussion majors.

Changes Effective Fall 2025:

- Changed Credits
- Changed Course Description

PERCN 230: Percussion: Performance III (3 Credits)
Old Listing Effective Through Summer 2025:

Individual instruction in percussion one hour per week. For B.Mus. percussion majors.

Changes Effective Fall 2025:

- Changed Credits
- Changed Course Description

PERCN 280: Percussion: Performance IV (3 Credits)
Old Listing Effective Through Summer 2025:

Individual instruction in percussion one hour per week. For B.Mus. percussion majors.

Changes Effective Fall 2025:

- Changed Credits
- Changed Course Description

RPTM 457: Peer Mentoring (2 Credits)
Old Listing Effective Through Summer 2025:

The purpose of the peer-mentoring course is to provide students who have successfully completed and demonstrated leadership ability in RPTM 456 with an opportunity to gain additional leadership and event planning skills by mentoring a group of students currently enrolled in the class. Peer mentors serve as facilitators to teams of students in RPTM 456 who are charged with planning, promoting, implementing and evaluating a special event for a community or campus-based organization. Peer mentors are expected to help teach a minimum of 2 classes during the semester. Peer mentors take a leadership role in helping students understand and apply course content. Additionally, peer mentors serve as a liaison between the course instructor, the agency supervisor they are working with, and their assigned team.

Enforced Prerequisite at Enrollment: RPTM 236 and RPTM 456

Changes Effective Fall 2025:

- Changed Credits
- Changed Prerequisites
- Changed Course Description

SPAN 253W: Introduction to Hispanic Literature (3 Credits) [BA] [IL] [WAC] [GH]
Old Listing Effective Through Summer 2025:

Introduction to generic distinctions, critical methods, and approaches to Hispanic literature. SPAN 253W Introduction to Hispanic Literature (3) (BA) This course meets the Bachelor of Arts degree requirements. During the semester students will learn how to write, and will practice writing, critical and analytical essays based upon the different genres of literature studied in class. Students will learn strategies and approaches for analyzing short stories, poems, movies, and novels, all written or directed by prominent authors from Spain and Latin America. The development of writing skills which reflect sophistication at the level of thought, organization, and style will also be a fundamental objective of the course.

Prerequisite: SPAN 100; SPAN 100A; SPAN 100B; SPAN 100C; SPAN 100H

Changes Effective Fall 2025:

- Changed Course Title
- Changed Abbreviated Title
- Changed Course Description
- Added Honors Attribute
- Added Bachelor of Arts: World Cultures, Bachelor of Arts: World Lang (12th Unit), Bachelor of Arts: World Language (All), Exceeds 12th Unit of World Language Attributes

SPAN 354: Topics in Border Studies (3 Credits) [BA]
Old Listing Effective Through Summer 2025:

This course offers a study of borders as key sites of contact, exchange, conflict, hybridity, and identity production in and across varied contexts of Spanish, Latin American, and/or Latina/o culture(s). This course offers a study of borders - geopolitical, social, intellectual, literary, artistic, and/or historical - as key sites of contact, exchange, conflict, hybridity, and identity production in and across varied contexts of Spanish, Latin American, and/or Latina/o culture(s). While diverse variables (including diaspora, gender, race and ethnicity, sexuality, colonialism, nationhood and transnationalism) will inform particular iterations of the course, approaches and text selection will be shaped by an understanding of borders as constructs defined by conditions of dynamic interaction and transformation. Materials to be considered in the course, which will vary according the focus, may include literary, artistic, and intellectual works, film, media-based texts, music, and/or historical documents

Changes Effective Fall 2025:

- Changed Course Number to 354W
- Changed Course Title
- Changed Abbreviated Title
- Changed Course Description
- Added Bachelor of Arts: World Cultures, Bachelor of Arts: World Lang (12th Unit), Exceeds 12th Unit of World Language Attributes
- Added International Cultures (IL) Attribute
- Added Writing Across the Curriculum (WAC) Attribute

SPAN 470: Youth Cultures in Latin(a/o) America (3 Credits)
Old Listing Effective Through Summer 2025:

Young people have been at the center of political and cultural revolutions around the world and throughout history. For example, revolutions, urban movements, ethnic/racial pride, LGBTQ+, feminist movements, music basaars, DJs and rave parties, and "barras de futbol" are only some of the manifestations associated with young people in Latin(a/o) American literature, film, music, and journalism. Nevertheless, the concept of "youth" as an academic category only appeared in the 1960's. In this course, we will study different manifestations of youth cultures in the Hemispheric Americas, paying special attention to the Latinx communities in the U.S. and Latin America, since the 1960's and until the contemporary moment. The key question that will guide us is: How does each of these literary, artistic, and media representations of youth enter into dialogue with political events in which young people have been at the center of efforts to bring about political changes in the U.S. Latinx communities and Latin American? Using short fiction, film and documentaries, songs, blogs, and other cultural materials (YouTube clips, images, graffiti, etc.), we will identify and compare different youth cultures in Latinx communities in the U.S. and Latin America in terms of their productions, representations, and effects in the public sphere. We will enrich our analysis of primary materials with theoretical and critical readings that will help us to contextualize the different manifestations in our study.

