Using this Bulletin

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 will be incorporated into the Bulletin.

Courses Added: Effective Summer 2020

- AE 441: Engineering Lifecycle Economics Analysis for Buildings
- ANSC 150S: Animal Science Freshman Seminar
- ANTH 418: Medical Anthropology
- ARMY 103: Physical Training Laboratory
- ASTRO 415: Introduction to Astrostatistics
- BIOL 418: Biology of Human Infectious Disease
- BIOL 483: Costal Biology Travel Experience
- CRIM J 409: White Collar Crime
- CSD 240: Supporting Communication Through The Performing Arts
- EDSGN 462: Introduction to Design for Additive Manufacturing
- GEOSC 481: Petroleum Seismology
- HM 272: Introduction to Worksheet-Based Analysis and Modeling for Managerial Decision Making
- KINES 431: Concussion in Athletics: Brain to Behavior
- LL ED 235: Chinese Culture in Child Lit
- MKTG 395: Sales Internship
- MUSIC 443W: Choral Emphasis in Secondary Music Education
- NURS 325N: Health and Environmental Sustainability
- PES 213: Polymer Chemistry Lab
- PES 305: Fluids/Heat Transfer
- PES 320: Polymer Sustainability
- PES 323: Rheology Lab
- PES 340: Polymer Characterization
- PES 341: Polymer Characterization Lab
- PES 351: Polymer Processng Lab
- PES 365: Processing for Polymer Product Performance
- PES 440: Failure Analysis and Characterization
- PES 441: Failure Analysis Lab
- PES 460: Polymer Formulation for Processing and Design
- PLSC 267N: Government and Politics of the Middle East
- STAT 400: Statistical Modeling II
- THEA 197: Special Topics

Courses Added: Effective Fall 2020

- A A 130N: Creative Arts Therapy Applications
- AE 397: Special Topics
- AE 462: Architectural Lighting Controls
- ARTH 280: The Secret Lives of Things: Design and Decorative Arts since the 18th Century
- ASIA 403: Food Cultures in Asia
- BIOL 455: Stem Cell Biology and Therapy
- DIGIT 297: Special Topics
- DIGIT 496: Independent Studies
- DIGIT 497: Special Topics
- DIGIT 499: Foreign Studies
- EDSGN 97: Special Topics
- ENGR 410: Coaching Skills and Practice for Engineering Leaders
- FIN 477: Behavioral Finance
- HIST 131N: Slavery, the Civil War, and Cinema
- KOR 422: Introduction to Korean Linguistics
- KOR 450: Korean Cultures in Global Contexts
- KOR 451: Food and Foodways in Korea
- KOR 452: Korean Language and Culture
- LA 235N: Introduction to Public Humanities
- LHR 450: Developing a Career in Human Resources or Employment Relations
- MGMT 451: Business, Ethics, and Society
- OLEAD 230: Leadership Across Industries

Courses Added: Effective Spring 2021

- ANSC 357: Equine Broodmare and Foal Care
- ARTH 207: The Eternal City: Rome from Antiquity to the Present
- BRS 350: Introduction to Life Cycle Assessment
- DIGIT 489: Professional Development in Digital Media, Arts, and Technology
- EDSGN 270: Summers by Design: An International Engineering Design Experience
- ENVST 294: Research Project
- LA 335: Public Humanities Capstone Experience
- OLEAD 220: Emotional, Social, and Cultural Intelligences and the Implications for Leadership
- PLANT 150S: Plant Science First Year Seminar
- SOC 296: Intercultural Dialogue Concepts and Practice
- SOC 369: Foundational Theory and Practice in Small Group Facilitation
- VBSC 331: Pharmacology I: Drug Actions and Reactions

Courses Dropped: Effective Spring 2021

- AE 444: Micro CADD Applications for Buildings
- AEE 450: Program Design and Delivery
- CSA 397: Special Topics
- DSM 295A: Field Experience in Foodservice Management
- DSM 295W: Professional Staff Field Experience
- ECON 463: Economic Demography
- ENGL 301M: Honors Seminar in English: Pre-1800s Literature
- HORT 420: Plant Growth Regulators
- HORT 490: Senior Seminar
- SOSC 1: Urbanization
- SOSC 480: Quantitative Methods in the Social Sciences
- SOSC 481: Qualitative Research Methods in the Social Sciences
- SOSC 492: Current Topics in the Social Sciences

Course Changes: Effective Spring 2021

AA 100: Introduction to International Arts (3 Credits) (IL) (GA)

Old Listing Effective Through Fall 2020:

An interdisciplinary, multicultural introduction to the arts of the world. A&A 100 Introduction to International Arts (3) (GA,IL,BA) This course meets the Bachelor of Arts degree requirements. The arts of the world
can be simultaneously universal and unique. By conveying qualities of
the human condition (mortality, love, lust, virtues, vices, etc.) the arts can
be universal. However, the arts communicating these qualities can be as
unique as the cultures that produced them. Consequently, the arts are
representative of the commonality and diversity of the peoples of the
world. A&A 100 will use the arts to consider similarities and differences
among cultures. The primary objective of this course is to develop each
student’s ability to appreciate the arts from a variety of cultures. By
equipping students with the skills to analyze works of art from other
countries, the course will make them more receptive to the unfamiliar.
The scope of this course will be open to all arts from all cultures but it
cannot be comprehensive given how large a field of study this represents.
The course will concentrate on but will not be limited to the visual arts,
arithmetic, designed environments, theatre and music. It will not include
all arts from all countries. Instead, case studies will be used to provide
students with in depth examination of specific examples. Individual
case studies will be selected based on qualities indicative of the culture
of origin. Care will be given to selecting case studies representative
of a wide variety of cultures. Effort will be made to include examples
from Asia, Africa, Australia, South America and Europe. Case studies
will be presented by guest lecturers and chosen from other resources
on campus. Members of the College of Arts and Architecture faculty,
international graduate students and visiting scholars will be invited to
present examples from their expertise. Objects in the Palmer Museum Of
Art, events at the Center for the Performing Arts and audio/visual/internet
resources will also be used as sources for other case studies. Because
the arts are central to this course, visual and audio experiences will be
a major component. A&A 100 is the foundations course required by the
International Arts Minor, but will also be available to other students not
pursuing the minor as a General Education Arts (GA) and United States
Cultures and International Cultures (US;IL) course.

Changes Effective Spring 2021:

• Recertification

• Description

AA 424: Arts Entrepreneurship Capstone Research Project (3
Credits)
Old Listing Effective Through Fall 2020:

Mentored research on an arts venture idea equips students for
immediate, informed, individually specific action upon completion of
the program. A&A 424 Arts Entrepreneurship Capstone Research Project (3
This course functions as the impetus for students to bring their specific
venture idea(s) into being, by researching the geographic region where
they want to operate, using the actual infrastructure necessary to their
specific project. By incorporating the acquired knowledge gleaned from
previous courses as applied knowledge towards their chosen venture, the
students will be operating literally as the CEO, while being mentored and
guided through the process. This course is a mechanism for integrating
and implementing the feasibility and marketing strategies developed
in the previous courses, thus equipping the students for immediate,
Informed, individually specific action upon completion of the program.

Prerequisite: A&A 322 and A&A 323

Changes Effective Spring 2021:

• Prerequisite

ACCTG 211: Financial and Managerial Accounting for Decision
Making
Old Listing Effective Through Fall 2020:

Introduction to the role of accounting numbers in the process of
managing a business and in investor decision making. ACCTG 211
Financial and Managerial Accounting for Decision Making (4) The
objective of this course is to introduce students to the discipline
of accounting through an introduction to two of accounting’s sub-
disciplines, financial and managerial accounting. The more specific
purpose is to provide students a basic understanding of the role
of financial and managerial accounting in the decisions of
capital market participants external to a business enterprise (e.g.,
stockholders, banks, financial analysts, prospective stockholders), and
in the decisions of those who manage business enterprises. Accounting
information has an important role in the resource allocation process
in our socio-economic system as a whole, as well as in each individual business enterprise. This course provides students an understanding of (1) the nature of the accounting function, and (2) how the information in accounting reports is used by various decision makers in their resource allocation decisions. In this course students will develop an understanding of (a) the five activity dimensions of accounting (the collection, recording, analysis, interpretation and reporting of information to decision makers for (mainly) their investment decisions), (b) the issues surrounding the five activity dimensions, (c) the environment in which accounting is practiced, and (d) what information is used in a number of specific decision situations, and how such information is used in such decision situations. The analysis, interpretation and decision-making orientation of this course includes a study of the procedural (mechanical and processing) aspects of the recording activity dimension which is an important means to the end –where the end is the analysis and interpretation of the information, and the reports produced by the recording/processing part of accounting. Through this focus on the recording activity dimension, students will obtain an understanding of (a) the nature and quality (strengths and weaknesses) of accounting information, (b) how to proceed in analyzing and interpreting accounting information, and (c) numerous other aspects of financial and managerial accounting. This course is an important background course for all business majors, as well as for numerous non-business majors. For accounting majors it is a prerequisite for ACCTG 405, 404, and 471. The course format consists of lectures, outside reading, class discussion, projects and homework assignments. The semester grade for this course will be determined by a weighted average of performance on mainly exams, quizzes, projects and participation.

Prerequisites: Enforced Prerequisites at Enrollment: MATH 21 or a higher math or a satisfactory score on the mathematics placement examination

Changes Effective Spring 2021:

• Abbreviated Title
• Description
• Prerequisites

ACCTG 305: Financial Statements and Management Decisions (4 Credits)
Old Listing Effective Through Fall 2020:

Impact of management’s financing, investing, and operating decisions on GAAP-based financial statements. Students who have passed ACCTG 310 or 311 may not take this course for credit. ACCTG 305 ACCTG 305 Financial Statements and Managerial Decisions (4) This course is a one-semester alternative to the traditional two-semester intermediate accounting sequence (ACCTG 371 and 472) intended for the non-accounting major. Students who have passed ACCTG 371 or 472 may not take this course for credit. It is a required course for the Finance major. It will also substitute for ACCTG 371 in meeting the requirements for an Accounting minor, and serve as a business supporting course for students in other School of Business majors. Students will gain a fundamental understanding of the information conveyed in the financial statements and, as a result, develop an appreciation for its usefulness and limitations in decision making. They will also develop the prerequisite knowledge base necessary to conduct financial statement analysis as required in Level I of the Chartered Financial Analyst (CFA) exam. A financial statement user decision-making perspective, rather than the accountant/preparer approach found in the traditional intermediate accounting course, is emphasized. Student success in meeting the learning objectives will be assessed through a combination of exams, homework problems, and assignments. The comprehensive final exam will test the student’s comprehension of the relevant material.

Changes Effective Spring 2021:

• Abbreviated Title
• Description

ACCTG 432: Accounting Information Systems
Old Listing Effective Through Fall 2020:

Systems analysis tools and techniques; internal control concepts; development of computer control procedures. ACCTG 432 Accounting Information Systems (3) Accounting data are utilized as information in making decisions and as a control mechanism. The focus of this course, however, will be upon the actual production of accounting data. The purpose of the course is to learn how accountants collect relevant data and transform them into reports appropriate for managers and external readers. Procedural details will focus first on the traditional accounting cycle and the journal entries for business transactions and events. Then we shall examine in detail the principle accounting cycles: sales cycle, cash receipts cycle, purchases cycle, cash disbursements cycle, payroll cycle, facilities cycle, general ledger cycle, production cycle. For each cycle, you should be able to explain the relation of the accounting process to the business enterprise, the basic journal entries, the basic internal control features, and the document flow.

Prerequisites: Enforced Prerequisite at Enrollment: (ACCTG371 or ACCTG471) and MIS 204

Changes Effective Spring 2021:

• Description
• Enforced Prerequisites

ADTED 456: Introduction to Family Literacy (3 Credits)
Old Listing Effective Through Fall 2020:

Introduces family literacy concepts, models, and components supporting families; adult, child, and parent education, interactive literacy activities, and case management. ADTED 456 Introduction to Family Literacy (3) This 3-credit course examines the concept of family literacy and different models and services that support families. Students will review the main parts of family literacy services and programs that support vulnerable families: adult education, early childhood education, parent education, interactive literacy activities, case management, and collaboration with partners who provide services to families (such as libraries, community centers, school districts, one-stop services, Head Start.) The course attends to issues such as racial/ethnic, cultural, and linguistic diversity among families, continuous program improvement, and professional development.

Prerequisite: Associate Degree or 60 undergraduate credits

Changes Effective Spring 2021:

• Prerequisites

ADTED 457: Adult Literacy (3 Credits)
Old Listing Effective Through Fall 2020:

Surveys adult basic and literacy education research, theory, programming, and instruction; highlights learners’ roles as parents, workers, and community members. ADTED 457 Adult Literacy (3) This 3-credit course explores adult literacy research, theory, programming, and instructional
practices in the context of family literacy. The course examines the role of adult education as it pertains to adult learners’ needs and their roles as parents, workers, and community members. The course addresses a broad range of topics, including adult learning theories, considerations for English language learners, reading and numeracy, health literacy, workforce and corrections education, and transitioning adults to postsecondary education or training. Readings and activities will draw on theoretical and practical aspects of adult education and family literacy literature.

Prerequisite: Associate Degree or 60 undergraduate credits

Changes Effective Spring 2021:

• Prerequisites

ADTED 458: Early Literacy Development
Old Listing Effective Through Fall 2020:

Focuses on young children’s language and literacy development, including parental and staff support, grounded in scientifically based reading research. ADTED 458 Early Literacy Development (3) This is a three-credit, post-baccalaureate course that focuses on young children’s language and literacy development. This course examines research related to how children acquire language, reading, and writing skills, as well as how family partnerships between the home and school can further support language and literacy development and children’s academic success. This course will cover a wide array of topics related to language and literacy development, including the influence of play and technology, the impact of read-alouds on literacy development, and the role of racial/ethnic and cultural diversity in learning. Students will examine early literacy development through a series of activities and readings.

Prerequisites: Associate degree or 60 undergraduate credits

Changes Effective Spring 2021:

• Prerequisites

ADTED 459: Interactive Literacy and Parental Involvement: Supporting Academic Success (3 Credits)
Old Listing Effective Through Fall 2020:

Explores parental involvement in education and parent-child literacy activities that support children’s language and literacy development, especially among diverse families. ADTED 459 Interactive Literacy: Parents and Children (3) Interactive Literacy: Parents and Children is one of five 3-credit courses in the 15-credit Certificate in Family Literacy developed by the Goodling Institute for Research in Family Literacy in the College of Education in partnership with the National Center for Family Literacy (Louisville, KY). It is offered during the summer and fall semesters to about 20 students per class. The course is 15 weeks in length, entirely online, and cohort-based. Study materials are both web- and print-based. Students work in teams for most of their assignments although they are also expected to produce a portfolio of individual application activities. An Associate’s Degree or 60 baccalaureate credits at an accredited institution are required to enter the course. Technological requirements, registration, and other support are provided. The courses focuses on the component of family literacy in which the low-literate parents engage in language and literacy development activities with their young children (birth to age 8). During interactive literacy the teachers both model and supervise the literacy interactions. Students learn to use planned and intentional activities that are developmentally appropriate for the children. They also learn how to teach the parent the necessary interaction skills as well as how to debrief the parents afterwards. They also learn how to assess the literacy interactions between parents and their children.

Prerequisite: Associate Degree or 60 undergraduate credits

Changes Effective Spring 2021:

• Prerequisites

ADTED 460: Introduction to Lifelong Learning and Adult Education
(3 Credits: Maximum of 3 Credits)
Old Listing Effective Through Fall 2020:

History, methods, agencies, program areas, and problems of lifelong learning and adult education in the United States.

Prerequisites: Associate Degree or 60 undergraduate credits

Changes Effective Spring 2021:

• Prerequisites

AE 221: Architectural Building Materials (3 Credits)
Old Listing Effective Through Fall 2020:

The structural and architectural use of building materials; commercial standardization, classification, and description as encountered in the building trades. AE 221 Architectural Building Materials (3) The course objective is for students to understand building materials and methods. It is taught using a combination of these methods, 1) job site visits to current construction projects on campus, 2) guest speakers from manufacturers, engineering firms, building code organizations, construction managers and contractors, 3) video series of building construction, and other various DVD’s, 4) visits to local building suppliers and testing facilities, 5) bus trip to several manufacturing, fabrication, milling plants, 6) hands-on mock-ups of construction assemblies, and 7) actual material samples. This course prepares students for further study in the advanced architectural engineering courses. Student evaluation and individual grades are based on a combination of homework, projects, quizzes, attendance and a final cumulative exam. The major part of the final grade is from six (6) quizzes of which the lowest quiz grade is dropped. Special facilities consist of 1) the drafting room, where various drawings and specifications are utilized to understand materials, 2) the computer lab, where students have access to the internet, which provides them with information from manufactures, suppliers and construction trade organizations, 3) the material samples room, where actual material samples and fasteners are examined and understood, 4) the hands-on mock-up room, where true size mock-ups are built by student groups and 5) the structures testing lab, where concrete beams, wood trusses, etc. built by the students are load tested to understand construction methods and failures.

Concurrent: AE 222

Changes Effective Spring 2021:

• Remove Concurrents

AE 222: Building Modeling and Documentation
Old Listing Effective Through Fall 2020:

Materials and methods of construction used in residences, and preparation of working drawings for a small building. The course objective is for students to understand construction documents,
communicate construction information with sketches and to create drawings and specifications. The course is organized around a series of modules related to working drawings. These modules consist of: 1) reading and interpreting construction documents, 2) hand-drawn sketches, from existing mock-ups, from existing drawings, from assigned details of existing campus buildings, from only given material and connection parameters, 3) CAD drawings of plans, elevations, wall sections, building sections, details, schedules. The final partial construction documents will be in accordance to CAD standards and various codes, including zoning, International Building Code, ADA, etc. This course prepares students for further study in the advanced architectural engineering courses. Student evaluation and individual grades are based on a combination of homework, projects, in class assignments, exams, quizzes and attendance. In class assignments are generally short and given to demonstrate a concept or as practice. Special facilities consist of: 1) the drafting room, where various drawings and specifications are utilized and where students prepare sketches, 2) the computer lab, where students have access to computer-aided design software, presentation software and communication software, 3) the material samples room, where actual material samples and fasteners are examined and understood and 4) the hands-on mock-up room, where true size mock-ups that represent the students' drawings are built by student groups.

Prerequisites: EDSGN 130 or EDSGN 100; Concurrent AE 221

Changes Effective Spring 2021:

• Prerequisites

• Remove Concurrent

AE 308: Introduction to Structural Analysis (4 Credits)
Old Listing Effective Through Fall 2020:

Algebraic and graphical methods of analysis of determinate members, deflections; introduction to indeterminate analysis methods. Course includes practicums. AE 308 Introduction to Structural Analysis (4) In this introductory course, students develop skills to perform analysis of structures, with emphasis on buildings and their structural elements. The objectives of this course are as follows: 1) to determine loads that the buildings/structural elements are likely to be subjected to during the lifetime of the building; 2) to discuss procedures used to determine reactions and internal forces in trusses, beams, and frames; 3) to introduce methods that can be used to calculate deflections. These objectives can be seen as three general steps that define structural analysis. Although the main emphasis in this course is the analysis of planar, statically determinate structures, an introduction to the analysis of indeterminate structures is also given. The course is required to be taken by all architectural engineering undergraduate students in the third year. A knowledge of statics and strength of materials is required and this course serves as Prerequisite for steel and concrete design courses in the Architectural Engineering Program.

Prerequisites: EMCH 211, EMCH 213

Changes Effective Spring 2021:

• Prerequisite

AE 309: Architectural Acoustics
Old Listing Effective Through Fall 2020:

Acoustical design for good hearing conditions and noise control; construction details, materials, acoustical properties of room shapes; sound absorption, transmission. Course includes practicums.

AE 309 Architectural Acoustics (3) Architectural acoustics encompasses four distinct areas of study: room acoustics, sound isolation, mechanical system noise and vibration and sound reinforcement. The course concentrates on the performance of the building components as they impact on the acoustical environment. The goal of good acoustical design is to provide an environment to afford occupants of a building a high quality listening environment and to minimize intrusion by offending noises. By manipulation of building materials, spatial relationships and geometry, the students learn to improve acoustical performance of a building. Through lectures, practicums, projects, tours to campus performance venues and examinations, the concepts of acoustical design are delivered and reinforced. The course offers students opportunity to work in team settings and to present their work orally to their peers. The course is required for all architectural engineering students, typically taken in the 3rd-year. PHYS 213 is a prerequisite for this course. This course is a prerequisite for Advance Architectural Acoustics and Noise Control. Students not in the architectural engineering curriculum are encouraged to consult with the instructor prior to enrolling in the course.

Prerequisites: AE 221, AE 222, PHYS 213

Changes Effective Spring 2021:

• Prerequisites

AE 372: Introduction to the Building Industry
Old Listing Effective Through Fall 2020:

Introduction to the building industry; owner, designer responsibilities; documents, bidding procedures; design-construct contracts; project management; insurance, labor relations.