Prerequisite: (SPAN 100A or SPAN 200) and SPAN 253W

Cross-listed Courses: LTNST 470

Changes Effective Fall 2025:

- Changed Course Description
- Added Bachelor of Arts: Humanities, Bachelor of Arts: World Lang (12th Unit), Bachelor of Arts: World Language (All), Exceeds 12th Unit of World Language Attributes
- Added United States Cultures (US) Attribute

SPAN 474: Many Mexicos (3 Credits)
Old Listing Effective Through Summer 2025:

Overview of Mexican literature, culture and history from pre-colonial period to present.

Prerequisite: (SPAN 100A or SPAN 200) and SPAN 253W

Changes Effective Fall 2025:

- Changed Course Description
- Added Bachelor of Arts: Humanities, Bachelor of Arts: World Cultures, Bachelor of Arts: World Lang (12th Unit), Bachelor of Arts: World Language (All), Exceeds 12th Unit of World Language Attributes
- Added International Cultures (IL) Attribute

SRA 221: Overview of Information Security (3 Credits)
Old Listing Effective Through Summer 2025:

Provides an understanding of the overview of information security including security architecture, access control, and internet secure applications. SRA 221 Overview of Information Security (3) SRA 221 focuses onan overview of information security. Students will learn the principles of information security, security architectures and models, aspects and methods of information security such as physical security control, operations security, access control, hacks/attacks/defense, systems and programs security, cryptography, network and web security, worms and viruses, and other Internet secure applications. Students will also learn how to plan and manage security, security policies, business continuity plans, disaster recovery plans, and social and legal issues of information security.A major component of the course will be several hands-on exercises and a final team-based project. This course will incorporate collaborative and action-learning experiences wherever appropriate. Emphases will be placed on developing and practicing writing and speaking skills through application of the concepts, theories and technologies that define the course.

Enforced Prerequisite at Enrollment: SRA 111 and (CMPSC 101 or IST 140 or CMPSC 121)

Changes Effective Fall 2025:

- Changed Course Abbreviation to CYBER
- Changed Prerequisites

STRNG 130: Violin: Performance I (3 Credits)
Old Listing Effective Through Summer 2025:

Individual instruction in violin one hour per week. For B.Mus. violin performance majors.

Changes Effective Fall 2025:

- Changed Credits
- Changed Course Description

STRNG 131: Viola: Performance I (3 Credits)
Old Listing Effective Through Summer 2025:

Individual instruction in viola one hour per week. For B.Mus. viola performance majors.

Changes Effective Fall 2025:

- Changed Credits
- Changed Course Description

STRNG 132: Violoncello: Performance I (3 Credits)
Old Listing Effective Through Summer 2025:

Individual instruction in violoncello one hour per week. For B.Mus. violoncello performance majors.

Changes Effective Fall 2025:

- Changed Credits
- Changed Course Description

STRNG 133: Double Bass: Performance I (3 Credits)
Old Listing Effective Through Summer 2025:

Individual instruction in double bass one hour per week. For B.Mus. double bass performance majors.

Changes Effective Fall 2025:

- Changed Credits
- Changed Course Description

STRNG 134: Guitar: Performance I (3 Credits)
Old Listing Effective Through Summer 2025:

Individual instruction in guitar one hour per week. For B.Mus. guitar performance majors. The study of technique and musical interpretation on the guitar. Grounded in classical guitar pedagogy, yet delving into Jazz & Latin styles as well.

Changes Effective Fall 2025:

- Changed Credits
- Changed Course Description

STRNG 180: Violin: Performance II (3 Credits)
Old Listing Effective Through Summer 2025:

Individual instruction in violin one hour per week. For B.Mus. violin performance major.

Changes Effective Fall 2025:

- Changed Credits
- Changed Course Description

STRNG 181: Viola: Performance II (3 Credits)
Old Listing Effective Through Summer 2025:

Individual instruction in viola one hour per week. For B.Mus. viola performance majors.

Changes Effective Fall 2025:

- Changed Credits
- Changed Course Description

STRNG 182: Violoncello: Performance II (3 Credits)
Old Listing Effective Through Summer 2025:

Individual instruction in violoncello one hour per week. For B.Mus. violoncello performance majors.

Changes Effective Fall 2025:

- Changed Credits
- Changed Course Description

STRNG 183: Double Bass: Performance II (3 Credits)
Old Listing Effective Through Summer 2025:

Individual instruction in double bass one hour per week. For B.Mus. double bass performance majors.

Changes Effective Fall 2025:

- Changed Credits
- Changed Course Description

STRNG 184: Guitar: Performance II (3 Credits)
Old Listing Effective Through Summer 2025:

Individual instruction in guitar one hour per week. For B.Mus. guitar performance majors. The study of technique and musical interpretation on the guitar. Grounded in classical guitar pedagogy, yet delving into Jazz & Latin styles as well.

Individual instruction in guitar one hour per week. For B.Mus. guitar performance majors.

Prerequisite: Acceptance into program by faculty jury permission

Changes Effective Fall 2025:

- Changed Credits
- Changed Course Description

STRNG 230: Violin: Performance III (3 Credits)
Old Listing Effective Through Summer 2025:

Individual instruction in violin one hour per week. For B.Mus. violin performance major.

Changes Effective Fall 2025:

- Changed Credits
- Changed Course Description

STRNG 231: Viola: Performance III (3 Credits)
Old Listing Effective Through Summer 2025:

Individual instruction in viola one hour per week. For B.Mus. viola performance major.

Changes Effective Fall 2025:

- Changed Credits
- Changed Course Description

STRNG 232: Violoncello: Performance III (3 Credits)
Old Listing Effective Through Summer 2025:

Individual instruction in violoncello one hour per week. For B.Mus. violoncello performance majors.