Prerequisites: sixth semester standing in Architectural Engineering

Changes Effective Spring 2021:

• Prerequisites

AE 405: Geotechnical Engineering (4 Credits)
Old Listing Effective Through Fall 2020:

Course prepares students for understanding, analysis, evaluation, and design of the most commonly used shallow foundation systems to support buildings. All structural loads on buildings, most notably gravity loads and win/seismic lateral loads, are transferred to the soil supporting the building. In order for the building to safely deliver these loads to the soil and avoid settlement issues and soil failure, a proper foundation system must be designed. Design of foundation systems is a function of soil material properties, foundation material, and the selected foundation system. This course educates the student on the basics of soil mechanics for foundation design, and educates the student on how to select and design the most commonly used types of foundation systems. Course is intended to provide students with the knowledge, tools, and understanding of material properties, analysis and design principles, and methods necessary for successful construction of foundation systems within the framework of quality control, code compliance, economic consideration and safety, while minimizing failure risks. The course is required for Architectural Engineering students in the Structural and Construction Options, but other students may take the course with permission by the instructor.

Prerequisites: (AE 308; CE 340,) (AE 402; AE 404)
Changes Effective Spring 2021:

• Prerequisite

**AE 453: Load and Energy Use Simulations for Buildings**

Old Listing Effective Through Fall 2020:

Course examines measurement and mathematical modeling techniques for predicting and determining energy use of whole buildings and important subsystems. Building systems use more primary energy utilization and generate more emissions than either the U.S. transportation or industrial manufacturing sectors. Due to the significance of the building sector on national energy used and emissions profiles, the development of quantitatively predictive energy and performance simulation of buildings is a rapidly advancing technical field. The Architecture and Architectural Engineering communities are pursuing aggressive programs to establish a data-based, protocol methodologies and computer-based modeling tools that enable accurate predictions of the expected energy utilization and indoor environment performance of alternative building designs. The developing modeling tools are to be integrated with on-site performance measurements and protocol based energy auditing of facilities. Expected performance characteristics predicted by the modeling tools are compared with the measured values. The building design community is evolving to design simulation methodologies used by the transportation and manufacturing sectors. In this course, the means of measuring and monitoring of the energy use associated with a building system, both on whole building and significant subsystems - lighting, heating ventilation and air conditioning, occupant operated equipment are reviewed. Inverse modeling techniques of using the data with associated significant independent variables, such as ambient weather parameters and occupant density, to establish, empirical expected building energy use models, as well as document energy efficiency renovation impacts are detailed. Industry established building performance rating scales which use such data are discussed. Fundamental heat transfer and thermal capacitance relationships as used by the engineering design community are discussed along with linearization approximations and Fourier series techniques used to simplify the resulting complex, coupled partial differential equations that result from energy balancing model equations. Analytical and numerical approaches to solving the equations to arrive at predicted thermal loads developed by a building system are reviewed. Readily available, building simulation software packages commonly used in the building design community to determine energy used by equipment configurations to meet predicted loads are discussed. Students are required to exercise one of the standard software tools to model a specific building facility.

Prerequisites: AE 310, AE 454

Changes Effective Spring 2021:

• Prerequisites

**AE 464: Advanced Architectural Illumination Systems & Design**

Old Listing Effective Through Fall 2020:

Flux transfer theory; advanced lighting and control systems; emergency lighting; daylighting; visual performance issues; psychological aspects of lighting. AE 464 Advanced Architectural Illumination Systems & Design (3) This is the final undergraduate architectural lighting course in the Lighting/Electrical Systems Option. The course focuses on advanced topics related to lighting design such as luminous flux transfer and its application to lighting analysis procedures, advanced issues in photometry, advanced control systems, and advanced topics in lighting design. The light design topics include the psychological aspects of lighting, and design for complex spaces such as museums, stores, and video conferencing. The course includes a weekly hands-on practicum experience, homework, exams and a design project.

Prerequisites: AE 461

Changes Effective Spring 2021:

• Remove Prerequisite
• Add Concurrent

**AE 466: Computer Aided Lighting Design**

Old Listing Effective Through Fall 2020:

Design and analysis for outdoor area; floodlighting; and interior applications, including design criteria; economic analysis; modeling algorithms; and visualization. AE 466 Computer Aided Lighting Design (3) The goal of this course is to cultivate an understanding of good lighting design practice through a series of design and analysis problems. Course topics include design criteria, design practice, and the application of lighting hardware and analysis procedures for outdoor area lighting, economic analysis of lighting systems, interior lighting design and lighting system visualization. Commercially available computer software is applied to approximately seven design projects, which students present in either PowerPoint or submit in a short report format. Students, faculty and outside professionals critique the project solutions. The critiques enhance the learning experience for all students through the evaluation of different lighting solutions applied to the same design problem.

Prerequisites: AE 461

Changes Effective Spring 2021:

• Prerequisite

**AE 470: Residential Building Design and Construction**

Old Listing Effective Through Fall 2020:

Managerial aspects; architectural and code considerations; cost estimating, design, and construction of structural, plumbing, HVAC, and electrical systems.

Prerequisites: A E 372 or C E 332 ; seventh-semester standing in Architectural Engineering or Civil Engineering

Changes Effective Spring 2021:

• Prerequisites

**AE 471: CONSTRUCTION MANAGEMENT OF RESIDENTIAL BUILDING PROJECTS**

Old Listing Effective Through Fall 2020:

Understanding residential project planning, management, contracts, budget, administration, and execution; discussion of the life cycle of a residential construction business.

AE 471 Construction management of Residential Building Projects (3) The course Construction Management of Residential Building Projects is designed to introduce the students to a general understanding of the construction industry, basic principles of project planning and management, contracts, budget and project administration and execution as applied to residential building construction. The content of the course is intended to provide the student with the knowledge, tools, and understanding of processes and tasks necessary to manage residential
Building projects to completion successfully and within the framework of quality control, code compliance, and safety, while minimizing risks. The scope of the residential construction considered in this course is primarily focused on single-family dwellings and multi-family dwellings. Furthermore, most of the topics covered can be applicable to new construction, remodeling, as well as repair projects.

Prerequisites: 6th semester standing

Changes Effective Spring 2021:

- Prerequisites

AE 476: Building Construction Engineering II
Old Listing Effective Through Fall 2020:

Construction of mechanical and electrical systems in major buildings; fire protection, sound control, elevating; trade coordination; manufacturers' developments; computer application.

Prerequisites: AE 309, AE 475

Changes Effective Spring 2021:

- Prerequisites

AE 481W: Comprehensive Architectural Engineering Senior Project I
Old Listing Effective Through Fall 2020:

Building project selection and preparation of overall plan; preliminary investigation of building design and construction issues; creation of individual Capstone Project Electronic Portfolio (CPEP) and project proposal required. AE 481 Comprehensive Architectural Engineering Senior Project I (4) The course sequence of AE 481 and AE 482 comprises the capstone engineering design program for Architectural Engineering students. AE 481 is taken by all undergraduate architectural engineering (A E) students and also serves as the writing intensive course requirement in A E. Based on an actual building project model, students will investigate the building, perform technical analysis, develop project criteria and prepare a written proposal for more detailed work to be accomplished in AE 482. Evaluation methods include but are not limited to written reports, verbal and written presentations, faculty consultations and development of a capstone project electronic portfolio (CPEP).

Prerequisites: ARCH 441, fifth year architectural engineering standing in major area of emphasis

Changes Effective Spring 2021:

- Prerequisites

AE 494M: Senior Honors Thesis
Old Listing Effective Through Fall 2020:

Comprehensive Architectural Engineering Senior Project development and planning with an honors thesis focus. In this course, an honors student in architectural engineering will work on a real-world building project which the student has selected and for which the student has obtained drawings and specifications, as well as the owner's permission to use this project as their undergraduate thesis project. Students enrolling in this course are required to complete the following: - Develop and initiate a plan for their undergraduate senior project in Architectural Engineering which will also serve as their Schreyer Honors College thesis. Through this thesis, the student demonstrates a command of relevant scholastic work and a personal contribution to that scholarship.

Secure an honors thesis adviser and meet with that person to select an in-depth and/or integration focus for their Honors Thesis work. The student then develops a formal proposal describing the focus area for the undergraduate senior project and honors thesis, outlining the analyses, investigations, and design elements of this work and the tools that will be employed.

- Summarize the existing conditions present in this building project as it relates to their AE option, systems integration, and the honors thesis topic.
- Conduct a thorough review of the relevant literature that has been published in the area that is the focus of the honors thesis, including details on the relevant building, construction, and energy codes that govern this work.
- Commence work on the investigation, analysis, and design portion of the thesis, together with the general activities required of all AE students in their undergraduate capstone projects.

Prerequisites: ARCH 441, fifth-year architectural engineering standing in major area of emphasis

Changes Effective Spring 2021:

- Prerequisites

AERSP 301: Aerospace Structures
Old Listing Effective Through Fall 2020:

Aerospace structural design concepts, flight safety. Stiffness, strength, stability of thin-walled structures under combined loads. Energy methods, finite element analysis. AERSP 301 Aerospace Structures (3) AERSP 301 covers essential topics in aerospace structures. The objectives of the course are to help students: 1) appreciate the roles that structures and structural materials play in aerospace vehicles; 2) understand general design concepts for aerospace structures: vehicles, components, and materials; 3) develop the analysis tools and skills needed to analyze the performance of aerospace structures; and 4) gain experience identifying, formulating, and solving aerospace structural engineering problems. AERSP 301 builds on structural mechanics topics covered in PHYS 211, EMCH 11 & EMCH 13 (or EMCH 210), and EMCH 215 & EMCH 216. It prepares students for study of advanced topics such as plates and shells, composites, structural stability, finite element analysis, structural dynamics, and aeroelasticity. It also provides students with the basic background needed to contribute effectively to multidisciplinary trade studies in vehicle design activities. AERSP 301 begins with an overview of the general features of flight vehicle structures, with emphasis on thin-walled members and advanced materials. Then, the implications of assured safety of flight for structural design are explored, leading to coverage of: load cases, flight envelopes, load factors, factors of safety, kinds of structural failures, and margins of safety. Topics in structural analysis proceed from an initial review of topics in elasticity, structural materials, and beam bending. Then, the deflection and stress responses of thin-walled beams under transverse shear and torsional loading are addressed. More than a third of the course is devoted to energy principles and the development of the finite element method of structural analysis. The course finishes with a treatment of the structural stability of beams and panels, a key topic with respect to the behavior of thin-walled aerospace structures.

Prerequisites: EMCH 210 or EMCH 213

Prerequisite or concurrent: AERSP 313

Changes Effective Spring 2021:
AERSP 309: Astronautics
Old Listing Effective Through Fall 2020:

Introduction to space and space flight; laws of particle mechanics; orbits and trajectories; space vehicles and propulsion. AERSP 309 Astronautics (3) This course, required for aerospace engineering majors, focuses primarily on the dynamics of spaceflight, including both orbital and attitude (orientation) motion of spacecraft. Topics include: three-dimensional rotational kinematics (direction cosine matrices, vector components in different coordinate systems, Euler angles, the angular velocity vector, and velocity and acceleration in different reference frames), three-dimensional particle dynamics (Newton’s laws of particle motion, energy, angular momentum, and systems of particles), two-body orbital mechanics (Newton’s law of universal gravitation, the orbit equation, conic sections and orbit terminology, Kepler’s equation, classical orbital elements, and representations of satellite position and velocity), orbital maneuvers and transfers (impulsive maneuvers, Hohmann transfers, simple inclination changes, and relative motion between spacecraft), rigid-body dynamics (angular momentum and energy, the inertia matrix, principal-axis system, Euler’s equations of rigid-body motion, torque-free motion, and effects of external torques), rocket performance (the rocket equation, specific impulse, estimating propellant requirements for a mission, and a survey of propulsion technology), and the space environment (standard atmosphere, simple radiative-heat-transfer analysis, the Van Allen radiation belts, meteors and debris hazards). The course relies upon a sound understanding of mechanics, matrix algebra and vector calculus. Assignments include analytical and numerical problems, some of which require computer programming.

Prerequisites: EMCH 212, MATH 250, CMPSC 201 or CMPSC 202

Changes Effective Spring 2021:

• Prerequisites

AERSP 311: Aerodynamics I
Old Listing Effective Through Fall 2020:

Fluid statics and kinematics; fluid dynamics of inviscid and viscous flows; Navier-Stokes equations; introduction to boundary layers. AERSP 311 Aerodynamics I (3) This is the first course in incompressible inviscid and viscous flows. It includes an introduction to fluids, fluid statics and hydrostatics. Fluid kinematics, including Eulerian versus Lagrangian viewpoint, steady versus unsteady flows, volume and mass flow rates, vorticity and circulation, and streamlines are described. Derivation of the governing equations for the conservation of mass, momentum and energy is presented. Dimensional analysis is covered. Potential flow with and without the effects of viscosity is analyzed. A derivation and exact solutions of the Navier-Stokes equations are given and boundary layers are introduced. This is the first of a two course sequence in aerodynamics, where both courses are required for senior-year propulsion and design courses. Evaluation of student performance will be by two midterm exams worth approximately 25% each, a final exam worth approximately 35% and weekly homework assignments worth approximately 15%.

Prerequisites: EMCH 212, MATH 250, CMPSC 201 or CMPSC 202

Changes Effective Spring 2021:

• Prerequisites

AERSP 312: Aerodynamics II
Old Listing Effective Through Fall 2020:

Fluid mechanics of viscous and compressible flows, laminar boundary layers, turbulent flows, isentropic flows, shock waves, supersonic life and drag. AERSP 312 Aerodynamics II (3) Exact solutions of the Navier-Stokes equations for unsteady flow. Boundary layers solved by the methods of Blasius, Falkner-Skan and Thwaites. Boundary layer stability and transition to turbulence. Turbulent flow and solution methods. Fluid flow measurement techniques and numerical methods. Derivation of the governing equations for the conservation of mass, momentum and energy for compressible flow. Steady one-dimensional isentropic flow. Normal, traveling and oblique shock waves. Compressible flow with area change and converging-diverging nozzle flows. Prandtl-Meyer expansions and supersonic life and drag. One-dimensional flow with friction or heat transfer. Unsteady and linearized compressible flow. Introduction to the method of characteristics. This is the second of a two course sequence in aerodynamics and is a prerequisite for senior level courses in propulsion and design. Evaluation of student performance will be by two midterm exams worth approximately 25% each, a final exam worth approximately 35% and weekly homework assignments worth approximately 15%.

Prerequisites: AERSP 311, AERSP 313, ME 201

Changes Effective Spring 2021:

• Prerequisites
What it means to be Black in America by engaging with questions about identity and authenticity, freedom and unfreedom, radicalism and reform, gender and sexuality, and the role of music in African American life. AFAM 100 Living While Black: Themes in African American Thought and Experience (3) This course introduces some of the major themes that have emerged from the experiences, expressions, and reflections of African-descended peoples in the Americas. Exploring these themes will reveal that black life is a distinctive phenomenon within the context of the larger historical and cultural narrative of the Americas. The course will use texts from major African American intellectuals and artists to uncover the major issues that have shaped black life in the Americas. Some of the themes and writers explored include “identity and authenticity” as illustrated in the works of W.E.B. DuBois and Audre Lorde; “freedom and unfreedom” using the works of Frederick Douglass and Angela Davis; “radicalism or reform” as expressed in the works of Booker T. Washington, Bayard Rustin, David Walker, and Claudia Jones; “gender and sexuality” as expressed in the work of John Oliver Killens, bell hooks, and Francis Ellen Watkins Harper; “songs in the key of black life” as seen in the works of Ralph Ellison, Farah Jasmine Griffin, Amiri Baraka, and Tricia Rose; “love, the spirit, and the word,” in the works of James Cone, Toni Morrison, Nikki Giovanni, and James Baldwin; and “the black planet,” as described in the writings of Langston Hughes, Marcus Garvey, and Lorraine Hansberry. These authors represent the key debates in African American life and thought and illustrate the wide range of intellectual, cultural, political, and artistic expression that has defined black life in modern America. This course provides a beginning foundation for understanding the various meanings of the lived experiences of Black people in the Americas in the twentieth century.

Changes Effective Spring 2021:
- Add GH Attribute
- Recertification
- Add IL Attribute
- Change Number to 100N
- Abbreviated Title
- Title
- Description

AFAM 101: The African American Woman (3 Credits) (US) (BA) (GH)
Old Listing Effective Through Fall 2020:
The sociological, historical, and political experiences of African American women, their roles and contributions to society.

Cross-Listed Courses: WMNST 102

Changes Effective Spring 2021:
- General Education Recertification
- Add GS Attribute
- Add Inter-Domain Attribute
- Number
- Long Title
- Abbreviated Title
- Description
- Cross-Listing

AFAM 102: Women of Color: Cross-Cultural Perspective (3 Credits) (IL) (GH)
Old Listing Effective Through Fall 2020:

Global examination of value systems of women of color; attention to minority ethnic groups in the United States and developing countries.

Cross Listing: WMNST 102

Changes Effective Spring 2021:
- General Education Recertification
- Add BA Attribute
- Abbreviated Title
- Description

AFAM 110N: Introduction to African American Studies
Old Listing Effective Through Fall 2020:

An introductory survey of African American Studies practice and scholarship, focused on the major methods, figures, texts, and debates that define the field.

Changes Effective Spring 2021:
- Course Number
- GS Attribute
- Inter-Domain
- Abbreviated Title
- Description

AFAM 126N: The Popular Arts in America: The History of Hip-Hop
Old Listing Effective Through Fall 2020:

An examination of the roots, development, and significance of hip-hop in our culture.

Changes Effective Spring 2021:
- GH Attribute
- Inter-Domain
- Course Number
- Abbreviated Title
- Description
- Cross-Listing

AFAM 145: African American Religions and Spirituality (3 Credits) (IL) (US) (GH) (BA)
Old Listing Effective Through Fall 2020:

History and significance of the religious dimension of the Black American struggle for equality from enslavement to the contemporary period.

Cross Listing: RLST 145

Changes Effective Spring 2021:
- Recertification
- Abbreviated Title
- Title
- Description

AFAM 213: African American Women’s History (3 Credits) (US) (GH) (WAC)
Old Listing Effective Through Fall 2020:
This course examines the social, political, and economic history of African American women in the United States from slavery to the present.

Cross Listing: HIST 213, WMNST 213

Changes Effective Spring 2021:

- Recertification
- Add BA Attribute
- Description

AFR 105: Environments of Africa: Geology and Climate Change
Old Listing Effective Through Fall 2020:

Significant natural features of Africa as related to human endeavor; case studies include the Nile, climate change, and natural resources. AFR 105 Environments of Africa: Geology and Climate History (3) (GN, IL, BA) This course meets the Bachelor of Arts degree requirements. “Environments of African: Geology and Climate History” investigates the interrelationships between geology, hydrology, land use and human development in several areas of Africa. We focus primarily on regions north of the equator, although there is a brief segment on South Africa mining. Specific topics include the Nile River (sources of the Nile, agricultural practices, effects of damming the Nile, hydropolitics), the Sahara and Sahel (salt mines, climate change, drought, water resources), and natural resources and their role in politics (gold, diamonds, oil, and gas). The theme of climate change cuts across the entire semester. The quantitative and analytical components of the course involve working through a combination of map exercises and data manipulations (flood stage, groundwater age, rainfall and temperature records). Writing exercises are conducted both individually (essays, analysis of readings) and in collaborative teams (climate change analysis). Readings for the course come from the popular scientific literature; current refereed research journals, and transcribed oral histories of African people. Faculty lectures will comprise ~30% of the course, and student presentations ~20%, with the remainder of the time devoted to in-class collaborative exercises. There are no prerequisites for this course. It will be offered annually with a maximum enrollment of 100 students. The goals of the course are to (1) introduce the scientific study of Africa; (2) develop quantitative and scientific reasoning skills; (3) explore the relationship between human society and the natural world. The topics that we explore (e.g., global climate change, allocation of limited water resources) are important political issues that affect people in developing and developing countries throughout the world. It is crucial that the next generation of citizens be informed as to how scientific data is obtained, presented, and interpreted by scientists as well as politicians. Students will work individually and (more commonly) in teams to analyze real data from natural African systems, and will then report their findings to the class both orally and in writing. Examples of the data sets include 100-year records of monthly rainfall and temperature from stations throughout the continent, fossil suites from ancient lake cores in the modern Sahara, and historical writings of Nile flood levels from preBiblical times. Through these exercises students will gain an appreciation of the scope of geological time and change, and will be able to incorporate this new long-term perspective into identification and resolution of modern questions.

Cross-Listed Course: EARTH 105

Changes Effective Spring 2021:

- Recertification
- Title
- Abbreviated Title

AFR 443: Ethnic Conflict in Africa (3 Credits) (IL) (BA)
Old Listing Effective Through Fall 2020:

This course explores the various causes and impacts of ethnic conflicts in the African context.

Cross-Listed Courses: PLSC 443

Prerequisites: AFAM 100, AFR 110, PLSC 1, PLSC 3, PLSC 7, PLSC 14, PLSC 17, PLSC 20, or AFRAS 301

Changes Effective Spring 2021:

- Prerequisite

AGBM 106: Agribusiness Problem Solving (3 Credits)
Old Listing Effective Through Fall 2020:

Development of quantitative problem solving skills applied to specific examples of agribusiness management problems, using EXCEL spreadsheets. AGBM 106 Agribusiness Problem Solving (3) The goal of this course is to develop agribusiness problem solving skills. These skills include optimization, marginal analysis, time discounting, and measuring efficiency. Examples will be implemented using Microsoft EXCEL spreadsheets rather than algebra, calculus and abstract mathematics. This course, then, plays an important role by building skills for use in later agribusiness management courses as well as teaching important problem solving skills to non-majors who want to learn quantitative economics problem-solving skills in the context of agribusiness management. Material will be organized according to the course topics: optimization, marginal analysis, time discounting, and efficiently measurement. Each topic area presentation will rely on specific examples of agribusiness management problems. The first lecture of each week will be a standard lecture emphasizing concepts, presented in a passive learning format. The second lecture of each week will be presented in a technology classroom with spreadsheet examples being worked out by the professor in front of the class, who will guide the students. The third lecture of each week will be taught in a computer laboratory, with students solving the problems actively, but with supervision. Problem solving skills will be reinforced by assigning problem sets for students to do on their own after the computer laboratory experience. It is permitted for students to submit identical labs but problem sets should not be identical.

Prerequisite: AGBM 101

Changes Effective Spring 2021:

- Add GQ Attribute
- Description
- Prerequisites

AGBM 302: Food Production Marketing (3 Credits)
Old Listing Effective Through Fall 2020:

Analysis of economic and psychological determinants of the demand for food; marketing decisions in an increasingly consumer-driven food system.

Prerequisite: AGBM 101, AGBM 102, AGBM 106

Changes Effective Spring 2021:
AGBM 308: Strategic Decision Making in Agribusiness (3 Credits) (WAC)
Old Listing Effective Through Fall 2020:

Utilize case studies to investigate strategic decision making among agribusiness firms, highlighting how information and market power shape strategies. AGBM 308 Strategic Decision Making in Agribusiness (3) This course is designed to analyze strategic decision making among agribusiness firms and other economic agents in a market environment characterized by imperfect information and market power. The course draws upon game theory and other strategic decision tools to analyze four broad types of strategic decisions, each of which corresponds with the four main parts of the course: 1) Strategic Decisions Between Rival Firms: Focusing on firm decisions made between rivals with full information, part one includes the following topics and strategies: limit pricing, entry deterrence, predatory pricing, excess capacity, wars of attrition, strategic commitment, tit-for-tat pricing, and retaliation. 2) Strategic Firm Decisions in an Uncertain World: Focusing on firm decisions made with incomplete information, part two includes topics on probabilities, expected value and expected utility, learning curves, investment decisions, flexibility, and option value. 3) Strategic Decisions Between Unequal Partners: Focusing on firm decisions made between unequal partners with asymmetric information, part three includes topics on vertical coordination, incentive compensation, franchising, and auctions. 4) Cooperation and Strategic Alliances: Part four investigates how firms can overcome informational problems described above through the use of strategic partnerships. This writing-intensive course will rely on both class lectures and a substantial amount of class discussion. The course content will feature eight to ten industry applications and case studies of individual companies to reinforce economic theory. Learning Objectives- Students will: 1) Classify practical agribusiness problems by the type of available information – full, incomplete, or imperfect and by the nature of market power in an industry. Construct and analyze game trees and other representative models of strategic decisions facing businesses and employees. Solve strategic business problems using economic models based on game theory and other economic principles. Write business-style memos and reports that summarize a business decision, plan, or solution that is supported by economic analysis.

PREREQUISITE: AGBM 101, AGBM 102, AGBM 106

Changes Effective Spring 2021:
- Description
- Prerequisites

AGBM 338: Agribusiness in the Global Economy (3 Credits) (IL)
Old Listing Effective Through Fall 2020:

Managing agribusinesses in the global food industry, international food product marketing, key public institution and policies affecting food trade.

PREREQUISITE: AGBM 101, AGBM 102, AGBM 106

Changes Effective Spring 2021:
- Abbreviated Title
- Prerequisites

AGBM 407: Farm Planning and Financial Management (3 Credits)
Old Listing Effective Through Fall 2020:

Economic principles applied to the management of farms, with particular emphasis on the financial aspects of management.

PREREQUISITE: AGBM 101, AGBM 106

Changes Effective Spring 2021:
- Abbreviated Title
- Prerequisites

AGBM 408: Financial Decision Making for Agribusiness (3 Credits)
Old Listing Effective Through Fall 2020:

Develop financial management and business analysis skills, integrating previous course work and finance training, principles of financial management, planning, control.

PREREQUISITE: AGBM 308W, BA 301

Changes Effective Spring 2021:
- Abbreviated Title
- Prerequisites

AGBM 320: Markets and Prices: Analysis and Forecasting (3 Credits)
Old Listing Effective Through Fall 2020:

Understand how prices are determined; develop the skill to analyze and forecast how prices change as the underlying conditions change. AGBM 320 Markets and Prices: Analysis and Forecasting (3) In AGBM 320, Markets and Prices: Analysis and Forecasting, students learn how prices are determined and learn how to analyze and forecast how prices change as the underlying conditions change. This involves learning those tools that are used to analyze and understand how commodity markets work and how prices are determined. The class mixes theory with practical knowledge and examples, and aims to create a balanced representation of the tools used in market analysis. The students learn how to find data, manipulate it and analyze and apply these skills to test the validity of simple economic models, to forecast commodity prices, to understand market trends and learn the use of derivative instruments to manage price risk. One objective of this class is to improve the understanding of economic modeling and to increase the familiarity of students when applying statistical functions and regression analysis to solve applied problems. These core competencies rely on previous knowledge of basic statistic tools and data manipulation. In the process, students will learn to analyze market fundamentals and better understand those forces that affect prices. This will also help them better understand supply and demand and the ability of market participants to adjust to changing conditions.

PREREQUISITE: AGBM 101, AGBM 102 and AGBM 106; SCM 200 or STAT 200

Changes Effective Spring 2021:
- Abbreviated Title
- Prerequisites
AGBM 420: Agribusiness Markets & Prices (3 Credits)
Old Listing Effective Through Fall 2020:

Understand and forecast price level and volatility for commodities, differentiated products, services. Why markets work and why they may not.

PREREQUISITE: 6 credits in Agribusiness Management, Business Administration, Agricultural Economics, and/or Economics

Changes Effective Spring 2021:

• Prerequisites

AGBM 455: Retail Horticulture Business Management (3 Credits)
Old Listing Effective Through Fall 2020:

The nature, operation, and management of retail garden centers, winery tasting rooms, and independent food retailers. Overview of retail marketing principles and practices as they pertaining to horticultural retail businesses. Lectures, discussions, and projects focus on: selecting and pricing goods and services; how independent retailers effectively use traditional promotion avenues and social media networks to connect with customers; and how to develop a relevant brand, cause marketing effort, and loyalty program. Students will also learn: about retail layout and display strategies; that each consumer segment has different wants, interests, and abilities to obtain goods and services, and about effective employee management.

PREREQUISITE: HORT 101, AGBM 101
CROSS LISTING: HORT 455

Changes Effective Spring 2021:

• Prerequisites

AGBM 470A: Comparing Agricultural and Food Systems in the US and France: Lecture (2.5 Credits)
Old Listing Effective Through Fall 2020:

Explore key differences and similarities in the food and agricultural systems of the United States and France. INTAG 470A / AGBM 470A Comparing Agricultural and Food Systems in the US and France: Lecture (2.5) This course is designed to explore key similarities and differences in the food and agricultural systems of the United States and France. It introduces students to a number of overarching food and agricultural topics that pertain to both countries, and students explore and analyze these key issues from both countries perspective. These overarching topics include the structure of agricultural and environmental policies, the use agricultural land for biofuel production, organic agriculture, food safety, attitudes and policies surrounding the use of genetically modified crops, the role of large agribusiness firms, attitudes towards diet and health, and several other important topics. Students conduct background reading on these topics, hear lectures — sometimes from guest presenters — that frame the topics from both the U.S. and France’s perspective, and write reports on specific crops or foods that expose key similarities and differences between the two food systems. Finally, students pick one crop or food for an oral presentation that contains background information on how that crop fits into the two food systems, U.S. and France, and analyzes the key issues that relate to the overarching topics already identified. This course has two components that must be taken in partnership: 470A (FOOD SYS US/France I) and 470B (FOOD SYS US/France II). The first is a classroom – based course, and meets regularly during the semester. The second is a two –

week component that takes place after the end of the semester. In this second component, after traveling to France, students hear presentations from the French perspective on the overarching topics identified earlier and also explore the topics first hand via field trips to farms, wholesale markets, retail markets, and other places relevant to the French food system. This component is organized by a host university, AgroParisTech. For these two weeks, students live in dorms within the city of Paris. Knowledge of French is not required.

PREREQUISITE: INTAG 100 or 3 credits in social or behavioral sciences
CROSS LISTING: INTAG 470A

Changes Effective Spring 2021:

• Description
• Prerequisites

AGECO 438: Principles of Weed Management (4 Credits)
Old Listing Effective Through Fall 2020:

Weedy plant taxonomy, biology and ecology of weedy plant populations, and integration of biological, chemical, cultural and biological controls. AGRO 438 / AGECO 438 Principles of Weed Management (4)The study of weeds and their management is a challenging and demanding task that requires diverse abilities. The term weed is an anthropocentric construct meaning it is a human colored definition. We will study the biology and ecology of weedy plants drawing on examples from a wide range of plant systems; those systems include agricultural fields (agronomic and horticultural crops) and forests. Of course our knowledge of the biology and ecology of weedy plant populations will then be used to underpin and assess control tactics and their integration. The discipline has a history of equating management with herbicidal control and in fact some 80% of the pesticides used in U.S. agriculture are herbicides. However through novel farmer designed management systems, through a research community focused on alternative methods of management and through increased focus on invasive species, exciting breakthroughs are occurring in alternative methods of management and prevention. This course seeks to introduce you to the breadth of management approaches in use and under study. The specific objectives are for students to be familiar with: 1) the local weed flora, 2) fundamental aspects of weed biology and ecology relevant to managed landscapes, 3) the control methods used in managing weed populations, 4) how control measures can be integrated to accomplish acceptable levels of pest suppression, 5) operationalizing a weed management plan, 6) how herbicides enter and move to their site of action in plants, 7) classifying herbicides by their site of action, and 8) the distinction between herbicide concentration in soils and plant available herbicide concentration.

Cross-Listed Courses: AGRO 438
Prerequisite: 6 credits in plant sciences

Changes Effective Spring 2021:

• Abbreviated Title
• Description
• Prerequisites
• Recommended Preparations

AGRO 28: Principles of Crop Management (3 Credits)
Old Listing Effective Through Fall 2020:
Biological and agronomic principles applied to production and management of major feed and forage crops of the northeastern United States.

Prerequisite: 6 credits in biological science

Changes Effective Spring 2021:
- Abbreviated Title
- Description
- Remove Prerequisites

AGRO 438: Principles of Weed Management (4 Credits)
Old Listing Effective Through Fall 2020:

Weedy plant taxonomy, biology and ecology of weedy plant populations, and integration of biological, chemical, cultural and biological controls. AGRO 438 / AGECO 438 Principles of Weed Management (4) The study of weeds and their management is a challenging and demanding task that requires diverse abilities. The term weed is an anthropocentric construct meaning it is a human colored definition. We will study the biology and ecology of weedy plants drawing on examples from a wide range of plant systems; those systems include agricultural fields (agronomic and horticultural crops) and forests. Of course our knowledge of the biology and ecology of weedy plant populations will then be used to underpin and assess control tactics and their integration. The discipline has a history of equating management with herbicidal control and in fact some 80% of the pesticides used in U.S. agriculture are herbicides. However through novel farmer designed management systems, through a research community focused on alternative methods of management and through increased focus on invasive species, exciting breakthroughs are occurring in alternative methods of management and prevention. This course seeks to introduce you to the breadth of management approaches in use and under study. The specific objectives are for students to be familiar with: 1) the local weed flora, 2) fundamental aspects of weed biology and ecology relevant to managed landscapes, 3) the control methods used in managing weed populations, 4) how control measures can be integrated to accomplish acceptable levels of pest suppression, 5) operationalizing a weed management plan, 6) how herbicides enter and move to their site of action in plants, 7) classifying herbicides by their site of action, and 8) the distinction between herbicide concentration in soils and plant available herbicide concentration.

Cross-Listed Courses: AGECO 438

Prerequisite: 6 credits in plant sciences

Changes Effective Spring 2021:
- Abbreviated Title
- Description
- Prerequisites

AIR 251: The Evolution of USAF Air and Space Power I (2 Credits)
Old Listing Effective Through Fall 2020:

Examines aspects of air and space power from the first balloons to the beginning of the Cold War era

Changes Effective Spring 2021:
- Abbreviated Title
- Title

AIR 252: The Evolution of USAF Air and Space Power II (2 Credits)
Old Listing Effective Through Fall 2020:

Continued examination of air and space power from the Cold War era to the Persian Gulf War and beyond.

Changes Effective Spring 2021:
- General Education Recertification
- Abbreviated Title
- Credits
- Description
- Prerequisite

AIR 351: Leadership Studies I (3 Credits)
Old Listing Effective Through Fall 2020:

Study of leadership, management fundamentals, and communication skills required of Air Force officers. Students apply these concepts using case studies.

Changes Effective Spring 2021:
- Abbreviated Title
- Title
- Credits Repeatable
- Description

AIR 352: Leadership Studies II (3 Credits)
Old Listing Effective Through Fall 2020:

Continued study of leadership includes professional knowledge, AF personnel evaluation systems, and leadership ethics. Students apply concepts using case studies.

Changes Effective Spring 2021:
- Add GHW Attribute
- Abbreviated Title
- Description
- Add Prerequisites

AIR 451: National Security, Leadership Responsibilities, and Commissioning Preparation I (3 Credits)
Old Listing Effective Through Fall 2020:

This course examines the national security process, regional studies, advanced leadership ethics, and Air Force doctrine.

Changes Effective Spring 2021:
- General Education Recertification
- Long Title
- Abbreviated Title
- Credits
- Description
- Prerequisite
AIR 452: National Security Affairs/Preparation for Active Duty II (3 Credits)
Old Listing Effective Through Fall 2020:

Topics focus on preparation for military service after commissioning and current issues affecting the Air Force way of life.

Changes Effective Spring 2021:
- Description
- Add Concurrent

AMST 140: Religion in American Life and Thought (3 Credits) (WF) (US) (BA) (GH)
Old Listing Effective Through Fall 2020:

The function, contributions, tensions, and perspectives of religion in American culture.

Cross-Listed Courses: RLST 140

Changes Effective Spring 2021:
- Number
- General Education Recertification
- Description

AMST 160: Introduction to Asian American Studies
Old Listing Effective Through Fall 2020:

An introduction to the history, literature, and culture of Asian America.

Cross-Listed Courses: AAS 100

Changes Effective Spring 2021:
- General Education Recertification
- GS Attribute
- Inter-Domain
- Description

ANSC 306: Swine Production and Management (3 Credits)
Old Listing Effective Through Fall 2020:

Application of the principles of enterprise and facility development, operations management, quality control, public relations, marketing for the efficient operation of a swine production business.

Prerequisite: ANSC 201

Changes Effective Spring 2021:
- Description
- Move ANSC 201 from Prerequisite to Concurrent

ANSC 308: Sheep and Goat Production and Management
Old Listing Effective Through Fall 2020:

ANSC 308 Sheep and Goat Production and Management (3) encompasses the requisite information for students to manage any of the small ruminant livestock species including meat and wool sheep, hair sheep, and meat goats. Students will critically evaluate genetic, reproductive, nutritional, economic, and management criteria that influence profitability and sustainability of small ruminants as viable agricultural animal enterprises in Pennsylvania, the United States and the world. Hands-on learning to develop practical management skills will be provided via the laboratories held at the Penn State Sheep Barns.

Concurrents: ANSC 201

Changes Effective Spring 2021:
- Description
- Add Concurrent

ANSC 309: Beef Cattle Production and Management (4 Credits)
Old Listing Effective Through Fall 2020:

Application of principles of nutrition, breeding, physiology, health, facilities, and marketing to produce and manage beef efficiently.

ANSC 309 Beef Production and Management (4) Beef Production and Management, offered every spring semester to an anticipated 20-40 students, will provide a comprehensive review of the business-related and production oriented concepts associated with modern beef production. This course will combine traditional disciplines of beef management with business management, operations management, quality control and marketing. Additional topics will include economics and factors affecting cost of production. As the course progresses, and following the exposure of students to the fundamentals of beef production, they will be given the opportunity to evaluate real production scenarios for development of business and management recommendations.

In addition to the classroom, the Penn State Beef Center, College computer labs, and selected field trips will comprise the facilities used to teach the course. In addition, students will conduct problem solving exercises on beef enterprises throughout the state. Beef Production and Management will be included in the series of other production courses offered in this department. Having completed the course, students will be able to: 1. Describe the necessary management procedures in a beef enterprise that are vital for efficient and profitable production. 2. Describe and understand the fundamentals of the various segments of the cattle industry. 3. List the important components of a business management plan for a beef operation, including short and long-term capital requirements, and a projected budget. 4. Discuss the trends and important issues facing the beef industry in Pennsylvania, the nation and world. 5. Critically evaluate business and production scenarios to provide an in-depth analysis and a recommended course of action for improving a beef enterprise.

Prerequisite: ANSC 201

Changes Effective Spring 2021:
- Description
- Move ANSC 201 from Prerequisite to Concurrent

ANSC 327: Horse Production and Management (4 Credits)
Old Listing Effective Through Fall 2020:

ANSC 327, Horse Production and Management, is a 4 credit course for students pursuing careers that are directly or indirectly associated with the horse industry. This course is an in-depth examination of a broad range of topics that are fundamental to the care and welfare of all horses, as well as to managing a successful equine business. The course begins with an examination of equine behavior, with a focus on safe handling. Horse selection and judging are discussed and practiced. General health care, specific diseases, and parasitology are all covered. Significant time
is spent on nutrition, reproduction, and exercise physiology. Finally, topics like facility design and management, coat color genetics, and emergency preparedness are discussed. Students completing this course should be able to:

1) Demonstrate and describe the production and management techniques necessary for the successful operation of the horse enterprise.
2) Describe the utilization of the horse’s unique athletic ability in various disciplines.
3) Evaluate and apply the relationship of form to function in the use of horses for work and recreation.
4) Discuss and utilize the principles of selection, breeding, feeding, and management of horses in a range of scenarios.
5) Summarize the scope and diversity of the horse industry

Prerequisite: ANSC 201

Changes Effective Spring 2021:
- Add Enforced Prerequisite or Concurrent: ANSC 201

**ANSC 447: Equine Exercise Physiology (3 Credits) (GN)**

Old Listing Effective Through Fall 2020:

ANSC 447, Equine Exercise Physiology, is a 3 credit junior/senior-level course for students interested in the basic and applied aspects of exercise physiology of the horse. The course begins with discussion on the history of equine sport. Students then explore the biochemistry and energetics of exercise followed by the anatomy and physiology that make the horse a unique mammalian athlete. The course then moves to the more applied aspects of exercise and training responses and training regimes specific for different disciplines. Finally, student will explore important management practices associated with the care of the equine athlete. Upon completion of this course students should be able to:

1. Apply an understanding of form and function of the horse to the diverse and unique athletic capabilities of the horse.
2. Discuss physiologic responses of the muscular, skeletal, respiratory, and cardiovascular systems of the horse to various exercise and training regimes.
3. Prepare and/or evaluate appropriate training regimes for horses preparing for different disciplines. An important component of this will be the ability to use knowledge of the basic science to improve application.
4. Design and describe physical therapy strategies for horse recovering from exercise or training related injuries.
5. Communicate to clients, customers and peers important information about exercise physiology, training, and exercise related issues, enabling them to improve the health and performance of their horse

PREREQUISITE: ANSC 327

Changes Effective Spring 2021:
- Prerequisites

**ANSC 457: Equine Reproduction and Breeding Farm Management (3 Credits)**

Old Listing Effective Through Fall 2020:

Advanced aspects of equine reproduction will be covered, including collection of semen, processing it for shipment, and insemination of mares. ANSC 457 Equine Reproduction and Breeding Farm Management (3) Equine Reproduction and Breeding Farm Management is intended to expand on the knowledge of equine reproduction and breeding farm management acquired in other classes. The students will get hands on experience in artificial insemination of mares and semen collection of stallions. Having completed the course, students will be able to:

A. Collect semen from a stallion.
B. Assess seminal characteristics and process the chilled semen to be sent to another farm.
C. Artificially inseminate a mare.
D. Apply scientific principles to make the decisions necessary to manage an equine breeding facility. The information covered will include but not be limited to reproductive management of the mare and stallion, foaling, and neonatology. Evaluation will typically be based on written tests, research and presentation of a selected topic, and laboratory attendance and participation.