Changes Effective Fall 2025:

- Changed Credits
- Changed Course Description

STRNG 233: Double Bass: Performance III (3 Credits)
Old Listing Effective Through Summer 2025:

Individual instruction in double bass one hour per week. For B.Mus. double bass performance majors.

Changes Effective Fall 2025:

- Changed Credits
- Changed Course Description

STRNG 234: Guitar: Performance III (3 Credits)
Old Listing Effective Through Summer 2025:

Individual instruction in guitar one hour per week. For B.Mus. guitar performance majors. The study of technique and musical interpretation on the guitar. Grounded in classical guitar pedagogy, yet delving into Jazz & Latin styles as well.

Prerequisite: Acceptance into program by faculty jury permission and STRNG 184 Guitar Performance II

Changes Effective Fall 2025:

- Changed Credits
- Changed Course Description

STRNG 280: Violin: Performance IV (3 Credits)
Old Listing Effective Through Summer 2025:

Individual instruction in violin one hour per week. For B.Mus. violin performance major.

Changes Effective Fall 2025:

- Changed Credits
- Changed Course Description

STRNG 281: Viola: Performance IV (3 Credits)
Old Listing Effective Through Summer 2025:

Individual instruction in viola one hour per week. For B.Mus. viola performance major.

Changes Effective Fall 2025:

- Changed Credits
- Changed Course Description

STRNG 282: Violoncello: Performance IV (3 Credits)
Old Listing Effective Through Summer 2025:

Individual instruction in violoncello one hour per week. For B.Mus. violoncello performance majors.

Changes Effective Fall 2025:

- Changed Credits
- Changed Course Description

STRNG 283: Double Bass: Performance IV (3 Credits)
Old Listing Effective Through Summer 2025:

Individual instruction in double bass one hour per week. For B.Mus. double bass performance majors.

Changes Effective Fall 2025:

- Changed Credits
- Changed Course Description

STRNG 284: Guitar: Performance IV (3 Credits)
Old Listing Effective Through Summer 2025:

Individual instruction in guitar one hour per week. For B.Mus. guitar performance majors. The study of technique and musical interpretation on the guitar. Grounded in classical guitar pedagogy, yet delving into Jazz & Latin styles as well.

Prerequisite: Acceptance into program by faculty jury permission and STRNG 234 Guitar: Performance III

Changes Effective Fall 2025:

- Changed Credits
- Changed Course Description

VOICE 130: Voice: Performance I (3 Credits)
Old Listing Effective Through Summer 2025:

Individual instruction in voice one hour per week. For B.Mus voice performance majors.

Changes Effective Fall 2025:

- Changed Credits
- Changed Course Description

VOICE 180: Voice: Performance II (3 Credits)
Old Listing Effective Through Summer 2025:

Individual instruction in voice one hour per week. For B.Mus voice performance majors.

Changes Effective Fall 2025:

- Changed Credits
- Changed Course Description

VOICE 230: Voice: Performance III (3 Credits)
Old Listing Effective Through Summer 2025:

Individual instruction in voice one hour per week. For B.Mus voice performance majors.

Changes Effective Fall 2025:

- Changed Credits
- Changed Course Description

VOICE 280: Voice: Performance IV (3 Credits)
Old Listing Effective Through Summer 2025:

Individual instruction in voice one hour per week. For B.Mus voice performance majors.

Changes Effective Fall 2025:

- Changed Credits
- Changed Course Description

WWNDS 130: Flute: Performance I (3 Credits)
Old Listing Effective Through Summer 2025:

Individual instruction in flute one hour per week. For B.Mus. flute performance majors.

Changes Effective Fall 2025:

- Changed Credits
- Changed Course Description

WWNDS 131: Oboe: Performance I (3 Credits)
Old Listing Effective Through Summer 2025:

Individual instruction in oboe one hour per week. For B.Mus. oboe majors.

Changes Effective Fall 2025:

- Changed Credits
- Changed Course Description

WWNDS 132: Clarinet: Performance I (3 Credits)
Old Listing Effective Through Summer 2025:

Individual instruction in clarinet one hour per week. For B.Mus. clarinet majors.

Changes Effective Fall 2025:

- Changed Credits
- Changed Course Description

WWNDS 133: Bassoon: Performance I (3 Credits)
Old Listing Effective Through Summer 2025:

Individual instruction in bassoon one hour per week. For B.Mus. bassoon performance majors.

Changes Effective Fall 2025:

- Changed Credits
- Changed Course Description

WWNDS 134: Saxophone: Performance I (3 Credits)
Old Listing Effective Through Summer 2025:

Individual instruction in saxophone one hour per week. For B.Mus. saxophone performance majors.

Changes Effective Fall 2025:

- Changed Credits
- Changed Course Description

WWNDS 180: Flute: Performance II (3 Credits)
Old Listing Effective Through Summer 2025:

Individual instruction in flute one hour per week. For B.Mus. flute performance majors.

Changes Effective Fall 2025:

- Changed Credits
- Changed Course Description

WWNDS 181: Oboe: Performance II (3 Credits)
Old Listing Effective Through Summer 2025:

Individual instruction in oboe one hour per week. For B.Mus. oboe majors.

Changes Effective Fall 2025:

- Changed Credits
- Changed Course Description

WWNDS 182: Clarinet: Performance II (3 Credits)
Old Listing Effective Through Summer 2025:

Individual instruction in clarinet one hour per week. For B.Mus. clarinet majors.