Prerequisite: ANSC 327

Changes Effective Spring 2021:
- Description
- Enforced Prerequisite: ANSC 327 and Permission of Program

**ANTH 215: Skin: Evolution, Biology and Culture (3 Credits) (GN)**

Old Listing Effective Through Fall 2020:

This course will explore the evolution and roles of skin and human life, including health, communication, and social wellbeing. ANTH 215 Skin: Evolution, Biology and Culture (3) (GN) Skin mediates the most important of transactions of human lives because it is our interface with the physical and social environments. Skin is constantly changing and reflects our age, ancestry, and health, while serving as our personal "billboard." In "Skin," students will explore the evolutionary and social histories of human skin, including the changes in structure and function it has undergone in the course of human evolution. Three unique attributes of human skin will be explored at length: 1) functional nakedness and sweatiness; 2) the range of skin's natural colors; and 3) skin as a surface for decoration. The course begins with an overview of the structure and function of human skin and proceeds to an exploration of the comparative biology and evolution of skin in vertebrates, especially nonhuman mammals. Special attention will be paid to the outermost layer of skin, the epidermis. This will lead to a discussion of human hairlessness and sweating, and the role of skin in temperature regulation. Detailed exploration of the evolution of human skin color follows. The key role played by melanin pigmentation in protecting skin from sunlight will be discussed as a prelude to review of the evolution of human pigmentation in human dispersals. Discussion of the role of skin color in human interactions through history follows, including an introduction to the development and manifestations of color-based racism. The importance of skin as the organ of touch and as a vehicle for communication will then be reviewed. This will introduce the subject of skin as a mirror of human emotions, as in anger and blushing. Because aging of skin is one of the most visible signs of aging and is one of the most significant of human preoccupations, this phenomenon will be discussed in detail, and some of the most common skin diseases and problems associated with "wear and tear" will be surveyed. Considerable time and discussion will be devoted to skin decoration, with particular attention paid to the use of cosmetics and paints in the establishment of identity and the advertisement of sexuality in individuals, and the importance of tattoos in expressing individuality and group identity. The course will conclude with a speculative investigation of the future of human skin, including the prospects for artificial skin and robotic skin, and the expanding frontiers of skin decoration and communication via remote touch.
Prerequisite: ANTH 21 or ANTH 45

Changes Effective Spring 2021:

• Remove Prerequisite

ANTH 271: Parasites and Human Evolution
Old Listing Effective Through Fall 2020:

Advance our understanding of human evolution by studying the ecologies and evolutionary histories of our parasites. ANTH 271 Parasites and Human Evolution (3) (GN) Honors The goal of this course is to advance our understanding of human evolution by studying the ecologies and evolutionary histories of our parasites. Many of these parasites flourish only under very specific human behaviors and habitats, are wholly dependent on us, and have evolved with us for thousands or millions of years. Therefore, by asking when and how we first acquired those parasites, under which environmental and cultural conditions we are the most susceptible, and how the parasites have evolved and adapted to us and we in response to them, we can gain considerable insight into our own evolutionary history. As examples, the lifecycle of tapeworms is dependent on our consumption of meat, the speciation of body and head lice was likely coincident with the development of clothing, and the spread of endemic malaria was likely associated with agriculture. A series of human parasites will be studied in sufficient depth – from biology to genetics to population dynamics and so on – to facilitate a holistic consideration of the implications for human evolution, population history, and culture.

Prerequisites: one introductory course that covers some aspects of evolutionary biology or parasitology, for example: ANTH 021, BIOL 110, ENT 202, MICRB 106, or MICRB 201

Changes Effective Spring 2021:

• Remove General Education
• Description

ANTH 321W: Intellectual Background of Archaeology
Old Listing Effective Through Fall 2020:

Introduction to primary sources on the development of archaeology as a scientific discipline.

Prerequisites: ANTH 002, ANTH 045

Changes Effective Spring 2021:

• Remove Prerequisites
• Add Corequisites

ANTH 401: Human Evolution: The Material Evidence (3 Credits)
Old Listing Effective Through Fall 2020:

Human origins as seen in the fossil record and comparative biology of humans and their primate relatives.

Prerequisite: ANTH 021

Changes Effective Spring 2021:

• Prerequisites

ANTH 403: Evolution of Human Walking (3 Credits)
Old Listing Effective Through Fall 2020:

An in depth analysis of the biology, biomechanics, evolutionary history of human walking and running.

Prerequisite: ANTH 021

Changes Effective Spring 2021:

• Prerequisites

ANTH 405: Primatology (3 Credits)
Old Listing Effective Through Fall 2020:

Nonhuman primate origins, evolution, comparative physical and behavioral characteristics, ecological context, phylogeny and taxonomy; and their importance in anthropology.

Prerequisite: ANTH 021

Changes Effective Spring 2021:

• Prerequisites

ANTH 408: Anthropological Demography (3 Credits) (BA)
Old Listing Effective Through Fall 2020:

Analysis of demographic studies in traditional and very small populations. ANTH 408 Anthropological Demography (3)(BA) This course meets the Bachelor of Arts degree requirements. This course examines population-related problems from an anthropological perspective. Special emphasis is placed on ecological and economic approaches to the study of population dynamics in small-scale, preindustrial societies. This is an advanced undergraduate course that builds upon introductory anthropology and leads the student into more difficult demographic problems that are linked with economics, politics, religion and other cultural factors that shape population and population change. While the course is designed to introduce any of the basic analytical methods of demography, attention is focused primarily on fundamental theoretical issues concerning population growth, resources, fertility, mortality, age structure, and household demography in traditional societies. Data is drawn from ethnographic studies of living populations, from historical demography, and from paleodemography (the reconstruction of population patterns from skeletal samples). There will be three take-home problem sets. These will be a mixture of short essay questions and simple numerical exercises that can be solved on a pocket calculator or a spreadsheet. This course fulfills a 3 credit 400-level requirement for the Anthropology major and minor.

Prerequisite: 3 credits in anthropology

Changes Effective Spring 2021:

• Prerequisites

ANTH 410: Osteology (4 Credits)
Old Listing Effective Through Fall 2020:

Introduction to the systematic study of the human skeleton from an evolutionary developmental biological perspective. ANTH 410 Osteology (4) This course introduces students to the aspects of the human skeleton and dentition that are of anatomical, archaeological, forensic, and developmental significance. Topics include the identification of skeletal and dental structures; the distinction between normal and pathological bone; the estimation of age, sex, and stature from skeletons; bone metabolism; growth and development; and the functional aspects of musculoskeletal and dental systems. Up to one-half of the course is spent on bone identification and skeletal anatomy. Lectures
are supplemented by labs that provide practical experience in the
identification of individual bones and anatomical structures, age and
sex estimation, and the differentiation of abnormal from normal bony
structures. It is absolutely essential for students to attend labs to
familiarize themselves with bone specimens and casts. At the close
of this course, students are expected to be able to recognize human
bones and be familiar with anatomical terms, the bony landmarks that
define their shape, and the relation of those bones with various soft-
tissue structures. Students will have a basic grasp of bone growth
and development, as well as how to identify an individual’s general
characteristics from the skeleton, such as age, sex, and prior life-
history events including disease and trauma. The course fulfills a 400-
level elective for the Anthropology (BA) major and minor, as well as
the Archaeological Science and Biological Anthropology (BS) degree
programs.

Prerequisites: 3 credits in anthropology, 3 credits in the biological
sciences, or concurrent enrollment in ANTH 401 or ANTH 501

Changes Effective Spring 2021:

• Prerequisites

ANTH 411: Skeletal Forensic Anthropology (3 Credits)
Old Listing Effective Through Fall 2020:

An introduction to anthropological forensic science with an emphasis
on what can be learned from human skeletons and archaeological
recovery methods. ANTH 411 Skeletal Forensic Anthropology (3) This
course is a survey of forensic anthropology focusing on human skeletal
remains and archaeological recovery methods. Emphasis is placed
on field methods used to collect human remains from surface and
buried contexts; taphonomic processes; estimating age, sex, stature,
and ancestry from human skeletons; recognizing signs of trauma and
scavenger damage; and identifying individuals from skeletons. Lectures
are accompanied by class discussions and complemented by practical
lab sections closely tied to lecture materials. There will be two exams, a
midterm and a final, and students are responsible for preparing a poster
and presenting a semester-long research project. This course is related
to existing ANTH 410, Human Osteology, and proposed course ANTH 413,
Molecular Forensic Anthropology. It fulfills a 400-level requirement for the
anthropology major or minor, as well as the university’s Forensic Science
major.

Prerequisite: ANTH 021 or ANTH 410 or Forensic Science major

Changes Effective Spring 2021:

• Prerequisites

ANTH 412: Settlement Demography (3 Credits)
Old Listing Effective Through Fall 2020:

Examination of the demography and ecology of human settlement
systems in the preindustrial past. ANTH 412 Settlement Demography
(3) This seminar will examine the population dynamics of human
settlement systems in preindustrial societies, living, historic, and
prehistoric. The focus will be on subsistence-level agrarian settlements,
but some attention will also be paid to settlement patterns in hunter-
gatherers, in market economics, and in complex societies. After reviewing
basic assumptions and problems of working with spatial data, the course
will examine processes determining settlement size, composition, and
location on the micro-level (i.e. that of individual households, farmsteads,
hamlets, and villages) and then pass on to regional patterns of transport,
migration, and defense. The processes of site colonization, settlement
expansion and contraction, site abandonment, and re-colonization
will all be considered in detail. Since human settlements are always
non-randomly distributed across spatially-heterogeneous landscapes,
some basic landscape ecology will be presented in the course. Some
fundamentals of geostatistical analysis will also be taught, although
the course is not intended to be a survey of quantitative geography or
spatial analysis. Rather, it is designed to be a more specialized follow-
up to ANTH 408 (Anthropological Demography); the new course builds
upon the basic explored in ANTH 408 by extending them into the spatial
domain. During the last quarter of the semester, students will split into
2-3 teams, each of which will re-analyze settlement data from a region
and time period of its choice for presentation to the rest of the class. The
proposed course will provide 3 elective credits toward the undergraduate
major and minor, and will be open to graduate students as well. The
overall aim is to produce scholars who can think in creative ways about
the dynamics of settlement systems in their own reading and research.
The course should be of interest to archaeologists, anthropological
demographers, ethnologists, and other students interested in human
population science, especially as it relates to preindustrial society.

Prerequisite: ANTH 408

Changes Effective Spring 2021:

• Prerequisites

ANTH 413: Molecular Forensic Anthropology (3 Credits)
Old Listing Effective Through Fall 2020:

An introduction to the field of the application of DNA methods to
estimating forensically useful phenotypes. ANTH 413 Molecular Forensic
Anthropology (3) This course is a survey of forensic anthropology
focusing on human genetic methods. Emphasis is placed on laboratory
methods for analyzing DNA variation, the genomic and geographical
distributions of genetic variation, estimating genetic ancestry, sex,
pigmentation, facial features, and other traits. Lectures are accompanied
by class discussions and complemented by practical lab sections
closely tied to lecture materials. There will be three exams and students
are responsible for preparing a poster and presenting a semester-
long research project. This course is related to existing ANTH 411,
Skeletal Forensic Anthropology. It fulfills a 400-level requirement for the
anthropology major or minor, as well as the university’s new Forensic
Science major.

Prerequisites: ANTH 021 or Forensic Science major

Changes Effective Spring 2021:

• Prerequisites

ANTH 416: The Evolution of Human Mating (3 Credits)
Old Listing Effective Through Fall 2020:

The Evolution of Human Mating is a science course designed to
familiarize students with the primary literature on the evolution and
development of human mating behavior and sex differences.

Prerequisite: C in ANTH 216 or permission of program

Changes Effective Spring 2021:

• Prerequisites
**ANTH 420: Archaeology of the Near East**  
Old Listing Effective Through Fall 2020:

Culture of the Near East and India from Paleolithic times through the Bronze Age.

Prerequisites: ANTH 008, ANTH 009, ANTH 011, or ANTH 012  
Cross-Listed Courses: JST 420  
Changes Effective Spring 2021:  
- Add Cross-Listing  
- Prerequisites

**ANTH 421: Intro to Geospatial Science in Anthropology and Archaeology (3 Credits)**  
Old Listing Effective Through Fall 2020:

This course is a practical, data driven, introduction to applications of Geospatial tools in anthropological and archaeological research. ANTH 421 Intro to Geospatial Science in Anthropology and Archaeology (3) As anthropologists, we are interested in humans, how humans interact with each other, and how that interaction is modulated by space and place. The purpose of this course is to introduce students to the basic concepts of spatial theory in anthropology, and the use of GIS (Geographic Information Systems) as a tool in anthropological and archaeological research designs. Students will gain familiarity with geospatial technologies, their use as a tool for data creation, storage and manipulation, and a broad array of data analyses. The course is relevant to anyone documenting or investigating spatial dimensions of human social behavior. Students will gain familiarity with GIS software, its use as a tool for data creation, and a broad array of data analyses. This class will be offered each Fall semester. It will introduce students to sources and uses of data in addressing anthropological or archaeological research questions. It will prepare the student for more advanced spatial analysis courses such as Advanced Geospatial Science for Anthropologists and Archaeologists. Students will be expected to develop a research project which uses GIS as a tool to address broader anthropological research questions. The class will culminate in the development of a research contract for a future fieldwork project. A list of sample topics is provided. Students will be expected to develop an original and functioning GIS which addresses their research question. The purpose of this exercise is to introduce the student to all stages in the development and operationalization of an anthropological research GIS in the development of an archaeological or anthropological project. There are two components to this class: classroom and labs. The classroom component will consist of lectures and discussions. The student will receive hands-on experience with GIS applications during the laboratory component of the class. The laboratory component will enable students to gain experience applying the concepts discussed in class to archaeological data through use of GIS programs in a technology classroom setting. Data used in the laboratory exercises derive from actual anthropological and archaeological fieldwork. Students are expected to complete labs in one of the several computer labs across campus that have GIS software installed. Grades are based upon the completion of 12 lab exercises, a draft of a proposed contract, the final contract and a short presentation of the proposed contract to the class. This course will fulfill three credits of the requirement in both the Minor and Major in Anthropology. This is the first part of a two part course. The second part of this course is called Advanced Geospatial Science for Anthropologists and Archaeologists.

Prerequisite: ANTH 001 or ANTH 002  
Changes Effective Spring 2021:  
- Prerequisites

**ANTH 422: Meso-American Archaeology and Ethnography (3 Credits) (BA)**  
Old Listing Effective Through Fall 2020:

Survey of ethnohistorical and ethnographic patterns of Meso-American society; origin and development of ancient civilization in Mexico, Guatemala, and Honduras.

Prerequisite: ANTH 008, ANTH 009, ANTH 011, or ANTH 012  
Changes Effective Spring 2021:  
- Prerequisites

**ANTH 423: The Evolution of American Indian Culture (3 Credits) (BA)**  
Old Listing Effective Through Fall 2020:

Historic and archaeological sources used to trace American Indian lifestyles from the first immigrants to the period of Euro-American contact.

Prerequisite: 3 credits in anthropology  
Changes Effective Spring 2021:  
- Prerequisites

**ANTH 424: Andean Ethnology and Archaeology (3 Credits) (BA)**  
Old Listing Effective Through Fall 2020:

Cultures of the Andes from earliest settlements to Inka Empire; includes discussion of life in modern Andean communities. ANTH 424 Andean Ethnology and Archaeology (3)(BA) This course meets the Bachelor of Arts degree requirements. When the Spanish conquistadors arrived in the Andes in 1532, they were astonished by the complexity and grandeur of the Inca Empire, which stretched along western South America incorporating a multitude of different societies that occupied a seemingly inhospitable landscape with coastal deserts, rugged mountain chains, and dense jungles. This course traces out the history and development of Andean cultures from the earliest peopling of the continent to the rise and fall of the Inca Empire. Using archaeological, historical, and ethnographic sources, students will learn about the relationship between Andean societies and their environments and landscapes, as well as the economic, social, and political changes that transformed small egalitarian communities through time into large, stratified states. Through the course, students will not only gain a strong background in pre-Columbian Andean history but will also hone their skills in the use of different lines of evidence to reconstruct the past while learning to critically evaluate existing interpretations. All students are expected to participate actively in discussions. Lectures will be supplemented by illustrations (slides, handouts, videos), and students will learn how societal dynamics are expressed in material culture and in the organization of architecture and settlements. Grades will be based on the results of three exams, a short paper, and participation in discussions. The course complements existing courses at the same (400) level on the archaeology of Mesoamerica (ANTH 422) and North America (ANTH 423). It continues the discussion (at a higher level) of some of the themes covered in ANTH 008 (Incas, Aztecs, Mayas). It fulfills the archaeology credits requirement for the major and is one of the 400-level courses that
can be used for the minor. For students outside the major, it may be used to meet the Other Cultures or the Social Sciences requirement in Bachelor of Arts programs.

Prerequisite: ANTH 002, ANTH 045

Changes Effective Spring 2021:

ANTH 426W: Archaeological Laboratory Analysis
Old Listing Effective Through Fall 2020:

Scientific laboratory methods used in the analysis of ceramic and lithic artifacts. ANTH 426W Archaeological Laboratory Analysis (3) This course, Archaeological Laboratory Analysis, employs experiential learning to teach students how to ask and answer archaeological questions using real data. While students learn the fundamentals of interpretation in other courses using already processed computer (and internet) assembled data sets, this is not how archaeological data are analyzed. Archaeological data emerge from the ground covered with dirt and the analyst must learn how to identify and measure their important attributes, and interpret what they mean. This class will provide a hands-on learning experience where students learn how to examine and use physical remains to reconstruct and interpret human behavior. Students in the Anthropology program currently learn this critical step on an ad hoc basis by working with faculty on individual research projects. This approach, while effective, is neither systematic nor comprehensive. This is a course on analytical systematics. It provides students with an introduction to problem formulation, artifact processing, artifact cataloging, attribute identification, artifact classification, analysis, data illustration and photography. At the same time, students will be introduced to two separate and distinct approaches to interpretation: 1) morphological/diagnostic analysis, and 2) direct experimentation and replication. Students will be graded on the completion of nine laboratory exercises. These exercises will require that students identify the research question being addresses, the theoretical assumptions used in the analysis, the data sample, the analytical method(s) employed, and the conclusions reached. The exercises will also request that students identify personal insights and difficulties encountered during the analysis. This course fills a vital position in training undergraduate majors to provide a framework for training graduate students who enter the program with minimal field and laboratory training in archaeology.

Prerequisites: ANTH 007 and ANTH 008 and ANTH 009 or ANTH 011

Changes Effective Spring 2021:

ANTH 427: Forensic Archaeology (3 Credits) (WAC)
Old Listing Effective Through Fall 2020:

Application of archaeological techniques to crime scene investigations, with practical experience in field and laboratory contexts.

Prerequisite: ANTH 2

Changes Effective Spring 2021:

ANTH 428: Archaeological Methods and Theory
Old Listing Effective Through Fall 2020:

Scientific methods as applied to archaeological data: evolution, ecology, diffusion, and cyclicism theory.

Prerequisites: ANTH 007, ANTH 008, ANTH 009, ANTH 011, or ANTH 012

Changes Effective Spring 2021:

ANTH 429: Paleoethnobotany (3 Credits)
Old Listing Effective Through Fall 2020:

Introductory course in paleoethnobotany, the study of the interrelationships between people of the past, natural environment, and plant resources. ANTH 429 Paleoethnobotany (3) This course is a survey of the fast-developing field of paleoethnobotany-- also known as "archaeobotany" or "phytoarchaeology"-- that involves the extension of ethnobotany into the past, emphasizing archaeological plant remains and study of the historical dimensions, complex dynamics, and myriad interrelations between people and plant resources. The primary goals of the course are 1) to promote understanding of the vital interplay between the natural environment and human societies, with their diverse systems of belief and resource use, especially those of the past but with relevance to the present; and 2) to foster an appreciation for what modern paleoethnobotany involves as a subdiscipline or specialization in archaeology, related to both anthropology and the plant sciences. The course begins by considering the history and nature of the field, including parallel developments in plant biology. The first half of the semester entails weekly sessions that focus attention on the plant organism, sources of archaeobotanical data, taphonomic issues, and the major classes of archaeobotanical materials. Fundamental issues involved in fieldwork, and the variety of laboratory concerns and methodologies specific to paleoethnobotany as whole and with regard to individual subareas are addressed. Individual laboratory sessions highlight the different preservation states that affect ancient plant materials, as well as methods of identification and analysis. In the second half of the semester, attention is focused on theory and application, issues central to and/or addressed by paleoethnobotany as a subdiscipline of archaeological anthropology. The course follows a seminar style, with substantial participation by students, including individual presentations, laboratory study, and analysis. Learning is augmented and enhanced by use of various visual aids, along with modern comparative specimens and actual archaeological plant remains. ANTH 429 will fulfill 3 credits of

Prerequisites: ANTH 002, ANTH 045

Changes Effective Spring 2021:

ANTH 425: Zooarchaeology (3 Credits)
Old Listing Effective Through Fall 2020:

Introduction to the systematic study of animal skeletal remains from archaeological sites.

Prerequisite: ANTH 002 or ANTH 021

Changes Effective Spring 2021:

ANTH 428: Archaeological Methods and Theory
Old Listing Effective Through Fall 2020:

Scientific methods as applied to archaeological data: evolution, ecology, diffusion, and cyclicism theory.

Prerequisites: ANTH 007, ANTH 008, ANTH 009, ANTH 011, or ANTH 012

Changes Effective Spring 2021:
the additional courses in the Anthropology minor and majors. ANTH 2 is a Prerequisite.

Prerequisite: ANTH 2

Changes Effective Spring 2021:

- Enforced Prerequisite

ANTH 432: Environmental Archaeology (3 Credits)
Old Listing Effective Through Fall 2020:

Introductory course in Environmental Archaeology, with emphasis on method and theory in the subfields archaeobotany, pedoarchaeology, and zooarchaeology. ANTH 432 Environmental Archaeology (3)This class is a survey of the fast-developing field of environmental archaeology, or archaeobiology, which encompasses archaeology, the earth sciences, plant biology, and zoology. Environmental archaeologists apply techniques and insights obtained from these fields to questions concerning the relationships among humans, cultural systems, and the natural world, as reflected in the archaeological record. The general goal of the course is to promote understanding of the vital interplay between human societies, with their diverse systems of belief and cultural practices, and the natural environment, with emphasis on human interactions with biotic resources. Instruction is by lecture, supplemented by laboratory sessions emphasizing hands-on experience. Weekly topics are explored through selected readings and class discussions, augmented with laboratory assignments (practical exercises) variously focused on specific types or classes of archaeobiological materials. ANTH 432 will fulfill 3 credits of the additional courses in the Anthropology minor and major, as well as the Archaeological Science major. Anth 002 is a prerequisite.