Changes Effective Fall 2025:

- Changed Credits
- Changed Course Description

WWNDS 183: Bassoon: Performance II (3 Credits)
Old Listing Effective Through Summer 2025:

Individual instruction in bassoon one hour per week. For B.Mus. bassoon performance majors.

Changes Effective Fall 2025:

WWNDS 184: Saxophone: Performance II (3 Credits)
Old Listing Effective Through Summer 2025:

Individual instruction in saxophone one hour per week. For B.Mus. saxophone performance majors.

Changes Effective Fall 2025:

- Changed Credits
- Changed Course Description

WWNDS 230: Flute: Performance III (3 Credits)
Old Listing Effective Through Summer 2025:

Individual instruction in flute one hour per week. For B.Mus. flute performance majors.

Changes Effective Fall 2025:

- Changed Credits
- Changed Course Description

WWNDS 231: Oboe: Performance III (3 Credits)
Old Listing Effective Through Summer 2025:

Individual instruction in oboe one hour per week. For B.Mus. oboe majors.

Changes Effective Fall 2025:

- Changed Credits
- Changed Course Description

WWNDS 232: Clarinet: Performance III (3 Credits)
Old Listing Effective Through Summer 2025:

Individual instruction in clarinet one hour per week. For B.Mus. clarinet majors.

Changes Effective Fall 2025:

- Changed Credits
- Changed Course Description

WWNDS 233: Bassoon: Performance III (3 Credits)
Old Listing Effective Through Summer 2025:

Individual instruction in bassoon one hour per week. For B.Mus. bassoon performance majors.

Changes Effective Fall 2025:

- Changed Credits
- Changed Course Description

WWNDS 234: Saxophone: Performance III (3 Credits)
Old Listing Effective Through Summer 2025:

Individual instruction in saxophone one hour per week. For B.Mus. saxophone performance majors.

Changes Effective Fall 2025:

- Changed Credits
- Changed Course Description

WWNDS 280: Flute: Performance IV (3 Credits)
Old Listing Effective Through Summer 2025:

Individual instruction in flute one hour per week. For B.Mus. flute performance majors.

Changes Effective Fall 2025:

- Changed Credits
- Changed Course Description

WWNDS 281: Oboe: Performance IV (3 Credits)
Old Listing Effective Through Summer 2025:

Individual instruction in oboe one hour per week. For B.Mus. oboe majors.

Changes Effective Fall 2025:

- Changed Credits
- Changed Course Description

WWNDS 282: Clarinet: Performance IV (3 Credits)
Old Listing Effective Through Summer 2025:

Individual instruction in clarinet one hour per week. For B.Mus. clarinet majors.

Changes Effective Fall 2025:

- Changed Credits
- Changed Course Description

WWNDS 283: Bassoon: Performance IV (3 Credits)
Old Listing Effective Through Summer 2025:

Individual instruction in bassoon one hour per week. For B.Mus. bassoon performance majors.

Changes Effective Fall 2025:

- Changed Credits
- Changed Course Description

WWNDS 284: Saxophone: Performance IV (3 Credits)
Old Listing Effective Through Summer 2025:

Individual instruction in saxophone one hour per week. For B.Mus. saxophone performance majors.

Changes Effective Fall 2025:

- Changed Course Description

Program Changes
Agricultural and Biorenewable Systems Management, B.S. (BRS_BS)
Effective Summer 2025:

- Added new Integrated B.S. in Agricultural and Biorenewable Systems Management and M.S. in Biorenewable Systems

American Sign Language, Minor (ASL_UMNR)
Effective Summer 2025:

- New minor added

Architecture, B.S. (ARCBS_BS)
Effective Summer 2025:

- Revised Program Description
- Changed total requirements for degree completion from 135 credits to 120 credits
- Changed Requirements for the Major from 96 credits to 81 credits
- Changed Prescribed Courses for Major from 87 credits to 69 credits
- Added ARCH 380, ARCH 381, ARCH 499, ARTH 202N to Prescribed Courses for the Major
- Removed AE 424, AE 211, ARTH 202 from Prescribed Courses for the Major
- Removed C or better requirement from AE 422, ARCH 204, ARCH 232 in Prescribed Courses for the Major
- Added Additional Courses for the Major
- Removed Supporting Courses and Related Areas for the Major

Architecture Studies, Minor (ARCST_UMNR)
Effective Summer 2025:

- Changed total requirements for the minor from 21 credits to 18 credits
- Changed Additional Courses for the Minor from 15 credits to 18 credits
- Added AA 121, ARCH 170N, ATCH 410, ARCH 441, ARCH 496 to Additional Courses for the Minor
- Removed ARTH 201, ARTH 202, ARCH 312, ARTH 120, ARTH 140, ARTH 308N, ARTH 315, ARTH 330, ARTH 401, ARTH 405, ARTH 412, ARTH 413, ARTH 415, ARTH 420, ARTH 440, ARTH 456, ARTH 458, ARTH 460, ASIA 315, ASIA 440, LARCH 65, ARCH 443 from Additional Courses for the Minor
- Removed Supporting Courses and Related Areas for the Minor

Art History, B.A. (ARTH_BA)
Effective Summer 2025:

- Removed ARTH 111Z, ARTH 120Z, ARTH 220Z from Additional Courses for the Major
- Removed ARTH 120Z, ARTH 220Z, ARTH 413, ARTH 464 from Supporting Courses and Related Areas for the Major

Artificial Intelligence Methods and Applications, B.S. (Information Sciences and Technology, Capital) (AIMA_BS, AIMCA_BS)
Effective Fall 2025:

- New program added

Biomedical Engineering, B.S. (BME_BS)
Effective Summer 2025:

- Changed total requirements for degree completion from 130-131 credits to 130-132 credits
- Changed Requirements for the Major from 111-113 credits to 112-114 credits
- Changed Prescribed Courses for the Major from 72 credits to 64 credits
- Added C or better requirement to BME 303 in Prescribed Courses for the Major

- Removed MATH 230, MATH 251 from Prescribed Courses for the Major
- Changed Additional Courses for the Major from 14 credits to 22 credits
- Added MATH 230, MATH 231, MATH 232, MATH 251, MATH 250, MATH 252 to Additional Courses for the Major
- Changed name of Biochemical Option to Biopharmaceutical Option
- Changed name of Medical Imaging and Devices Option to Medical Imaging Option
- Changed name of Biomaterials Option to Medical Device Design Option
- Changed Medical Device Design Option from 24 credits to 25 credits
- Changed Prescribed Courses for the Medical Device Design Option from 9 credits to 10 credits
- Added BME 410, EE 210 to Prescribed Courses for the Medical Device Design Option
- Removed BME 446, MATSE 201 from Prescribed Courses for the Medical Device Design Option
- Changed Additional Courses for the Medical Device Design Option from 6 credits to 3 credits
- Removed CHEM 202, CHEM 210 from Additional Courses for the Medical Device Design Option
- Changed Supporting Courses and Related Areas for the Medical Device Design Option from 9 credits to 12 credits
- Changed 6 credits from department list requirement to 9 credits from department list in Supporting Courses and Related Areas for the Medical Device Design Option

Biotechnology, B.S. (BIOTC_BS)
Effective Summer 2025:

- Changed total requirements for degree completion from 125 credits to 120 credits
- Changed Requirements for the Major from 95 credits to 90-93 credits
- Changed Common Requirements for the Major from 47 credits to 42 credits
- Changed Prescribed Courses for the Major from 47 credits to 42 credits
- Removed MATH 141, MICRB 202, PHYS 251 from Prescribed Courses for the Major
- Added Additional Courses for the Major
- Changed General Biotechnology Option from 48 credits to 48-50 credits
- Changed Prescribed Courses for the General Biotechnology Option from 20 credits to 22 credits
- Added MATH 141 to Prescribed Courses for the General Biotechnology Option
- Changed BIOTC 416 from 2 credits to 3 credits in Prescribed Courses for the General Biotechnology Option
- Removed BIOL 322 from Prescribed Courses for the General Biotechnology Option
- Changed Supporting Courses and Related Areas for the General Biotechnology Option from 20-22 credits to 20 credits
- Changed requirement for 14-16 credits from department list C to 14 credits from department list C in Supporting Courses and Related Areas for the General Biotechnology Option

- Changed Clinical Laboratory Science Option from 48 credits to 48-51 credits
- Changed Additional Courses for the Clinical Laboratory Science Option from 9-11 credits to 9-12 credits
- Added MATH 141, STAT 200, STAT 250 to Additional Courses for the Clinical Laboratory Science Option
- Removed BIOL 322, BIOL 222 from Additional Courses for the Clinical Laboratory Science Option
- Changed Supporting Courses and Related Areas for the Clinical Laboratory Science Option from 1-3 credits to 3 credits
- Changed requirement for 1-3 credits from department list to 3 credits from department list C in Supporting Courses and Related Areas for the Clinical Laboratory Science Option

Chemical Engineering, B.S. (CHE_BS)
Effective Summer 2025:

- Changed Prescribed Courses for the Major from 84 credits to 79 credits
- Removed BMB 251, CHEM 457 from Prescribed Courses for the Major
- Removed C or better requirement from CHE 410, CHE 430 in Prescribed Courses for the Major
- Changed Supporting Courses and Related Areas for the Major from 21 credits to 26 credits
- Added requirement for 2 credits of lab in Supporting Courses and Related Areas
- Changed requirement for 3 credits of approved engineering electives to 6 credits of approved engineering electives in Supporting Courses and Related Areas

Chemistry, B.S. (Science) (CHEM_BS)
Effective Summer 2025:

- Changed total requirements for degree completion from 125 credits to 120 credits
- Changed General Education credits included in Requirements for the Major from 15 credits to 14 credits
- Changed Electives from 0 credits to 3 credits
- Changed Requirements for the Major from 94 credits to 86 credits
- Changed Prescribed Courses for the Major from 54 credits to 51 credits
- Removed PHYS 213, PHYS 214 from Prescribed Courses for the Major
- Changed CHEM 316 from 1 credit to 2 credits in Prescribed Courses for the Major
- Changed Additional Courses for the Major from 23 credits to 22 credits
- Changed requirement for 16 credits of chemistry at the 400-level to 15 credits in Additional Courses for the Major
- Changed Supporting Courses and Related Areas for the Major from 17 credits to 13 credits

Classics and Ancient Mediterranean Studies, B.A. (CAMS_BA)
Effective Summer 2025:

- Changed total requirements for degree completion from 123 credits to 120 credits
- Changed Electives from 20-24 credits to 21 credits
- Changed Ancient Mediterranean Archaeology Option from 15-16 credits to 12 credits