Prerequisite: ANTH 002

Changes Effective Spring 2021:

- Prerequisites

ANTH 444: Primitive Warfare (3 Credits)
Old Listing Effective Through Fall 2020:

Critical overview of the ethnography and theory of primitive warfare. ANTH 444 Primitive Warfare (3) Anthropology 444 is concerned with the phenomenon of lethal group violence in tribal societies so called “primitive war”. Through lectures, readings, and research projects, this course reviews anthropological approaches to the study of primitive war, focusing both on ethnographic examples and on theoretical approaches. The course covers topics such as explanations, traditional and modern, for the existence of warfare; the primate background to human warfare; and the social causes and individual motives leading to warfare in tribal societies; as well as its consequences for those societies. Students become familiar with both general and particular manifestations of primitive warfare, and are exposed to individual ethnographic cases of primitive warfare as they motivate a variety of theoretical paradigms. All students are expected to attend all lectures and to complete all weekly readings. At the last class meeting of each week, a rotation of students are assigned to organize and direct the class discussion of the week’s readings in the light of the lectures earlier in the week. Performance in this activity constitutes 40% of the student’s grade. Another 40% is earned in the research term paper each student must prepare. The final 20% of the grade is based on overall student contribution to class discussion, particularly during those weeks when the student is not a discussion leader. There is no final examination. This course can be used to fulfill major and minor requirements in Anthropology. Because warfare was and often still is a major activity in most tribal societies, this course provides an important complement to area-focused ethnography and archaeology courses such as ANTH 241 (Peoples and Cultures of Highland New Guinea), ANTH 422 (Mesoamerica), ANTH 423 (North America), ANTH 425 (American Southwest), ANTH 440 (Lowland South America), and ANTH 447 (Africa). This course is also relevant to topically focused course such as ANTH 450 (Comparative Social Organization), ANTH 451 (Economic Anthropology), ANTH 454 (Political Anthropology), and ANTH 456 (Cultural Ecology). On the graduate level, this course addresses central topics covered in ANTH 522-523 (Ecological Theory in Anthropology), ANTH 556 (Social Organization of Traditional Societies), and ANTH 559 (Behavioral Anthropology).

Prerequisite: ANTH 045 ; and ANTH 002 or ANTH 021

Changes Effective Spring 2021:
• Abbreviated Title
• Prerequisites

**ANTH 446: Mating and Marriage (3 Credits)**  
Old Listing Effective Through Fall 2020:

An examination of human mating mainly from the viewpoint of behavioral ecology, centering on the species-typical institution of marriage. ANTH 446 Mating and Marriage (3) This course is an examination of human mating and marriage mainly (although not exclusively) from the viewpoint of evolutionary behavioral ecology. Its central concern is the species-typical and uniquely human institution of marriage. Why do all human societies recognize this peculiar institution, whose social and biological functions, apparently obvious, become mysterious on close examination? What, exactly, is marriage? What are its consistent characteristics and attributes—or does it have none? How are spouses chosen, and by whom? What does being married imply for the behavior of the spouses, and that of their children and other relatives? What are the evolutionary scenarios that might have led us to marriage? Although sexual behavior is clearly a key element in answering some of these questions, and receives considerable attention, this is not a course on human sexuality. Nor is it a course on kinship, even though kinship is also crucial to understanding marriage and also receives a good deal of attention. Rather, this course attempts to bring to bear on this central social institution bodies of knowledge from the biological and social sciences that may contribute to understanding how and why marriage arose as a universal feature of human societies, and how and why it is perpetuated in contemporary societies. We begin the semester with the posing of the central problem—what is marriage and why do we have it? For about half the course, we approach this question from an evolutionary, sociobiological point of view: We look into the biological background of human mating—its evolutionary history, its physiology, its behavioral ecology, etc. as we go through a semi-popular book on the subject by a biological anthropologist. Next we turn to more academic readings, old and new, that further elucidate the ecological constraints and fitness consequences of various behaviors relating to mating and mate choice, child rearing, etc., in terms of reproductive success, survivorship, etc. In the second half of the course, we take a more social anthropological point of view. We look at what anthropologists have written about marriage and marriage customs over the years. We try to relate the traditional social anthropology to more modern human behavioral ecology. Finally, in a research project report, each student examines some specific of marriage as it is manifested in ethnographically known societies. In these reports we are particularly interested in how and by whom mates and spouses are chosen, and who contributes what to the raising of children.

**Prerequisite:** ANTH 045, ANTH 021

**Changes Effective Spring 2021:**

• Abbreviated Title  
• Prerequisites

**ANTH 448: Ethnography of the United States**  
Old Listing Effective Through Fall 2020:

Ethnographic descriptions of various dimensions of life in the United States. ANTH 448 / AMST 448 Ethnography of the United States (3) Ethnographic descriptions of various dimensions of life in the United States. The course covers uses of ethnography in American Studies toward an understanding of social and cultural communication and performance. The application of ethnography and concepts of cultural anthropology to complex societies such as the United States is discussed. The course teaches students to use ethnographic methods for research of American society and culture. Attention is given to the ethics and issues of ethnographic fieldwork. The course satisfies the “area” requirement in “society” for American Studies majors.

**Prerequisites:** ANTH 45

**Cross-Listed Courses:** AMST 448

**Changes Effective Spring 2021:**

• Prerequisites

**ANTH 453: Anthropology of Religion (3 Credits) (BA)**  
Old Listing Effective Through Fall 2020:

Traditional and modern religions and historical and contemporary religious movements from an anthropological perspective. ANTH 453 Anthropology of Religion (3)(BA) This course meets the Bachelor of Arts degree requirements. This course will examine the origin, evolution and social function of religion from a cultural materialist perspective. It will begin with a general discussion of an anthropological approach to the study of religion, using numerous examples from different cultures for purposes of illustration. Following a discussion of several topics relevant to the anthropological study of religion—including magic, rituals, witchcraft and mythology—the course will focus on the relationship between politics and religion: first discussing the role of religion as a mechanism of social and political control, and then examining the role of religion as a vehicle of sociopolitical change in the form of what anthropologists call revitalization movements. This course links to courses on the sociology, history, and philosophy of religion, to courses on intellectual history, and history of social sciences. Course evaluation will be based on 3 take-home essay examinations. Students will give the instructor 3 questions at indicated times; the instructor will return one question; the student will write an essay on the indicated question. Attendance is mandatory. This course will fulfill a 3 credit 400 level requirement for the Anthropology major and minor.

**Prerequisites:** ANTH 001 or ANTH 045

**Changes Effective Spring 2021:**

• Abbreviated Title  
• Prerequisites

**ANTH 455: Global Processes and Local Systems (3 Credits) (BA)**  
Old Listing Effective Through Fall 2020:

Ethnographic, comparative, historic, evolutionary treatment of global economic, political, and cultural processes and their consequences for local systems. ANTH 455 Global Processes and Local Systems (3) (BA) This course meets the Bachelor of Arts degree requirements. Students will learn about global economic, political, and cultural processes and their consequences for local systems, how anthropologists do ethnography in the modern world of villages and factories; varieties of anthropological approaches and theories and how to assess them and how to critically assess ethnographic work. Students will write a series of book reviews in which they critically analyze the works they read in the course. Each review will present the main argument of the work; the theoretical assumptions the argument entails; the evidence the author used, the methods the author used to develop the evidence; the relationships among theoretical assumptions, arguments, evidence, and methods; and conclusions. Each review will assess the validity and reliability of the findings and the relationships of findings, arguments, and assumptions to the conclusions. These reviews will direct the
student’s attention to the salient points of scientific ethnography and anthropological theory with specific examples. Grades for the reviews will be assigned on the basis of how well each component of the review is completed, short in-class writing assignments to test reading comprehension and orient discussion, and a synthetic essay.

Prerequisite: ANTH 045

Changes Effective Spring 2021:

• Prerequisites

ANTH 456: Cultural Ecology (3 Credits) (BA)
Old Listing Effective Through Fall 2020:

Survey of the methods and concepts of cultural ecology, focusing on the interaction between cultural and geographical systems.

Prerequisites: 3 Credits in anthropology

Changes Effective Spring 2021:

• Prerequisites

ANTH 458: Ethnographic Field Methods (3 Credits) (BA)
Old Listing Effective Through Fall 2020:

Course introduces students to ethnographic field methods, includes student projects and simple analyses that don’t require statistical sophistication. ANTH 458 Ethnographic Field Methods (3)(BA) This course meets the Bachelor of Arts degree requirements. This course is designed to introduce you to some (not all) ethnographic field methods. It will include actual projects you will have to carry out and other material that will make you a better ethnographer, such as how to pose questions that can be answered, how to select an appropriate sample for a project, how to take and use field notes. Because the emphasis is on field methods, we will do only simple analyses that don’t require any statistical sophistication (e.g., descriptive statistics, chi square tests)

Prerequisites: ANTH 045

Changes Effective Spring 2021:

• Prerequisites

ANTH 461: Molecular Anthropology (3 Credits)
Old Listing Effective Through Fall 2020:

Provides framework to understand current issues in biology, genetics, and anthropology as they relate to the evolution of our species. ANTH 461 Molecular Anthropology (3) The aim of this course is to provide students with the framework to understand current issues in biology, genetics, and anthropology as they relate to the evolution of our species. Basic methods in molecular biology, structure of the genome, molecular evolution, and human population genetics will be covered in the first part of the course. Once these tools are in place we will examine both classical and contemporary research reports on a number of topics, including the place of humans among the apes; mitochondrial Eve, DNA in forensics; Neandertal DNA and other applications of ancient DNA; reconstructing recent human evolution’ the biological meaning of race; disease gene mapping; recent technological advances in genomics; skin, hair, and eye color genes; and the genetic future of our species. There will be three exams that will each count for 25% of the grade. Attendance and participation are mandatory and will count for 25% of the final grade. A portion of this participation grade is earned by presenting 10 min. summaries of particular readings. Each student will be expected to summarize a scientific paper four times during the semester. These summaries are not expected to be exhaustive reports on the material, but should reflect an effort on the part of the student to understand and discuss the material and may require some background work.

Prerequisite: 3 credits in biological anthropology or 3 credits in biology

Changes Effective Spring 2021:

• Prerequisites

ANTH 466: The Skull (3 Credits)
Old Listing Effective Through Fall 2020:

Survey of the mammalian skull from many perspectives including evolution, development, anatomy, function, and variability of the skull. ANTH 466 The Skull (3) This course will provide a survey of what is known about the Mammalian skull from many perspectives including evolution, development, anatomy, function, and variability of the skull. The course will consist of lectures and a laboratory component. Students will learn about the basic skull architecture and be introduced to various specializations of extinct and extant species. The section on evolution will cover the evolution of the skull from the earliest jawless vertebrates through human evolution. During the section on development, we will discuss the nature of the formation of bone embryologically. Other topics include the ways in which bone changes shape and size during prenatal and postnatal growth, how changes in growth can result in evolutionary change in morphology. The section on the function of bone will focus on biomechanical interpretations of the morphology of the skull. The lectures will focus on human anatomy but provide contrasts with other mammals (e.g., horse, dog, mouse). The last section on variability will survey the major groups of mammals highlighting similarities and differences in bony architecture and skull morphology. This portion of the course will be more laboratory-based with students examining specimens, taking measurements and leading discussions on hypotheses regarding why skull architecture is so different among mammals. The objective of this course is to provide the student with a broad survey of information relating to the mammalian skull. Through assigned readings and lectures the student will become familiar with salient anatomical and osteological features, obvious differences in skull architecture and the various biological processes responsible for these differences. During the final laboratory part of the course the students will bring their knowledge to an assigned problem and specimen in order to apply what they have learned to a scientific question. Students will be required to attend all lectures and laboratories. Periodic quizzes will be administered as well as an exam at midterm. A paper that focuses on the student’s laboratory experience will be required at the completion of the course.

Prerequisite: A E 444, A E 461

Changes Effective Spring 2021:

• Prerequisites

ANTH 468: Evolution and Development of Human Origins (3 Credits)
Old Listing Effective Through Fall 2020:

In depth analysis of the genetic and developmental basis for phenotypic variation and evolution of humans and primates. ANTH 468 Evolution and Development of Human Origins (3) Recently biology has undergone a revolution regarding our understanding of the mechanisms underlying the evolution and development of animal form. This knowledge has a profound impact on the way we conduct and interpret morphological analyses pertaining to human evolution. In this course we will explore
basic principles underlying Darwinian natural selection and our understanding of the evolution of complex characters. Then we will delve into developmental genetics to explore how the gene regulation can alter spatial and temporal expression patterns during development. We will next conduct a survey the basic embryology of key morphological systems of interest to biological anthropologists including: the axial skeleton and somite formation, limb buds, musculoskeletal system, skull formation, and dental and skin appendage formation. We will also explore issues concerning skeletal plasticity, fossil analysis, and comparative genomics. Discussion particular case studies related to human and primate evolution and morphological variation will illustrate the principles discussed in this course.

Prerequisites: ANTH 021

Changes Effective Spring 2021:

ANTH 470: Our Place in Nature (3 Credits: Maximum of 3 Credits) (H)

Old Listing Effective Through Fall 2020:

An in-depth consideration of humanity's behavioral origins as biological beings through natural selection. ANTH 470 Honors Our Place in Nature (3) The title "Our Place in Nature" takes off from T.H. Huxley's famous book in 1863 that put humans in rather than outside of nature, and the idea of the course is to place humans in the context of organic evolution both specifically and as a kind of general "model" organism (for example, genomic, phylogenetic, and comparative perspectives will be included). We will take a theme (one or more related topics, depending on enrollment, timeliness, etc.), which students will be assigned to work on singly or in groups. We'll first read from the historical, comparative, and evolutionary literature to see how "Our Place in Nature" relative to that theme, was first argued. Then we will follow the literature in evolutionary, developmental and genetic biology to the present to see how our current understanding of the trait evolved. Current research, especially on developmental and genetic aspects of the trait, will be examined in depth. We'll pay special attention to research strategies, comparative and genomic approaches, and latent working assumptions that help or hinder our explanations. The sociocultural context will be considered throughout, including the implications for society of our changing scientific assessment of the trait. As an Honors course, we will have the time, and the students the dedication, to pursue the chosen topic(s) in much greater and more rigorous detail than is possible in the usual lecture or even seminar course formats. The students who enroll for this course will be given a description of the approach and the intended general topic, on a course web page or by email when I learn they have registered. Requisite background reading will be identified so students will know what will be expected of them. Some prior reading will be assigned, so that we can begin the semester with a common basis in background. The course will assume the level of knowledge such as can be obtained in one of several recent "Evolution" texts, an understanding of modern genetics and genetic methodology, basic statistics, and a general work on the history and philosophy of science and evolutionary thinking (initially, probably J.A. Moore's Science as a Way of Knowing). This substantial background requirement is based on this being an upper-level class; for good students to get what good students deserve at a good university, we need to be able to start at a high level. Evaluation will stress original synthetic thought and investigation rather than memorized factual recapitulation. Work groups will tackle particular problems, present them, and turn in written products. There will be a written take-home synthetic essay exam. There will be other written assignments summarizing assigned reading or topics to keep students on track. The class will generally be based on oral discussion and/or be run in Socratic Q&A format. Evaluation will include a major component related to attendance and to level and quality of in-class participation, acquired knowledge and quality of thought and communication. This course will build on, and incorporate, knowledge acquired in physical anthropology, evolutionary biology, statistics, and genetics courses and will count as 3 credits toward the additional courses in biological anthropology required for the Anthropology major.

Prerequisite: An introductory course in biological anthropology, biology or a social science.

Changes Effective Spring 2021:

ANTH 472: The Ecology of Traditional Farming (3 Credits)

Old Listing Effective Through Fall 2020:

This course will examine the ecology of traditional farming, focusing on the farming household, its farm, and its subsistence needs.

Prerequisite: ANTH 045 or equivalent

Changes Effective Spring 2021:

ANTH 476: Anthropology of Gender

Old Listing Effective Through Fall 2020:

Cross-cultural construction of gender and sex roles; theories of gender construction; case studies and practical effects. ANTH 476 / WMNST 476 Anthropology of Gender (3) Students will learn the current theoretical approaches in anthropology to the cultural construction of gender and sex roles. The first 2-3 weeks of the course will concentrate on exploring and understanding these theoretical approaches. The remaining weeks will focus on case studies of non-western gender systems, and on the practical effects of those systems, but students will also be encouraged to relate these systems to their own experience. Each meeting will be based on discussion of the readings assigned for that meeting and students will be expected to participate. During the period devoted to theoretical approaches, discussion will focus on the assumptions, advantages, and disadvantages of each approach. For the part of the course devoted to readings on individual societies, one reading each week will be the basis for a critical essay of approximately five pages. These essays will be expected to include: 1) an identification of the theoretical approach that informs the work, 2) a statement of the author's arguments or questions, 3) a discussion of the methods used to provide data in support of the arguments or to answer questions, 4) a critique of the adequacy of data, and 5) a statement suggesting which additional elements might make for a better study. These essays will be graded for both content and form and students will have the option of rewriting essays (and improving their grade) after they receive comments. These essays will provide 60% of the course grade, while participation in discussions will provide another 15%. A short research paper will also be required. The paper must focus on a question or hypothesis concerning gender, and a preliminary proposal that includes the focus of the paper, its relevance to the course, and a beginning bibliography is required. A first draft of the paper will be required two weeks before the end of the semester. The research paper will provide 25% of the course grade. The course complements other courses in Anthropology that deal with sex
differences, but will provide a perspective on gender that is not available elsewhere in the curriculum. The course can be used to fulfill a Behavioral Anthropology requirement in both the major and minor in Anthropology and a writing across the curriculum requirement. It will also provide students in other departments with the opportunity to study aspects of diverse, non-western cultures. The course is currently identified as one that may be taken to fulfill the requirements of the Women’s Studies minor.

Cross-Listed Courses: WMNST 476(LA)

Changes Effective Spring 2021:

ANTH 492: Intermediate Field Methods (3-6 Credits: Maximum of 6 Credits)
Old Listing Effective Through Fall 2020:

On-site experience in collecting archaeological, behavioral, or biological data.

Prerequisite: ANTH 002

Changes Effective Spring 2021:

• Add Travel Component
• Prerequisites

ANTH 493: Field Techniques (3-6 Credits: Maximum of 6 Credits)
Old Listing Effective Through Fall 2020:

Training in techniques involving analyses of archaeological, behavioral, or biological data.

Prerequisite: ANTH 002

Changes Effective Spring 2021:

• Add Travel Component
• Prerequisites

ANTH 495: Internship (1-18 Credits: 18 Credits)
Old Listing Effective Through Fall 2020:

Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

Prerequisite: prior approval of proposed assignment by instructor

Changes Effective Spring 2021:

• Remove Prerequisites

ART 165: Artistic Concepts of Space (3 Credits) (GA)
Old Listing Effective Through Fall 2020:

A studio course that utilizes lecture and varied media experiences to investigate space as artistic expression. ART 165 Artistic Concepts of Space (3) ART 165 Artistic Concepts of Space is a hands-on studio course supplemented by lecture. It utilizes various media experiences to investigate notions of space in artistic expression. Explorations will include traditional ways of depicting and constructing space as well as contemporary approaches. Both 2-D and 3-D studio investigations will be employed. A lecture component will provide a historical and cultural backdrop upon which students may better understand the role of special depiction in artistic expression.

Changes Effective Spring 2021:
Old Listing Effective Through Fall 2020:

**ARTH 112U: Renaissance to Modern Art (3 Credits) (IL) (GA) (HON)**

Changes Effective Spring 2021:

- Recertification
- Add BA Attribute
- Description

**ART 168: The Digital Medium (3 Credits) (GA)**

Old Listing Effective Through Fall 2020:

A studio course where the computer is introduced as an artistic media. ART 168 The Digital Medium (3) This course will provide a much needed introductory technological/digital component wherein computing will be discussed as a media, rather than a tool. Students will be engaged in the creation of artistic manifestations of individual interpretations surrounding themes and concepts introduced in class. Each unit of the course will build upon the next resulting in a knowledge base of the possibilities of what the digital medium includes. Students will be asked to demonstrate their knowledge of the medium with a culminating final project that uses at least four of the techniques demonstrated in class. The final project will be determined by the student, manifestations may include a web site, short film, installation, projects, or performance.