- Changed Prescribed Courses for the Ancient Mediterranean Archaeology Option from 0 credits to 3 credits
- Added ANTH 439W to Prescribed Courses for the the Ancient Mediterranean Archaeology Option
- Moved CAMS 440W from Additional Courses to Prescribed Courses for the Ancient Mediterranean Archaeology Option
- Changed Additional Courses for the Ancient Mediterranean Archaeology Option from 3 credits to 0 credits
- Changed Supporting Courses and Related Areas for the Ancient Mediterranean Archaeology Option from 12-13 credits to 9 credits
- Added CAMS 199, ANTH 425, CAMS 499 to Supporting Courses and Related Areas for the Ancient Mediterranean Archaeology Option
- Removed CAMS 492, CAMS 493 from Supporting Courses and Related Areas for the Ancient Mediterranean Archaeology Option

Communications, B.A. (University College) (COMUC_BA)
Effective Summer 2025:

- Program added to Lehigh Valley campus

Corporate Communication, B.A. (CCUC_BA)
Effective Summer 2025:

- Program phased out at Lehigh Valley campus

Engineering, B.S. (GE_BS)
Effective Summer 2025:

- Program added to Lehigh Valley campus
- Revised Program Description
- Added Engineering Design and Innovation Option

Entrepreneurship and Innovation, Minor (ENTI_UMNR)
Effective Summer 2025:

- Revised Program Description
- Removed BIOL 419H from the Bio-Tech Cluster
- Removed FDSC 206, FDSC 430 from the Food and Bio-innovation Cluster
- Added Energy Transition Cluster

Geographic Information Science, Certificate (GIS_UCT)
Effective Summer 2025:

- Added GEOG 160, GEOG 364 to Required Courses

Geospatial Big Data Analytics, Certificate (GSPBDA_UCT)
Effective Summer 2025:

- Added EMSC 460, GEOG 461 to Analytics Course List
- Removed GEOG 461W from Analytics Course List
- Added GEOG 413, GEOG 467 to Big Data Course List
- Removed GEOG 481 from Big Data Course List

Graphic Design, B.Des. (GD_BDES)
Effective Summer 2025:

- Revised Program Description
- Revised Entrance to Major Requirements
- Changed total requirements for degree completion from 121 credits to 120 credits

- Removed General Education credits included in Requirements for the Major
- Removed Electives
- Changed Requirements for th Major from 73 credits to 75 credits
- Changed Prescribed Courses for the Major from 58 credits to 51 credits
- Added GD 107, GD 110, GD 115N, GD 207, GD 210, GD 211, GD 307, GD 308, GD 407, GD 409 to Prescribed Courses for the Major
- Removed GD 100, GD 102, GD 200, GD 203, GD 300, GD 301, GD 302, GD 303, GD 400, GD 402, IST 250, IST 256, PHOTO 202 from Prescribed Courses for the Major
- Changed Additional Courses for the Major from 15 credits to 12 credits
- Added GD 300, GD 315, GD 320, GD 400 to Additional Courses for the Major
- Removed AA 121, GD 115N, GD 297, GD 304, GD 310, GD 397, GD 401, GD 404, GD 495, GD 497 from Additional Courses for the Major
- Removed 6 credits from History of the Arts coursework requirement from Additional Courses for the Major
- Added Supporting Courses and Related Areas for the Major

Hospitality Management, B.S. (Health and Human Development, Berks) (HM_BS, HMBK_BS)
Effective Summer 2025:

- Added new Integrated B.S. in Hospitality Management and M.P.S. in Hospitality Management

Industrial Engineering, B.S. (Engineering, Behrend) (IE_BS, IESBC_BS)
Effective Summer 2025:

- Revised Program Description
- Changed Electives from 0 credits to 13 credits
- Changed Common Requirements for the Major from 111 credits to 87 credits
- Changed Prescribed Courses for the Major from 77 credits to 74 credits
- Removed IE 470 from Prescribed Courses for the Major
- Changed Additional Courses for the Major from 16 credits to 13 credits
- Removed IE 408, IE 418, IE 419 from Additional Courses for the Major
- Removed Supporting Courses and Related Areas for the Major
- Added General Option
- Added Service Systems Engineering Option

Information Technology Ethics and Compliance, B.S. (IEC_BS)
Effective Fall 2025:

- New program added

Integrative Science, B.S. (Science) (SCBS_BS)
Effective Fall 2025:

- Added new Integrated B.S. in Integrative Science and M.P.H. in Public Health at University Park campus

Interdisciplinary Business with Engineering Studies, B.S. (IBE_BS)
Effective Summer 2025:

- Changed Electives from 0 credits to 0-1 credits
- Changed Requirements for the Major from 112-114 credits to 111-113 credits
- Changed Prescribed Courses for the Major from 72 credits to 60 credits
- Added CMPSC 121 to Prescribed Courses for the Major
- Removed CMPSC 201, PHYS 211, PHYS 212, MATH 141 from Prescribed Courses for the Major
- Changed Additional Courses for the Major from 25-26 credits to 36-37 credits
- Added PHYS 211, PHYS 250, PHYS 212, PHYS 251, MATH 141, MATH 210, CMPEN 271, IE 302, IE 327, QC 450, IE 330, IE 497 to Additional Courses for the Major
- Removed CMPEN 270 from Additional Courses for the Major

Landscape Architecture, B.L.A. (LARCH_BLA)
Effective Summer 2025:

- Changed General Education credits included in Requirements for the Major from 21 credits to 3 credits
- Changed Requirements for the Major from 109 credits to 91 credits
- Removed Additional Courses for the Major

Marketing, B.S. (Capital) (MRKT_BS)
Effective Summer 2025:

- Revised Entrance to Major Requirements
- Changed Electives from 8 credits to 8-9 credits
- Changed Requirements for the Major from 79 credits from 78-79 credits
- Changed Prescribed Courses for the Major from 46 credits to 43 credits
- Removed MIS 204 from Prescribed Courses for the Major
- Changed Additional Courses for the Major from 21 credits to 23-24 credits
- Added MIS 204, MIS 250, DA 101, MKTG 343, MKTG 410, MKTG 443, MKTG 473, MKTG 474 to Additional Courses for the Major

Mathematics, B.A. (MTHBA_BA)
Effective Summer 2025:

- Revised 6 credits of 400-level MATH to add MATH 410 and restrict number of credits of MATH 400 in Additional Courses for the Major

Mathematics, B.S. (Science) (MTHBS_BS)
Effective Summer 2025:

- Revised 6 credits of 400-level MATH to add MATH 410 and restrict number of credits of MATH 400 in Additional Courses for the General Mathematics Option
- Revised 9 credits of 400-level MATH to restrict number of credits of MATH 400 in Additional Courses for the Graduate Study Option

Music, B.M. (MUSBM_BM)
Effective Fall 2025:

- Changed total requirements for degree completion with the Composition Option from 133 credits to 120 credits
- Changed total requirements for degree completion with the Keyboard Instruments Option from 126 credits to 120 credits

- Changed total requirements for degree completion with the Strings, Winds, Brass and Percussion Instruments Option from 125 credits to 120 credits
- Changed total requirements for degree completion with the Voice Option from 131 credits to 121 credits
- Added MUSIC 464W to Additional Courses for the Major
- Removed MUSIC 472 from Additional Courses for the Major
- Changed Composition Option from 54-56 credits to 41-45 credits
- Changed Prescribed Courses for the Composition Option from 40-42 credits to 28-30 credits
- Added MUSIC 127 to Prescribed Courses for the Composition Option
- Removed MUSIC 255, MUSIC 451, MUSIC 452, MUSIC 459, MUSIC 472 from Prescribed Courses for the Composition Option
- Changed Additional Courses for the Composition Option from 13 credits to 12-14 credits
- Added INART 258A, MUSIC 451, MUSIC 453, MUSIC 459 to Additional Courses for the Composition Option
- Changed requirement for 11 credits of Applied MUSIC courses to 8 credits of Applied MUSIC courses in Additional Courses for the Composition Option
- Removed requirement for 2 credits of approved ensembles from Additional Courses for the Composition Option
- Added Supporting Courses and Related Areas to the Composition Option
- Changed Keyboard Instruments Option from 47-50 credits to 41-42 credits
- Changed Supporting Courses and Related Areas Courses for the Keyboard Instruments Option from 42-44 credits to 36 credits
- Added MUSIC 420, MUSIC 423 to Additional Courses for the Keyboard Instruments Option
- Removed MUSIC 336, MUSIC 432, MUSIC 471, MUSIC 472 from Additional Courses for the Keyboard Instruments Option
- Added requirement for 6 credits of electives to Supporting Courses and Related Areas for the Keyboard Instruments Option
- Removed requirement for 4 credits in a secondary instrument from Supporting Courses and Related Areas for the Keyboard Instruments Option
- Removed requirement for 4 credits in music from Supporting Courses and Related Areas for the Keyboard Instruments Option
- Removed requirement for 4-6 credits in consultation with adviser from Supporting Courses and Related Areas for the Keyboard Instruments Option
- Changed Strings, Winds, Brass and Percussion Instruments Option from 46-49 credits to 41-43 credits
- Changed Additional Courses for the Strings, Winds, Brass and Percussion Instruments Option from 8-9 credits to 8-10 credits
- Added MUSIC 420, MUSIC 423 to Additional Courses for the Strings, Winds, Brass and Percussion Instruments Option
- Removed MUSIC 336, MUSIC 432, MUSIC 472 from Additional Courses for the Strings, Winds, Brass and Percussion Instruments Option
- Changed Supporting Courses and Related Areas for the Strings, Winds, Brass and Percussion Instruments Option from 38-40 credits to 33 credits
- Added requirement for 4 credits of approved ensembles to Supporting Courses and Related Areas for the Strings, Winds, Brass and Percussion Instruments Option

- Changed requirement for 24 credits in applied music through Level VIII of performance to 20 credits in applied music through Level VIII of performance in Supporting Courses and Related Areas for the Strings, Winds, Brass and Percussion Instruments Option
- Removed requirement for 4 credits in a secondary instrument from Supporting Courses and Related Areas for the Strings, Winds, Brass and Percussion Instruments Option
- Removed requirement for 4 credits in music from Supporting Courses and Related Areas for the Strings, Winds, Brass and Percussion Instruments Option
- Removed requirement for 2-4 credits in consultation with adviser from Supporting Courses and Related Areas for the Strings, Winds, Brass and Percussion Instruments Option
- Changed Voice Option from 52-53 credits to 42-43 credits
- Added MUSIC 420, MUSIC 423 to Additional Courses for the Voice Option
- Removed MUSIC 336, MUSIC 472 from Additional Courses for the Voice Option
- Changed Supporting Courses and Related Areas for the Voice Option from 45 credits to 35 credits
- Changed requirement for 24 credits in applied music through Level VIII of performance to 20 credits in applied music through Level VIII of performance in Supporting Courses and Related Areas for the Voice Option
- Removed requirement for 4 credits in a secondary instrument from Supporting Courses and Related Areas for the Voice Option
- Removed requirement for 2 credits in consultation with adviser from Supporting Courses and Related Areas for the Voice Option

Musical Arts, B.M.A. (MUBMA_BMA)
Effective Fall 2025:

- Added MUSIC 431, MUSIC 433 to Additional Courses for the Major
- Changed Applied music through Level VIII of performance requirement from 24 credits to 20 credits in Supporting Courses and Related Areas for the Major
- Removed 4 credits of music in consultation with an adviser requirements in Supporting Courses and Related Areas for the Major
- Added 8 credits of electives in Supporting Courses and Related Areas for the Major

Nutrition Studies, Minor (NSTD_UMNR)
Effective Summer 2025:

- Removed Additional Courses for the Minor
- Changed Supporting Courses and Related Areas for the Minor from 6 credits to 15 credits
- Removed NUTR 400, NUTR 407, NUTR 410, NUTR 421, NUTR 425, NUTR 445, NUTR 446, NUTR 451, NUTR 452, NUTR 460 from Supporting Courses and Related Areas

Premedicine, B.S. (PM_BS)
Effective Fall 2025:

- Added new Integrated B.S. in Premedicine and M.P.H. in Public Health

Rehabilitation and Human Services, B.S. (University College) (RHSUC_BS)
Effective Summer 2025:

- Program phased out at Lehigh Valley campus

Residential Construction Engineering, Minor (RCNEN_UMNR)
Effective Summer 2025:

- Revised Program Description
- Added AE 449, CE 410 to Prescribed Courses for the Minor
- Removed AE 471, ARCH 412 from Prescribed Courses for the Minor
- Added AE 471, AE 475 to Additional Courses for the Minor
- Added AE 210, ARCH 380, ARCH 412, ARCH 480, BA 301 to the Architecture Track in Additional Courses for the Minor
- Removed AE 211, RM 303 from the Architecture Track in Additional Courses for the Minor
- Removed AE 456, AE 542 from the Architectural Engineering Track in Additional Courses for the Minor
- Added AE 432, CE 336, CE 432 to the Civil Engineering Track in Additional Courses for the Minor
- Removed CE 410W from the Civil Engineering Track in Additional Courses for the Minor

Semiconductor Manufacturing and Microelectronics, Certificate (SMFME_UCT)
Effective Summer 2025:

- New certificate added

Surveying Engineering Technology, A.ENGT. (2SRT_AENGT)
Effective Summer 2025:

- Changed total requirements for degree completion from 66-69 credits to 65-59 credits
- Changed Requirements for the Major from 57-60 credits to 56-60 credits
- Changed Additional Courses for the Major from 24-27 credits to 23-27 credits
- Added MATH 41 to Additional Courses for the Major
- Removed MATH 40 from Additional Courses for the Major

FAQs

1. Where can I find a list of General Education courses and information about requirements?
   - For information about General Education requirements, please see the General Education (https://bulletins.psu.edu/undergraduate/general-education/) section in this Bulletin.
2. The General Education requirements have changed. Do the new requirements apply to me?
   - The new General Education requirements apply to students who start at Penn State in Summer 2018 and later. Requirements have not changed for students who began at Penn State before this semester. The older set of requirements can be found in the Archives page. Additional information is available on the Office of General Education website (https://gened.psu.edu).
3. What does the blue keystone symbol mean?
   - The keystone indicates that the course is designated as a General Education course. See the degree requirements for your program to identify the General Education courses that are required. Not all courses marked with the keystone count as meeting General Education requirements when required within your program. See the program requirements and speak to an adviser regarding

General Education courses that count or do not count toward the General Education requirements.

4. Where can I find bachelor of arts degree requirements?
   - Bachelor of arts degree requirements are included in the program requirements section for B.A. programs. You may also see the B.A. requirements in the Academic Information (https://bulletins.psu.edu/undergraduate/general-information/academic-information/) section.

5. 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 (https://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.

6. Which Undergraduate Bulletin should I use?
   - Your official record of general education requirements, University degree requirements, and program requirements is found in the Bulletin that matches the semester in which you enrolled at Penn State. See the Archive (https://bulletins.psu.edu/undergraduate/archive/) page to find past Bulletins.

7. Where can I find past Bulletins?
   - Past Bulletins can be found on the Archive (https://bulletins.psu.edu/undergraduate/archive/) page, which can be accessed from any page in the Bulletin's top navigation menu.

8. When will the Undergraduate 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 (p. 6) page.

9. What course description information is currently showing in the Bulletin?
   - The University Bulletins shows course description data that is active as of the most recently released Schedule of Courses. When an upcoming semester's Schedule of Courses is released, the course description information is updated on the same day to match that course data. Please visit the Understanding Course Description Information (p. 2) page to view the course description update calendar.

10. Why are there are 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).

11. How can I do a wild card search in the search box?
    - Use an asterisk (*) in the search box as a wild card. For example, MATH* will find everything that starts with "MATH", *MATH everything that ends with "MATH", and *MATH* everything that contains "MATH".

12. Where can I find the Graduate Bulletin?
    - The Graduate Bulletin is located at: https://bulletins.psu.edu/graduate/ (https://bulletins.psu.edu/graduate/).

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