Changes Effective Spring 2021:

- Recertification
- Add BA Attribute
- Description

**ARTH 301: Egyptian and Mesopotamian Art (3 Credits) (IL) (GA)**

Old Listing Effective Through Fall 2020:

Art of the Ancient Near East, including Egypt, Mesopotamia, and neighboring civilizations. ART H 301 ART H 301 Egyptian and Mesopotamian Art (3) (GA) (IL) (BA) This course meets the Bachelor of Arts degree requirements. Art history 301 provides an introduction to the arts of the Ancient Near East including those of Egypt and Mesopotamia. The class is dealt with chronologically. Works studied in class include papyri, seals, fabric, codices as well as sculpture, architecture, and painting. Additional readings of primary sources focused on mythology, and religion will form a key element in the structure of the class. The course is designed to meet two principal goals. The first is to increase students' powers of visual analysis and help them build a critical vocabulary for discussing an art object's medium, composition, style, and iconography. The second is to foster an understanding of the deep implication of the visual arts in their social and cultural contexts. The course therefore involves significant material relating to political, economic and religious issues. It investigates problems in patronage, function, reception and censorship. It considers such intra- and cross-cultural issues as representations of gender. Requirements include essay exams and at least one paper. As a general education course in the arts, this course provides an introduction to Ancient Near Eastern and Egyptian art to a student of any major. This course has no prerequisite, and assumes no prior exposure to fine art. Students majoring in Art History will learn in it both the common vocabulary of the field and the outlines of the field that form the foundation for future study.

Changes Effective Spring 2021:

- Recertification
- Description

**ARTH 112U: Renaissance to Modern Art (3 Credits) (IL) (GA) (HON)**

Old Listing Effective Through Fall 2020:

Survey of Renaissance, Baroque, Rococo, Romantic, Modern, and Contemporary art, with an emphasis on painting, sculpture, and graphic arts.

Changes Effective Spring 2021:

- Recertification

**ARTH 111U: Ancient to Medieval Art (3 Credits) (IL) (GA) (HON)**

Old Listing Effective Through Fall 2020:

Greek and Roman art, with emphasis on painting and sculpture. ART H 311 ART H 311 Greek and Roman Art (3) (GA) (IL) (BA) This course meets the Bachelor of Arts degree requirements. Art History 311 provides a survey of Greek and Roman art. Included are the Orientalizing, Archaic, Classical and Hellenistic periods of Greece and the Republican and Imperial Rome. Special attention is paid to politics, culture, and literature. The focus of this class is painting, sculpture and architecture; ceramics and other minor arts are also addressed. The course is designed to meet two principal goals. The first is to increase students’ powers of visual analysis and help them build a critical vocabulary for discussing an art object’s medium, composition, style, and iconography. The second is to foster an understanding of the deep implication of the visual arts in their social and cultural contexts. The course therefore involves significant material relating to political, economic and religious issues. It investigates problems in patronage, function, reception and censorship. It considers such intra- and cross-cultural issues as representations of gender. Requirements include essay exams and at least one paper. As a general education course in the arts, this course provides an introduction to Ancient Greek and Roman art to a student of any major. This course has no prerequisite, and assumes no prior exposure to fine art. Students
majoring in Art History will learn in it both the common vocabulary of the field and the outlines of the field that form the foundation for future study.

Changes Effective Spring 2021:

- Recertification
- Description

ARTH 326: Art Since 1940
Old Listing Effective Through Fall 2020:

An international survey of painting, sculpture, photography and other media since 1940. ART H 326 Art Since 1940 (3) (GA;US;IL)(BA)

This course meets the Bachelor of Arts degree requirements. This course offers a survey of art objects and practices after 1940. The class is international in scope, exploring the ways in which artists of different countries have responded to each other's work, and to international cultural and political events. Though the class will develop chronologically, lectures will be thematic in their emphasis. Topics to be covered include Abstract Expressionism, Pop Art and other forms of art relying upon methods of appropriation, Minimalism, Conceptualism, Fluxus and Performance Art, Land Art and Site-Specificity, and Art in protest movements (such as the Civil Rights movement). The course will also address such larger issues as: 1) the means by which art works engage in critiques of racial, sexual and national identity; 2) the political uses to which contemporary art has been put (often by figures other than the artists); 3) the dominant critical paradigms through which art has been filtered; 4) the relationship of art works to commodity culture and late capitalism; 5) and the ways in which contemporary art works challenge notions of exhibition, patronage, and ownership of art. This course should be of interest to students of Art History as well as to students interested in post-war history, literature and intellectual culture. It should also be of use to those enrolled in studio art, architecture and other practicum areas.

Changes Effective Spring 2021:

- General Education Recertification

ARTH 350: Undergraduate Seminar in the History of Art (3-6 Credits, Repeatable) (BA) (WAC)
Old Listing Effective Through Fall 2020:

An introduction to original research, methodology, analysis, and writing on a scholarly level.

Prerequisite: fifth-semester standing, 6 credits in art history at the 300 level or above

Changes Effective Spring 2021:

- Credits
- Enforced Prerequisite

ARTH 399: Foreign Study--Art History (1-12 Credits) (BA) (IL)
Old Listing Effective Through Fall 2020:

Courses offered in foreign countries by individual or group instruction.

Prerequisite: ARTH 100 or ARTH 110 or ARTH 111 or ARTH 112

Changes Effective Spring 2021:

- Remove Prerequisite

ARTH 401: Greek Art and Architecture (3-9 Credits, Repeatable) (BA) (IL)
Old Listing Effective Through Fall 2020:

Developments in Greek art and architecture, tenth century B.C. to first century B.C.; emphasis on the importance of Greek sanctuaries.

Prerequisites: ARTH 100, ARTH 111, ARTH 201, or ARTH 311

Changes Effective Spring 2021:

- Enforced Prerequisite

ARTH 402: The Illuminated Manuscript (3 Credits) (BA) (IL)
Old Listing Effective Through Fall 2020:

Specific stylistic periods in manuscript painting from A.D. 500-1500 in Western Europe and Byzantium.

Prerequisite: ARTH 100, ARTH 111, ARTH 302, ARTH 312

Changes Effective Spring 2021:

- Enforced Prerequisite

ARTH 405: Pioneers of Modern Architecture (3-6 Credits: Maximum of 6 credits) (BA) (IL) (US)
Old Listing Effective Through Fall 2020:

Selected period or theme in the development of modern architecture during the nineteenth and/or early twentieth centuries.

Prerequisite: ARTH 100, ARTH 112, ARTH 202, or ARTH 307

Changes Effective Spring 2021:

- Credits
- Enforced Prerequisite

ARTH 410: Taste and Criticism in Art (3 Credits) (BA)
Old Listing Effective Through Fall 2020:

History and literature of art criticism demonstrating the varied philosophic, cultural, iconographic, technical, and visual approaches.

Prerequisite: 6 credits of art history

Changes Effective Spring 2021:

- Enforced Prerequisite

ARTH 411: Roman Art (3-9 Credits: Maximum of 9 Credits) (BA) (IL)
Old Listing Effective Through Fall 2020:

Roman sculpture and painting from Augustus to Constantine.

Prerequisite: ARTH 100, ARTH 111, ARTH 201, or ARTH 311

Changes Effective Spring 2021:

- Credits
- Enforced Prerequisite

ARTH 412: The Gothic Cathedral (3 Credits) (BA) (IL)
Old Listing Effective Through Fall 2020:

Specific aspects of Romanesque and Gothic church architecture of western Europe, especially France and England, between 1000-1500.
Precedents to explore both the sensuous aspects of the medium of oil painting and their own increasingly subjective vision. In all the visual arts Baroque masters explored space, mass, and form with a heretofore unheard of freedom and drama. Lectures and discussion in the course may focus on painting, sculpture and/or architecture, in Italy, Flanders, France, Holland, and/or Spain. The course may include selected artists such as Bernini, Borromini, Caravaggio, A. Gentileschi, Poussin, Rembrandt, Rubens, Velazquez, and/or Vermeer. The style and meaning of Baroque art may be studied within its political and cultural setting. For example, new approaches in the visual arts in Italy, and particularly in Rome, may be explored in relation to the rise of the counter reformation. The Spanish war in the Netherlands, and the Dutch struggle for freedom, may be connected with the art of Flanders and Holland. Attendant developments in other fields such as natural philosophy (science) and literature may be related to the visual arts. For example, the use of the camera obscura may be discussed with the art of Jan Vermeer and the poetry of Giambattista Marino may be related to the art of Nicolas Poussin. Aesthetic, critical, interpretive, and theoretical ideas of major artists and writers of the seventeenth century as well as of today’s art and cultural historians may be considered. The emergence of new genres such as landscape and still-life may be examined, as well as the continuing themes of mythology, portraiture, and religion. Course objectives may include students’ understanding of the national and regional development of styles and schools within seventeenth-century art, the particular approaches to style and meaning by major artists of the period; the analysis of symbolism and meaning within art works of the period; the interrelationship between the art of the period and other disciplines such as natural philosophy and literature, and particular ways in which seventeenth-century art relates to the politics of particular countries, regions, and patrons. This course may serve as an elective for undergraduate students interested in the visual arts and art history, and for graduate students seeking a deeper exposure to art history. Evaluation may be accomplished through a combination of exams, quizzes, term papers, special projects, and participation in class discussion. Special facilities include a darkened room with dimmable spot lighting, computer, computer projector, and a large projection screen.

Prerequisite: 6 credits in art history (ART H)

Changes Effective Spring 2021:
- Enforced Prerequisite

ARTH 435: Studies in Modern Art (3-6 Credits: Maximum of 6 credits) (BA) (IL)
Old Listing Effective Through Fall 2020:
Lectures focusing on a selected movement of nineteenth- or twentieth-century art.

Changes Effective Spring 2021:
- Credits
- Enforced Prerequisite

ARTH 429: Studies in Baroque Art (3 Credits) (IL)
Old Listing Effective Through Fall 2020:
Selected topics in the painting, sculpture, and architecture of seventeenth-century Italy, France, Flanders, Holland, and Spain. ART H 429 Studies in Baroque Art (3) (IL) This course addresses aspects of European art of the seventeenth century, a rich and complex period in which illusionism and powerful visual effects in the arts reached maturity. Baroque painters went beyond the realism of their Renaissance predecessors to explore both the sensuous aspects of the medium.
historical and cultural contexts. Students are also exposed to various theoretical approaches through which these monuments will be studied. Some of the themes around which the course is structured include patronage, religious practice, cultural meaning, political relevance and the shifting meanings of monuments over time. Students will learn to understand and discuss ways of defining monuments, their formal character and lineage, historical and cultural contexts and their representation across space and time. Each semester monumental sites will be organized around a common theme such as, "Hindu and Buddhist Sites across Asia: Historical Significance and Contemporary Relevance," or "Islam across Asia: Global Ideas and Local Contexts." Political and Symbolic Centers in Asia: Between Early Modernity and the Nation State; or "Early Modern Asia: Empire and the Built Environment." Alternately, these topics will be incorporated within a multi-themed structure. The objective of the course is to expose students to the histories and cultures of Asia in a globalizing world. Another objective is to equip students with the methodological tools of art history as a discipline, even as they learn about specific monuments. The course will build on the foundation laid by survey courses in Art History, Architectural History and Asian Studies. Weekly readings will be assigned and discussed in class. The development of analytical and writing skills will be stressed, and grades will be based partly on essay exams and short response papers. In addition, students will write a research paper, to be completed by the end of semester.

Prerequisite: ARTH 100 or ARTH 120 or ARTH 315 or ARTH 320 or ARTH 330

Cross-Listing: ASIA 440

Changes Effective Spring 2021:

• Credits
• Remove Prerequisite

ARTH 442: Late Antique and Early Christian Art (3 Credits) (BA) (IL)
Old Listing Effective Through Fall 2020:

Survey of the architecture, painting, and minor arts of Christian society from the beginning to the mid-sixth century.

Prerequisite: ARTH 100, ARTH 111, ARTH 201, or ARTH 302

Changes Effective Spring 2021:

• Description
• Remove Prerequisite

ARTH 450: The History of Photography (3 Credits) (BA) (IL) (US)
Old Listing Effective Through Fall 2020:

The history of photography from 1839, with particular emphasis on the relationship with the plastic arts.

Prerequisite: ARTH 100, ARTH 112, ARTH 305, ARTH 307, or ARTH 325

Changes Effective Spring 2021:

• Enforced Prerequisite

ARTH 452: Byzantine Art (3 Credits) (BA) (IL)
Old Listing Effective Through Fall 2020:

Monumental and minor arts of Byzantium and related areas from the reign of Justinian to the Turkish conquest of Constantinople.

Prerequisite: ARTH 100, ARTH 111, ARTH 201, or ARTH 302

Changes Effective Spring 2021:

• Enforced Prerequisite

ARTH 456: Renaissance and Baroque Palaces (BA) (IL)

This course examines palace architecture and decoration in Italy, France, England, and Germany from 1450-1700.

Prerequisite: ARTH 100, ARTH 112, or ARTH 202 or ARTH 303, or ARTH 304

Changes Effective Spring 2021:

• Enforced Prerequisite

ARTH 458: The City 1600-1800 (3 Credits) (BA) (IL)
Old Listing Effective Through Fall 2020:

This course examines the architecture and urbanism of cities from 1600-1800. This course will examine what transformed the cities into centers of power, culture, and learning. We will look at new building types, the creation of civic institutions, and changes in the urban plan. The course will therefore provide an overview of the architecture and urbanism of the period and also explore the political and social contexts that made them possible. Topics include capitals of great political importance such as Paris, Beijing, and London as well as smaller centers like Turin and Lisbon that underwent major urban and architectural transformations. The social function of buildings that mark these capitals, from poor houses to opera houses, will also be explored. Primary and secondary reading, ranging from Pepy's Diary to Habermas' examination of the public sphere will offer period accounts as well as conceptual frameworks for understanding the capital. The objective is to challenge students to think deeply about our urban environment and its debts to this earlier era. This course fulfills elective and 400-level requirements in Art History and General Education (IL), but it is also designed to complement concentrations in History, Music, and Architecture.

Prerequisite: ARTH 202; ARTH 304; ARTH 100; ARTH 112; ARTH 314; ARTH 120; ARTH 140; ARTH 315

Changes Effective Spring 2021:

• Remove BA Attribute
• Enforced Prerequisite

ASM 327: Soil and Water Resource Management (3 Credits)
Old Listing Effective Through Fall 2020:

Soil and water management systems and practices including hydrology, surface drainage, open channels, and erosion, subsurface drainage, impoundments and irrigation.

PREREQUISITE: PHYS 250

Changes Effective Spring 2021:

• Description
• Prerequisites
BA 495A: Business Internship (3-6 Credits: Maximum of 6 Credits)
Old Listing Effective Through Fall 2020:
B A 495A Business Internship (3-6 per semester/maximum of 6) B A 495A facilitates the application of students' prior classroom learning in a field setting. This course is one of a series in the business program which collectively develop the skills and competencies necessary for success as a business administration student. The course is designed to provide students with a firsthand opportunity to experience the challenges and rewards of the business professional. Essentially, an internship bridges the gap between the academic environment and the professional environment. Internships provide an opportunity for students to link theory with practice in a nonacademic setting. Internships provide practical, real-world experiences which cannot be simulated in the classroom. Upon successful completion of an internship, students will: • Have a better understanding of employer expectations related to career advancement. • Have an enhanced strategic view of the industry/business segment in which they worked. • Have experience integrating and using their knowledge and skills from the classroom. • Have increased awareness of professional and technical areas of strengths and weakness.
Prerequisites: BA 321, BA 322, BA 420, and completion of 6 credits at the 300- or 400-level in the student’s option
Changes Effective Spring 2021:
• Prerequisite

BA 495B: Undergraduate Research in Business (3-6 Credits: Maximum of 6 Credits)
Old Listing Effective Through Fall 2020:
B A 495B Undergraduate Research in Business (3-6 per semester/maximum of 6) B A 495B provides students an opportunity to apply prior coursework to address a business problem or research question in far greater depth than a traditional research paper. This course is one of a series in the business program which collectively develop the skills and competencies necessary for success as a business administration student. The course provides the students with an opportunity to work intensively on a research project of extended duration and depth of analysis with a supervising faculty member. This course introduces the students to conducting business research on a more advanced level. Students will have the opportunity to develop the research question(s), read extensively in the academic literature, gather and analyze data, and thereby extend learning from prior coursework in a research setting.
Prerequisites: BA 321, BA 322, BA 420, and completion of 6 credits at the 300- and 400-level in the student’s option
Changes Effective Spring 2021:
• Prerequisite

BBH 146: Introduction to Health and Human Sexuality (3 Credits)
(GHA)
Old Listing Effective Through Fall 2020:
An examination of human sexuality as it relates to health.
Changes Effective Spring 2021:
• General Education Recertification
• Abbreviated Title
• Description

BBH 310: Research Strategies for Studying Biobehavioral Health
Old Listing Effective Through Fall 2020:
Surveys the various research methodologies used in biomedical research, including case, epidemiological, quasiexperimental and experimental approaches.
Prerequisites: Enforced Prerequisite at Enrollment: BBH 101 and STAT 200
Changes Effective Spring 2021:
• Abbreviated Title
• Description
• Enforced Prerequisites

BE 301: Mathematical Modeling of Biological and Physical Systems (3 Credits)
Old Listing Effective Through Fall 2020:
The ability to quantify relationships into mathematical models, and implement the models into the computer to find solutions, is essential for engineering analysis and design. This course provides the student with tools for modeling biological and physical systems. Upon completion of this course, the student will be able to: identify a process/system and represent that process/system mathematically; solve the mathematically-represented system using computer-based modeling tools, such as Excel and MATLAB; describe the emphasis areas offered in the Biological Engineering major; and be able to develop a systems model related to each area. The course includes engineering economics, matrix operations, curve fitting, numerical integration and differentiation, linear and nonlinear systems of equations, and applications of these methods to biological and agricultural systems.
Prerequisites: MATH 251
Changes Effective Spring 2021:
• General Education Recertification
• Abbreviated Title
• Description

BE 302: Heat and Mass Transfer in Biological Systems (4 Credits)
Old Listing Effective Through Fall 2020:
Engineering applications of the fundamentals of heat and mass transfer to natural and engineered biological systems. B E 302 Heat and Mass Transfer in Biological Systems (4) This course applies the principles of heat and mass transfer to the engineering of biological systems, ranging from soil/water ecosystems to animal, plant, and microbial production
systems. Heat transfer mechanisms (conduction, convection, and radiation) are covered, as well as analysis techniques for steady state and transient cases. Mass transfer mechanisms (diffusion, dispersion, and convection) are also covered followed by simultaneous heat and mass transfer, including psychrometrics, ventilation, and drying. Applications of heat and mass transfer to agricultural and biological engineering are interwoven throughout the course. These applications may include heat exchangers for hydraulic systems, flow through porous media, soil freezing and thawing, bioreactor design, post-harvest product storage, animal housing, and greenhouses.

Prerequisite: MATH 231, MATH 251, B E 301, M E 300. Prerequisite or concurrent: C E 360 or M E 320

Concurrent: C E 360 or M E 320

Changes Effective Spring 2021:

- Abbreviated Title
- Description
- Prerequisites

**BE 303: Structural Systems in Agriculture (3 Credits)**

Old Listing Effective Through Fall 2020:

Engineering analysis and design of structural systems in agriculture; topics: loads, connectors, analysis and design of structural members and systems. B E 303 Structural Systems in Agriculture (3) The objective of this course is to provide the student with the essential skills necessary to engage in practical agricultural structure analysis and design. Topics include a review of shear, moment and deflection concepts; loading in agricultural structures including earth loads, grain loads and livestock loads; methods for the analysis of determinate and indeterminate beams, trusses and frames; the material properties of wood including impact of species, grain orientation, degree of hydration, etc., on member adequacy. The nano and molecular structure of wood is also discussed and how it impacts material properties. A lecture is also presented including ethics in the workplace including issues related to new materials technologies. Lectures are focused on the practical application of basic engineering principles with examples. The lab period contains a substantial design analysis project where a student team analyzes an industrially designed structure (typically a post-frame building containing a truss roof system), which has been designed for a specific area. The team then redesigns the structure for a different location with different snow and wind loadings as well as intended usage, and optimizes the structure for efficient design of the structural members. The design and analysis uses a common industrial software package. There are also field trips near the end of the class to tie everything together. The course will serve as a prerequisite for senior-level structural design.

Prerequisite: E MCH 210 or E MCH 213

Changes Effective Spring 2021:

- Description

**BE 304: Engineering Properties of Food and Biological Materials (3 Credits)**

Old Listing Effective Through Fall 2020:

Engineering properties play a crucial role during the analysis, design, and synthesis phases of problem solving. The accurate knowledge of properties is essential to the precise determination of the overall system and component responses. Due to the time-dependent and environmentally-sensitive nature of properties of the agricultural, food, and biological materials, the theory and measurement systems are different from those used for conventional engineering materials and their systems. Therefore, the focus of this course is to provide the students with sound bases of the theory and measurement methods that are used to quantify physical, mechanical, thermal, biological, and chemical properties of products and their systems. In addition, the significance and importance of the inherent variation in the property values of agricultural, food, and biological materials is emphasized.

Prerequisites: (EMCH 210; EMCH 213), MATH 251 CONCURRENCE: BE 301, (CE 360; ME 320)

Changes Effective Spring 2021:

- Prerequisites
- Add Concurrents

**BE 306: Machines for Agricultural and Biological Processing (3 Credits)**

Old Listing Effective Through Fall 2020:

Application of machine systems to agricultural production and biological processing machinery. Functional design and analysis of equipment. B E 306 Machines for Agricultural and Biological Processing (3) This course is designed to provide a broad foundation for understanding machine system design for biological engineering students. In addition, this course serves as a foundation for those wishing to develop a more focused understanding of agricultural and general machine systems, and is a Prerequisite for B E 400 level courses. Machine systems are an integral part of many agricultural operations from field production to post-harvest processing, storage, transportation, and bio-based processing. Biomass feedstock logistics and bioenergy production systems are heavily relying on machine systems. Biological engineers will likely encounter a wide range of powered and automated equipment in their careers. This course consists of lectures, labs, and open-ended design projects. The lab activities will focus on testing and evaluating of machine performance using prototype machines and instruments. Lab activities and design projects will be completed in the format of small groups. This course equips the students to: (1) describe operating characteristics of engines and motors and properly select models for different applications; (2) design machine elements and mechanical power transmission systems to accomplish a machine task; (3) apply basic physics and engineering principles in a variety of machine-product interaction situations; and (4) practice technical report writing and oral presentation.

Prerequisite: EMCH 212, EMCH 210 or EMCH 213

Changes Effective Spring 2021:

- Abbreviated Title
- Description
- Prerequisite

**BE 307: Principles of Soil and Water Engineering (3 Credits)**

Old Listing Effective Through Fall 2020:

Utilization and engineering of soil-water resources; including rainfall-runoff, soil-water movement, erosion/sediment transport and flow processes. B E 307 Principles of Soil and Water Engineering (3) The two 50-minute class periods will focus on exploration of the underlying principles, equations, and importance of each of the topics to be covered. The two-period lab sessions will be used to explore each topic in a
practical and experiential mode, with class participants sharing in discussions, lab activities, and explanations/presentations of project items. Weekly quizzes and periodic exams (somewhat evenly distributed during the semester) will be given during the lab period at appropriate stages of the course (likely after each major topic). The lab activities will focus on using representative soil profiles, cropping-management systems, and watershed-scale settings common to the immediate Centre County region as the basis for the experiential learning. Lab activities will sequentially build from one lab period to the next, showing how each stage of soil and water engineering is used to develop a more complete watershed-type project. Labs will involve in-class activities and field trips including map use, problem formulation, team problem solving, discussions, and reports/presentations by class participants. Participants will be expected to gather information and conduct some analyses outside of the class meeting times so as to complete the required lab projects. As appropriate, field trips will be scheduled so as to show course participants the practical settings in which basic soil and water engineering principles can be applied. The course will serve as a course preceding the senior-level soil and water engineering design courses in the Natural Resources Engineering Option of the Biological Engineering (B E) major.

Prerequisite: C E 360 or M E 320
Concurrent: C E 360 or M E 320

Changes Effective Spring 2021:

• Abbreviated Title
• Description
• Concurrents

BE 460: Biological Engineering Design I (2 Credits) (WF)
Old Listing Effective Through Fall 2020:

BE 460 is part one of a two course sequence that provides a culminating design experience for students in the Biological Engineering major. Students will develop skills and techniques for managing and executing engineering design projects in the following fields: agricultural engineering, food and biological processing engineering, and/or natural resource engineering. Projects are sponsored by faculty, industry, or community initiatives and are structured to span two semesters. In the Fall semester, the emphasis is on classroom lectures, preliminary analyses, and project proposal development. In the Spring semester, the emphasis is on hands-on laboratory activities, project execution, and report preparation. Project teams perform all facets of the design process. This includes problem identification, planning of the project, formulation of design specifications, development and evaluation of alternative conceptual designs, development of detailed designs, consideration of safety and design optimization, design implementation, design testing, and analysis and documentation of results. Students improve their writing skills through preparation and refinement of various documents including a design notebook, proposal, statement of work, design specification report, status reports, and a final report. Students also present their results in other formats, including poster and oral presentations for both technical and non-technical audiences.

Prerequisite: B E 301 ; B E 391 ; 7th semester standing

Changes Effective Spring 2021:

• Prerequisites

BE 461: Design of Fluid Power Systems (3 Credits)
Old Listing Effective Through Fall 2020:

Hydraulic systems, hydrostatic transmissions, electro-hydraulic systems in application to agricultural production and processing systems. B E 461 Design of Fluid Power Systems (3)This course is designed to provide a solid foundation for understanding hydraulic and pneumatic systems for power transmission and motion control. Applications include mobile and stationary equipment. Biological Systems Engineers (and other engineers as well) will likely encounter a wide range of powered and automated equipment in their careers. This course equips the students to: (1) understand the key operating characteristics of most fluid power system components including compressors, pumps, valves, cylinders, and motors, (2) design fluid power circuits, (3) mathematically model the steady-state operation of fluid power systems, and (4) have sufficient knowledge to obtain the Hydraulic Specialist Certification offered by the Fluid Power Society. The course includes a hands-on laboratory offering the chance for students to construct circuits, see component cutaways, experience component and system performance demonstrations, and work with electronic control of hydraulic systems.

Prerequisite knowledge includes fluid mechanics and familiarity with mechanical power transmission systems. The course grade is based on homework assignments, laboratory reports, a design project, and exams.

Prerequisites: BE 306 or ME 360; CE 360 or ME 320

Changes Effective Spring 2021:

• Abbreviated Title
• Description
• Prerequisite

BE 462: Design of Wood Structures (3 Credits)
Old Listing Effective Through Fall 2020:

Structural properties of wood; design of wood structural elements; design of wood structural systems; design of post-frame buildings. B E 462 Design of Wood Structures (3)This course begins by defining the structural loads applicable to wood framed building systems. The course then introduces students to the unique physical and structural characteristics of solid lumber and other wood products, such as plywood and other panel products and structural composite lumber, including laminated veneer lumber, parallel strand lumber and composite wood I-joists. The engineering principles and specifications for designing wood structural members, including tension members, beams, columns, and beam-columns are presented in detail using the National Design Specification for Wood Design. Design specifications for designing wood structural connections using dowels, such as nails, bolts and lag-screws, are presented. Design procedures for designing selected wood-frame systems, such as floors, trusses, structural diaphragms and shear walls, are also presented. Students are introduced to a computer program which is an invaluable aid for analyzing and designing wood framed structural systems. At the conclusion of the course students will be able to specify structural loads for wood framing systems and analyze and design wood beams, columns, beam-columns, typical wood diaphragms and shear walls, simple wood structural systems, and a range of wood structural connections. The course builds on engineering students' prior knowledge from strength of materials and elementary structural analysis. Students are evaluated based on homework assignments, exams and a semester project.

Prerequisite: B E 303 , A E 308 , or C E 340
Changes Effective Spring 2021:

- Abbreviated Title
- Description
- Prerequisites

**BE 464: Bioenergy Systems Engineering (3 Credits)**

Old Listing Effective Through Fall 2020:

Fundamental theories and applied technologies for production and conversion of biomass into energy and co-products. Students may take only one course from B E 464 and A B E 884 for credit. B E 464 Bioenergy Systems Engineering (3) in the coming decades biomass will play an increasing role in satisfying society's energy and material needs, providing a renewable alternative to fossil fuels. This course will cover the fundamental theories and applied technologies used in production and conversion of biomass into transportation fuels, heat, power, electricity, chemicals and other value-added products. Production strategies focus on sustainable cropping systems, harvest, storage, and pretreatment for diverse biomass feedstocks. Conversion technologies covered include ethanol fermentation, biodiesel catalysis, combustion, pyrolysis, gasification, anaerobic digestion, and emerging processes. System analysis will address worker safety and health, environmental impacts, policy, and economics. The course is recommended for students in engineering and science majors with a background in thermodynamics, chemistry, and biochemistry or microbiology. Evaluation will be based on class participation, homework, quizzes, exams, and a team design project.

Prerequisite: EME 301 or M E 201 or M E 300 or CH E 220 ; Prerequisite or concurrent: B E 308 or CH E 340 or C E 479

Changes Effective Spring 2021:

- Description
- Prerequisites
- Concurrency

**BE 465: Food and Biological Process Engineering (3 Credits)**

Old Listing Effective Through Fall 2020:

Reactor design, kinetics, fluid flow, thermal processes, and other topics applied to the design of systems for the food and biological process industry. B E 465 Food and Biological Process Engineering (3) Learning objectives. At the end of this course students will be able to: 1. Use and convert units and dimensions applicable to food processing 2. Apply laws of conservation of mass and energy 3. Evaluate time and temperature profiles for food pasteurization and sterilization 4. Design an aseptic processing system 5. Describe operation of mechanical refrigeration systems 6. Calculate freezing times 7. Compute the energy requirements in single and multiple effect evaporators 8. Use the psychometric chart in relation to drying processes Engineering principles of reactors, fluid flow, thermal processes and other topics will be applied to the design of systems for the food and biological process industry. The examples used will be applicable to bioreactor production, food processing, pharmaceutical manufacture, etc.

Prerequisite: BE 302

Changes Effective Spring 2021:

- Description
- Enforced Prerequisite

**BE 467: Design of Stormwater and Erosion Control Facilities (3 Credits)**

Old Listing Effective Through Fall 2020:

Design of best management practices for stormwater management, erosion and sediment control as applied to the agriculture-urban interface. BE 467 Design of Stormwater and Erosion Control Facilities (3) This course equips seniors agricultural and biological engineers with the ability to design sediment and stormwater impoundments and erosion control structures used in agriculture and the development of the agricultural-urban interface. Predictive hydrology is presented along with an introduction to several hydrology-based models used in the land-development industry. Basins are presented as fundamental structures used to attenuate stormwater peaks as well as holding ponds to facilitate gravitational sediment removal from stormwater runoff. Various sediment traps are also included. Flood routing is developed so students understand and can design for flood peak attenuation. Low Impact Development (LID) practices such as green roofs, bioretention areas and vegetated filter strips are presented as infiltration-based alternatives to traditional stormwater management. Open channel design procedures including maximum permissible velocity and tractive force are reviewed. The Revised Universal Soil Loss Equation (RUSLE) is introduced and the latest version of the RUSLE software package is available for student use. Stream corridor restoration procedures, especially many of the structural practices, are introduced. The course includes a major design project executed in groups of 3 to 5 students. Students are assigned a land parcel and the proposed development. Students are expected to develop a Stormwater Management Plan, including several LIDs, and an Erosion and Sedimentation Control Plan, including a sediment basin. Students must present their final designs in oral and written format to their peers and a lay audience. This project makes up about 30% of their course grade. The remainder of the grade is from two take-home exams and daily homework. The majority of those taking this course are A B E seniors or graduate students. Civil and Environmental Engineers often elect this course.

Prerequisite: BE 307 or CE 461

Changes Effective Spring 2021:

- Abbreviated Title
- Description
- Enforced Prerequisite

**BE 468: Microbiological Engineering (3 Credits)**

Old Listing Effective Through Fall 2020:

Application of basic engineering principles and designs in biochemical and biological processes. B E 468 Microbiological Engineering (3) Microbial engineering is a combination of biochemistry and microbiology applied to engineering. The purpose of this course is to provide an understanding of conversions of raw agricultural materials into value-added products via microbial fermentation. This course presents all steps in this type of bioprocessing such as mutagenesis, genetic modification for microbial manipulation, enzyme and microbial kinetics, aeration, agitation for bioreactor design, and scale-up strategies, as well as various recovery methods for downstream processing.

Prerequisite: B E 308 or both MICRB201 and B M B211;

Concurrent: B E 302

Changes Effective Spring 2021:
and de-extinction. 

The course focuses on exploration of the fundamental principles and processes that determine the fate of nutrients and pollutants in liquid and semi-solid wastes that are applied to the soil for recycling and disposal. These principles then serve as the basis for design of systems for application of livestock manures, biosolids, septage, wastewater effluents, and other residual materials. Relevant state and federal regulations will be covered to illustrate the impact of regulations and policies on engineering practice. The course culminates in a project for which students design a system to dispose of municipal, agricultural, or industrial byproduct or wastewater. Principles will be reinforced with several homework sets. Field trips will expose students to land-based waste disposal processes and systems. The course will serve as a senior-level engineering science/design course in Agricultural and Biological Engineering (A B E).

Prerequisites: BE 307 or CE 370 or ASM 327

Changes Effective Spring 2021:

- Abbreviated Title
- Description
- Prerequisites

Laboratory exercises demonstrating principles of biology.

Concurrent Courses: Enforced Prerequisite at Enrollment: or concurrent: BIOL 11

Changes Effective Spring 2021:

- General Education Recertification

In this honors course, we'll explore changing perspectives on life and approaches to studying life. More specifically, we'll examine, through an historical lens, humankind's quest to describe and explain and, ultimately, to expand the diversity of the living world. We begin with early attempts to classify living things—for example, Aristotle and Pliny. We then see how medieval bestiaries appropriated classical ideas about nature while adding to them in the context of Christian historia. In the Enlightenment, Linnaeus's taxonomic work provided a new way of naming and systematizing organisms. On the other hand, the nascent scientific methods of Sir Francis Bacon anticipate the shift from the descriptive to the theoretical and mechanistic that accompanied Darwin's first sketch of a phylogenetic tree and the theory of evolution. We consider new theories, methods, and language in our examination of Watson and Crick and the double helix, molecular biology, and genomics. The course concludes with a glimpse at future possibilities enabled by what was studied previously in the course: genetic engineering, synthetic biology, and de-extinction.

The course's original structure offers the experiential engagement of the sciences through laboratory experiments and fieldwork along with the workshop and directed discussions characteristic of the humanities seminar. The content and type of "readings" also reflect both areas and include primary and secondary sources in a variety of media. A visit to a natural history museum and/or zoo provides important physical contexts where students learn about type specimens, live specimens, and how scientists today use collections. They will assemble and curate their own zoological collection, juxtaposing various approaches to describing and classifying animals. The integration of the humanities and the sciences into a single course, along with the incorporation of significant experiential work, helps students gain a broad and deep understanding of and appreciation for each of these intellectual disciplines and for life itself.

Cross-Listing: CMLIT 183Q

Changes Effective Spring 2021:

- Change Course Abbreviation to SC

The overall goal of BIOTC 416 / MICRB 416 is to introduce students to fundamentals of applied biotechnology and the use of microorganisms in the synthesis of biologically important and industrially useful products. The course will focus on the application of the tools of Microbiology, Molecular Biology, Biochemistry, Forensics, Environmental Biology and Bioinformatics to exploit microbes as vessels, to create an array of products to benefit humans, animals and the environment. Specifically, discussions will address the use of microbes in the cleanup of polluted environments (bioremediation) as well as their role in producing drugs (vaccines, antibiotics, etc.), industrially important enzymes (rennet, meat tenderizers, indigo production etc.), and biodegradable plastics to name a few. Furthermore, ethics and regulations surrounding the production, marketing and distribution of these biologics will be discussed. Students will also gain a deeper understanding of the application of recombinant DNA technology, genomics and bioinformatics.

Cross-Listed Courses: MICRB 416

Changes Effective Spring 2021:

- Credits
- Description
- Prerequisites

The study of how living organisms inherit their traits, how plants and animals evolved, and how they now interact. Students who have passed BIOL 033, 133, 110, 220W, or 222 may not schedule this course.

Changes Effective Spring 2021:

- Recertification
- Description
BRS 221: Engineering Principles of Biorenewable Systems (3 Credits)
Old Listing Effective Through Fall 2020:

Application of engineering principles critical to agricultural and biorenewable systems. BRS 221 Engineering Principles of Biorenewable Systems (3) This course provides an overview of engineering principles to students in non-engineering majors, but who are likely to encounter challenges that require quantitative solutions. Problem solving skills are extremely important to technology. At the end of the course, students will be able to: solve problems related to biorenewable systems using a structured, logical method combining concepts from physics and math; recognize and apply unit factoring and dimensional analysis to problem solving; quantify physical relationships and apply engineering principles to evaluate basic engineering technology problems involving electrical systems, structural members, fluid mechanics, heat transfer, and psychrometrics. Hands-on examples are used throughout the course to tie the course material to applications in agricultural and biorenewable industries. Examples include residential wiring; sizing structural members made of wood, steel, and other materials; non-moving and flowing fluids in bioproduct and agricultural processing; heat transfer through wall, windows, and other materials likely to be found in construction and processing facilities; psychrometrics in environmental growth and drying facilities. This course provides the groundwork for topics explored in more detail later in the BioRenewable Systems curriculum.

Prerequisite: MATH 110 or MATH 140; PHYS 250 or PHYS 211

Changes Effective Spring 2021:

- Abbreviated Title
- Description
- Prerequisites

BRS 391: Contextual Integration of Communication Skills for the Technical Workplace (2 Credits) (GWS)
Old Listing Effective Through Fall 2020:

To develop corporate communication skills in technically focused students in a contextual manner. A S M (A B E) 391 Contextual Integration of Communication Skills for the Technical Workplace (2) A B E/A S M 391 is the first half of a two-semester capstone experience in corporate focused leadership and communication skills training. The sequence is formatted into two 2-credit courses (second semester Junior for A B E/A S M 391 and first semester senior for the companion A B E/A S M 392 course). A key facet of this training is the contextual approach taken. All course modules focus on leadership and communication development, ethical decision-making, corporate social responsibility, strategic group management, facilitation, and diversity. Students may be evaluated through writing and speaking projects, professional presentations, written worksheets in class and out, creation of portfolios and reports, in-class group and individual exercises, interaction with industry executives (reports), and leadership journals.

Prerequisite: BRS 391, junior level standing in B E or BRS

Changes Effective Spring 2021:

- Recertification
- Abbreviated Title
- Title
- Description
- Prerequisite

BRS 392: Contextual Integration of Leadership Skills for the Technical Workplace (2 Credits) (GWS)
Old Listing Effective Through Fall 2020:

B E/BRS 392 is the second half of a two-semester experience in corporate-focused leadership and communication skills training. The sequence is formatted into two 2-credit courses (second semester junior for B E/BRS 391 and first semester senior for the B E/BRS 392 course). A key facet of this training is the contextual approach taken. All course modules focus on leadership and communication needs of industry within its corresponding technical content - thereby representing a complete contextual approach. To meet the needs of the student, the course will reflect clear understanding of leadership and communication but also appreciate critical aspects of the technical content of student’s work and of the industries within which the students will ultimately work. The primary focus of BE/BRS 392 is on leadership, with communication, ethics, sustainability and career issues the secondary focus. The course provides students with interactions with individuals from industry (company visitors, industry trips, and recruiting opportunities). Topics developed for B E/BRS 392 include personal development, ethical decision-making, corporate social responsibility, strategic group management, facilitation, and diversity. Students may be evaluated through writing and speaking projects, professional presentations, written worksheets in class and out, creation of portfolios and reports, in-class group and individual exercises, interaction with industry executives (reports), and leadership journals.

Prerequisite: BRS 391, junior level standing in B E or BRS

Changes Effective Spring 2021:

- Recertification
- Abbreviated Title
- Title
- Description
- Prerequisite

BRS 426: Safety and Health in Agriculture and Biorenewable Industries (3 Credits)
Old Listing Effective Through Fall 2020:

BRS 426 explores management aspects of occupational safety and health specifically as it pertains to both the agricultural and biorenewable systems industry sectors. Employers are increasingly demanding students have training in safety and health. Topics to be covered include principles of safety and health, hazard analysis, hazard prevention and control, human behavior and safety, training and education, safety and health regulations, agricultural emergencies and developing a written safety program. Because students will complete a hazard analysis and develop a safety program for a workplace related to agriculture or
biorenewable systems, recommended preparations for BRS 393 (Industry Tour) or relevant work experience.

Prerequisites: 5th Semester standing or higher

Prerequisite: 5th semester standing

Changes Effective Spring 2021:

- Abbreviated Title
- Description
- Remove Prerequisites
- Add Concurrents

**BRS 429W: Biorenewable Systems Analysis and Management (3 Credits) (WF)**

Old Listing Effective Through Fall 2020:

BRS 429W is a capstone course for the BioRenewable Systems major. The course covers systems analysis and optimization techniques including an introduction to systems theory, qualitative and quantitative analysis, linear programming, waiting line models, PERT/CPM, minimal spanning tree, calculus methods, simulation modeling for decision making, inventory, and energy audits. All topics are presented in the form of case studies that require the students to solve problems in realistic production and processing scenarios. The course also provides a writing-intensive structure. The course targets BRS students in their last semester because it integrates knowledge and experiences acquired in prior BRS, business, and agricultural science courses.

Prerequisites: BRS 422

Changes Effective Spring 2021:

- Recertification
- Description

**CAMS 15: Wonders of the Ancient World (3 Credits) (GH) (BA)**

Old Listing Effective Through Fall 2020:

Overview of ancient world by focusing on the famed “Seven Wonders” and similar achievements from 3000 B.C.E.-1st Century C.E.

Changes Effective Spring 2021:

- Recertification
- Description

**CAMS 33: Roman Civilization (3 Credits) (IL) (BA)**

Old Listing Effective Through Fall 2020:

Origin of the Romans; sociopolitical development; food, homes, education, marriage, family life, amusements, private and public worship. CAMS 033 CAMS 033 Roman Civilization (3) (GH/IL) (BA) This course meets the Bachelor of Arts degree requirements. Roman Civilization (CAMS 033) provides a comprehensive survey of one of the major and most interesting societies from which contemporary western culture developed. For over 1200 years, the Romans expanded and ruled over the largest empire in recorded history. An understanding of their successes and failures can inform our own understanding of modern politics and international relationships. Many ideas in such diverse areas as government, law, military organization and strategy, the calendar, social practices, urban life, literature, art, and architecture clearly derive from Roman practices. Knowledge of the Romans, and the similarities and important differences between their lives and ours provides an opportunity to reflect on human values and contemporary culture. The course includes discussion of the origins of the Romans, how they saw it themselves, and the rather different picture painted by modern
archaeology. How the Romans expanded and maintained their power with long periods of peace from what is now Great Britain to the borders of India, and how their power waned in the later Roman period is one of the great illustrations of political institutional design. Roman society included various social groups, from slaves to the wealthy members of the traditional nobility. The opportunity for movement from slave to freedman or freedwoman to landowner helps explain why for generations Roman rule was widely accepted. Roman urban life, with its great public meeting halls, baths, arenas, race courses, and luxurious houses and comfortable apartment blocks was eagerly accepted across Europe, North Africa, and the Near East. Many of these areas were more intensively and successfully populated under the Romans than at any time since. The greatest achievements of Rome’s poets, Virgil’s “Aeneid” and Ovid’s “Metamorphoses” remain rich sources for current writers, composers, and choreographers. Major Roman historians and thinkers also continue to inform and inspire. Religious beliefs and the causes for the growth of Christianity are also important features of the Roman Empire. Almost two thousand years separate us from the summit of Roman power and yet we still benefit from a study of their society to understand our own.

The class meetings include twice weekly lectures for all students enrolled and once a week discussion sections of thirty students or less. Small enrollment classes meeting three times each week may also be scheduled. Assignments include individual and group papers, tests, and a final examination. Students are expected to participate actively in class discussions. In addition to twice weekly lectures for the 200 students in this course, smaller discussion sections of 30 students or less are scheduled once per week. All students will be expected to participate actively in the class discussions. In addition, students will write one individual paper and a longer paper based on collaborative work. In preparation of the written papers, students will gather information from both computer/electronic resources and use of the library. WEB resources for the study of classical antiquities and ancient texts are extremely rich. By integrating these various sources, students will be expected to synthesize various sources and to analyze the relationships between ancient and modern culture. A major assignment in this course requires collaborative learning and the preparation of a written paper in groups of 4 students. Study of the Romans includes learning in detail about the geography, resources, and cultures of a very large area of the world from southern Scotland to North Africa, and from Gibraltar to the borders of India. Many basic features of these areas remain relatively unchanged, and the realities of the resources and climate continue to regulate modern societies who inhabit the same spaces, often less successfully.

Changes Effective Spring 2021:

- General Education Recertification
- Description

CAMS 44: Ancient Near Eastern and Egyptian Mythology (3 Credits) (IL) (GH) (BA)
Old Listing Effective Through Fall 2020:

This course provides a survey of all major Ancient Near Eastern mythological traditions in their cultural and historical context. The course also addresses the relation between myth and religion, as well as the relation between these mythological corpora and those of Ancient Greece and Rome and the tapestry of cultic traditions reflected in the Hebrew Bible.

Cross-Listing: RLST 44

Changes Effective Spring 2021:

- General Education Recertification
- Abbreviated Title
- Description

CAMS 50: Words: Classical Sources of English Vocabulary
Old Listing Effective Through Fall 2020:

An introduction to English word forms stressing the most frequently occurring Latin and Greek elements and their derivatives.

Changes Effective Spring 2021:

- General Education Recertification
- Abbreviated Title
- Description

CAMS 70: Prophecy: The Near East Then and Now (3 Credits) (IL) (GH)
Old Listing Effective Through Fall 2020:

Prophecy in the ancient Near East, the ancient Jewish and Christian traditions, and today. CAMS 070 CAMS (J ST, RL ST) 070 Prophecy: The Near East Then and Now (3) (GH;IL) The objective of this course is to introduce students to the prophetic traditions of the ancient Near East and the Bible of the Judeo-Christian traditions. The course will explore the development of prophetic circles in the ancient Near East (incl. Egypt, Syria, Canaan, and Mesopotamia) and then focus on the major prophetic traditions of the Hebrew Bible (to include at least Isaiah, Jeremiah, Ezekiel, Amos, Hosea, Micah, Haggai, Zechariah, and Daniel) and how these traditions were understood in early Judaism and nascent Christianity. Special attention will be paid to the roles of priests, kings, and prophets in ancient Israel to better understand Israelite and Judaean prophetic traditions in ancient Israelite society. The course will then examine the rise of apocalypticism and its modern manifestations in the coalition of conservative Christians and Jews in “Zion” – the new Jerusalem. Additional emphasis will be placed on the religious and political interactions which manifest themselves in the prophetic movements–then and now–including the rhetoric of ideology and propaganda. Important figures and events illustrate these cultural and political trends, in antiquity, and in the contemporary setting.

Cross-Listing: RLST 70, JST 70

Changes Effective Spring 2021:

- Recertification
- Abbreviated Title
- Title
- Description

CAMS 83: First-Year Seminar in Classics and Ancient Mediterranean Studies (3 Credits) (IL) (BA) (FYS) (GH)
Old Listing Effective Through Fall 2020:

Critical approach to the study of ancient Mediterranean languages, literatures, and/or material cultures. CAMS 083S CAMS 083S First-Year Seminar in Classics and Ancient Mediterranean Studies (3) (GH;FYS;IL) (BA) This course meets the Bachelor of Arts degree requirements. The first-year seminar in Classics and Ancient Mediterranean Studies (CAMS) is concerned with interesting and challenging features of one or more of the cultures that surrounded the Mediterranean Sea in antiquity, from around 3,500 B.C. to 500 A.D. While the topic of CAMS first-year seminars varies, in all, you will be introduced to the civilizations that
surrounded the Mediterranean Sea in ancient times and why their great accomplishments, their struggles, and their failures remain important to us even today, thousands of years later. You will learn about ancient literature and physical remains that provide information about these cultures. In this class, you will learn to assess theories about ancient societies, the types of evidence that exist for antiquity, and how to gain access to academic resources in the library and in electronic form. The topics of the seminars vary. Some current seminars include a critical study of widely believed "Ancient Mysteries," such as the continent of Atlantis and Pyramid Power; a seminar on the relationships among Christians, Jews, and Pagans in the later Roman period; and Word Power, a course that gives you linguistic tools to understand the sources and nature of much of our modern English vocabulary. You will read selections of ancient literature in English translation and examine the remains of the societies that produced them to ponder basic questions about the meaning and value of human life. Some knowledge of ancient Mediterranean cultures has always been indispensable to intelligent participation in western society. Their social, political, economic, and legal systems, their religious experience, their language and art all are of interest, and their contribution to our own present world view can hardly be overemphasized. Today, the oldest of humanistic disciplines is more vital, more wide-ranging, and more current than ever before. By reading ancient literature, studying the structure of ancient languages, and learning about the religious, political, and social ideas formulated in antiquity, you may gain important insights into our own culture and come to understand the common humanity all people share.

Changes Effective Spring 2021:

- General Education Recertification
- Number
- Description

CAMS 90: Jerusalem: Past, Present, and Future

Old Listing Effective Through Fall 2020:

Social, cultural, religious, political, and archaeological history of Jerusalem from earliest times (c. 3000 BCE) to present. CAMS 90 / JST 90 / RLST 90 Jerusalem: Past, Present, and Future (3) (GH;IL)(BA) This course meets the Bachelor of Arts degree requirements. Jerusalem, a holy city for Judaism, Christianity and Islam, is symbolically depicted in art and literature as the physical and spiritual center of the world. Throughout its history, this "city of peace" was a focal point attracting numerous cultures and peoples, the latter sometimes as prophets and more often as conquerors. The reasons for Jerusalem's centrality and significance during the past five millennia as a heavenly and earthly capital are explored in this course. The course curriculum will survey the religious, political, archaeological and historical record of ancient Jerusalem, beginning with its earliest settlement during the fourth and third millennia BC. Jerusalem's urbanization in the second millennium BC, its role as the capital of biblical Israel and Judah during the First and Second Temple periods, and its transformation as a center of Christianity and later Islam are studied utilizing the testimony of artifacts, architecture, and iconography in relation to the written word. Throughout the ages and continuing into the 21st century, Jerusalem remains a contested city for the three monotheistic faiths. The holy city's impact on the politics of the modern Middle East will be critically examined in light of Jerusalem's history and recent archaeological discoveries and their modern-day interpretation. Objectives include the critical evaluation of archaeological, historical and literary evidence and its relationship to modern-day political and religious perceptions of Jerusalem. The course will encourage research skills (including library training sessions) and writing and oral communication skills based on an analytical approach to the texts and material culture relevant to Jerusalem. This course will fulfill three credits of the General Education or the B.A. humanities requirement and the GI requirement. For majors in CAMS, the course will fulfill the requirement of three credits in Near Eastern literature and language, civilization, or archaeology; and for those in the CAMS ancient Mediterranean archaeology option it will fulfill the three credits of archaeology course work requirement. The course will fulfill three credits of course work concerned with the ancient period or with the land of Israel.

Changes Effective Spring 2021:

- Recertification
- Description

CAMS 104: Ancient Egypt (3 Credits) (BA) (GH)

Old Listing Effective Through Fall 2020:

The history and archaeology of ancient Egypt from the dawn of history to the Greco-Roman period.

Cross Listing: HIST 104

Changes Effective Spring 2021:

- Recertification
- Add IL Attribute
- Description

CAMS 140: Classical Archaeology–Ancient Greece (3 Credits) (IL) (BA) (GH)

Old Listing Effective Through Fall 2020:

Literary sources and material evidence for society; culture of the inhabitants of Greece in ancient times. CAMS 140 Classical Archaeology–Ancient Greece (3) (GH;IL)(BA) This course meets the Bachelor of Arts degree requirements. Greek Archaeology (CAMS 140 GH;GI) presents the literary and physical evidence for ancient Greek culture, especially in the Late Bronze Age from about 1550-1100 B.C. and in the Classical Period of the fifth and fourth centuries B.C., when the city of Athens was at its height of political and cultural influence. The course emphasizes the archaeological sites that illustrate these stages, on the island of Crete, at Troy, and on the Greek mainland at places such as Delphi, Olympia, and Athens. The connections among political and economic changes and the artifacts, both impressive buildings and humble fragments of broken pottery, are emphasized. The course begins with some fundamental principles of archaeology, with particular emphasis on survey methodologies; the various scientific and comparative methods used to establish dating; problems with existing ethical guidelines concerning the destructive marketing of antiquities; and the connections among geography, environment, and human settlement patterns. The great sites of the Bronze Age Aegean, including Knossos, Troy, Mycenae, and Pylos are described with discussion of the connections to Egypt and the Ancient Near East. The use of pottery and other artifacts to trace political structure on Crete is demonstrated. The decipherment of the Early Greek Linear B language provides evidence for relating economic and political organization to the results of surveys and excavation at various sites. The course briefly touches on the ceramic evidence for the collapse of this Bronze Age society and the Iron Age transition to Classical culture, including the reintroduction of writing, cultural interchange through Mediterranean trade, and colonization. The course culminates with a detailed consideration of the city of Athens, with emphasis on the economic and political center in the Agora; housing,
students to become familiar with the Roman and Imperial fora and information on economic and social relationships through a series and forum are also emphasized. The port of Ostia, where an ethnically different stages in its history. The public baths, arena, temples, tombs, Pompeii, as well as the artifacts and decoration typical of Pompeii at this course emphasizes the planning and organization of housing at Roman culture from other Italic cultures, both Etruscan and Greek. The connections between political and economic developments of this wide-flung area over a 1,200-year period. By seeing coinage, funerary practices and monuments. Lectures illustrate some ways that archaeologists have used information provided by ancient authors such as Herodotus, Pausanias, and Thucydides to understand the excavated areas of the Athenian Agora and nearby sites. This course has two in-class essay examinations and a comprehensive final examination. Collectively these count for 75 percent of the course grade. In addition, students are graded on five assignments, each of which comprises 5 percent of the course grade. Four are essays based on textbook assignments. The fifth consists of a team-led classroom review of the previous six to eight classes. Assignments require use of Perseus II, a major and reliable Web resource for the study of ancient Greek civilization.CAMS 140 is a counterpart to CAMS 133 and 150, an appropriate Prerequisite for CAMS 440W, and an appropriate parallel to CAMS/HIST 100 or a successor to CAMS 025. CAMS 140 is one of three courses accepted as a Prerequisite for students enrolling in the Penn State Education Abroad Program in Athens.CAMS 140 fulfills common requirements in the major under two categories: (1) for a 3 credit course concerned with Greek or Roman language, literature, civilization, or archaeology, and (2) 6 credits of study in the general field of Classics and Ancient Mediterranean Studies at any level. CAMS 140 may be used to fulfill the requirements for 12 credits of course work at any level toward a CAMS Minor. CAMS 140 is an approved General Education Humanities course that may fulfill three credits of the six-credit requirement. It may also be used to fulfill the three credit B.A. humanities requirement.

Changes Effective Spring 2021:

• General Education Recertification

• Description

CAMS 150: Classical Archaeology—Ancient Rome (3 Credits) (IL) (GH) (BA)

Old Listing Effective Through Fall 2020:

Literary sources for the development of Roman civilization in relation to the relevant archaeological discoveries. CAMS 150 Classical Archaeology—Ancient Rome (3) (GH;IL) (BA) This course meets the Bachelor of Arts degree requirements Roman Archaeology (CAMS 150 GH) presents the literary and physical evidence for ancient Roman culture, from its formation in the Republican Period through Late Antiquity, over 1200 years later. The course emphasizes three archaeological sites that illustrate stages of Roman culture, Cosa, Pompeii, and Ostia. The connections between political and economic changes and artifacts, both impressive buildings and humble fragments of broken pottery, are emphasized. The course begins with some fundamental principles of archaeology, with particular emphasis on survey methodologies; the various scientific and comparative methods used to establish dating; problems with existing ethical guidelines concerning the destructive marketing of antiquities; and the connections among geography, environment, and human settlement patterns. The site of Cosa, in Etruscan territory, is used to demonstrate features of Roman urbanism in the Republican and the ways in which influences enter Roman culture from other Italic cultures, both Etruscan and Greek. The course then turns to the extraordinarily well preserved site of Pompeii. This course emphasizes the planning and organization of housing at Pompeii, as well as the artifacts and decoration typical of Pompeii at different stages in its history. The public baths, arena, temples, tombs, and forum are also emphasized. The port of Ostia, where an ethnically diverse population was housed in impressive apartment blocks, provides information on economic and social relationships through a series of funerary reliefs, and the well published excavations. Throughout the course, comparisons to Rome and its major monuments enable students to become familiar with the Roman and Imperial fora and landmark structures such as the Pantheon, the Colosseum, and the Baths of Caracalla. Lectures illustrate some ways that archaeologists have used information provided by ancient authors such as the Elder and Younger Pliny, Vitruvius, Suetonius, and others to understand Roman culture. Assignments include essays based on the assigned readings and participation in student group-directed classroom reviews throughout the semester. Students will be evaluated on essay tests and a final examination, which assess students’ ability to identify artifacts and discuss their significance, to compare cultural features at various stages of historical development, and to interpret the relationship between written and physical evidence for Roman culture. Collectively these count for 75 percent of the course grade. In addition, students are graded on five homework assignments, each of which comprises 5 percent of the course grade. Four are essays based on textbook assignments. The fifth consists of a team-led classroom review of the previous six to eight classes. CAMS 150 GH is an appropriate prerequisite for CAMS 440W, an upper level archaeology course. CAMS 150 GH is one of several courses that fulfill common requirements in the major under two categories: (1) for a 3 credit course concerned with Greek or Roman language, literature, civilization, or archaeology, and (2) 6 credits of study in the general field of Classics and Ancient Mediterranean Studies at any level. CAMS 150 GH may be used to fulfill the requirements for 12 credits of course work at any level toward a CAMS Minor. CAMS 150 GH is an approved General Education course that may fulfill three credits of the six credit Humanities requirement. It may also be used to fulfill the three credit B.A. humanities requirement.Classroom discussion, written assignments based on text readings, and student led review classes are required in CAMS 150. As it is available, assignments will require the use of Perseus II, a major and reliable Web resource for the study of ancient Greek and Roman civilization. In CAMS 150, students have an opportunity to study the geographically dispersed areas of Roman settlement across a long period of time, from Britain to Africa and Spain to Mesopotamia. CAMS 150 allows students to see how the Romans were influenced by the non-Roman cultures of the Mediterranean region as they gained political and economic control over them, and how these regions were Romanized. Students have an opportunity to master the geography and historical developments of this wide-flung area over a 1,200-year period. By seeing how Mediterranean cultures were interrelated in antiquity through trade, colonization, invasion, and accommodation, students are led to reflect on cultural interchange in the present. Some class time is devoted to consideration of the problems brought about by the antiquities market in destroying a shrinking resource for understanding our past. The difficulty in regulating the trade in antiquities through current ethics guidelines permits students to consider the difficult relationship between policy and enforcement in this area, and ethical choices more generally.

Changes Effective Spring 2021:

• Recertification

• Description

CAMS 180: Ancient Warfare (3 Credits) (BA) (IL) (GH)

Old Listing Effective Through Fall 2020:

Historical survey of the evolution of warfare in the ancient Mediterranean region from prehistoric times to the Later Roman Empire. CAMS 180 CAMS (HIST) 180 Ancient Warfare (3) (GH;IL) Warfare has occupied a central place in the civilizations of the Mediterranean from the earliest times. The prehistoric origins of warfare is a hotly debated topic and constitutes the starting point for this course. Most scholars are agreed that military culture grew in step with sociopolitical development over the course of the third millennium BCE. In the following centuries, the Egyptians, and later the Assyrians and Persians, took great strides in
developing sophisticated tactical systems, using infantry, chariotry, and cavalry. These matters occupy a little over the first third of the course. Across the Aegean Sea, Bronze Age (Mycenaean) Greece was ruled by elites occupying massively walled citadels, their leaders buried surrounded by their weapons. But how did these warriors fight? Do the epic poems of Homer memorialize Bronze Age combat? In the Archaic Period (700-500 BCE) infantry warfare in Greece was transformed by the appearance of the heavily-armored infantryman (the hoplite), deployed in a tight formation (the phalanx). The processes involved in the appearance of this kind of warfare, its nature, and its affects on Greek society and culture will be the focus of our attention for the second third of the course. On the periphery of the Mediterranean basin stood a variety of warrior cultures (the Scythians, Celts, or Germans). Numerous warrior-dominated polities vied with each other in Archaic Italy, but one of them, sitting on a ford on the river Tiber, ultimately rose to be the greatest military power produced by the ancient Mediterranean world &ndash; Rome. The Roman legions first won and then ensured the security of a Mediterranean-wide empire that stood for 700 years and evolved ultimately into world&amp;quot;s first standing army of professional volunteers. The Roman military system holds our attention for the final third of the course. The course defines &amp;quot;warfare&amp;quot; broadly to include both tactical and strategic, as well as cultural and ideological, matters. Even this canvas is too vast to be surveyed in all its richness, so the major themes explored are: (i) what is war, where does it come from, and how did it change as civilization spread?; (ii) in what ways did warfare develop in the periods under study, in terms of strategy, tactics, and weapons technology?; (iii) how do different warfare practices reflect essential facets of the various cultures under consideration?

Cross Listing: HIST 180

Changes Effective Spring 2021:

• Recertification

• Description

CAMS 400: Comparative Study of the Ancient Mediterranean World (3 Credits) (WAC) (BA)

Old Listing Effective Through Fall 2020:

Comparative study of ancient Mediterranean civilizations. CAMS 400W Comparative Study of the Ancient Mediterranean World (3)(BA) This course meets the Bachelor of Arts degree requirements. CAMS 400W provides students in the Classics and Ancient Mediterranean Studies (CAMS) Major, and other undergraduate and graduate students in allied fields, a capstone overview of research methodologies as they are applied to contemporary issues in ancient Mediterranean studies. The course is interdisciplinary in nature, and stresses the interactions among the ancient cultures of the Mediterranean region. The specific course content varies depending on the current research interests of the department faculty and the work undertaken by participating students. The course is organized as a seminar with participation by department faculty, and, when appropriate, visiting speakers. The topics concern issues of chronological, geographic, and cultural breadth. Students are expected to give an oral presentation of their research on a relevant topic during the last three weeks of the semester. This course requires a sequence of written assignments that constitute drafts in the process of writing an extended research paper. These consist of a statement of the problem, an annotated bibliography, a preliminary draft, and a final paper revised in light of the instructor’s comments on the assignments. This paper and an oral presentation in class based upon it will constitute about half of the final grade. A quiz and essay final examination will constitute the remainder of the grade.

Prerequisite: 3 credits in Classics and Ancient Mediterranean Studies

Changes Effective Spring 2021:

• Abbreviated Title

• Credits Repeatable

CAS 100A: Effective Speech (3 Credits) (GWS)

Old Listing Effective Through Fall 2020:

Principles of communication, implemented through presentation of speeches, with some attention to group discussion and message evaluation. CAS 100A Effective Speech (3) (GWS) This general education course studies the purposeful use of oral communication as a means of addressing practical problems, both professional and civic. It is designed to introduce students to principles of effective public speaking, implemented through the design and presentation of individual speeches and through practice in message analysis and evaluation. Class size is limited and class meetings involve considerable attention to developing public speaking skills through in-class activities, collaborative learning, peer critiques, and analysis of public speeches and other messages. At least three individual, graded speeches are required in this course. Additional presentations (graded or non-graded) may be required by some instructors. Course work may also include instruction and practice in group decision making. Assessment includes evaluation by examination (one or two; no final exam is given in the course) and by occasional quizzes and other activities, all of which emphasize the mastery and application of the conceptual content of the course. Public presentations are evaluated for content, organization, and presentation.

Changes Effective Spring 2021:

• Recertification

• Description

CAS 100B: Effective Speech (3 Credits) (GWS)

Old Listing Effective Through Fall 2020:

Principles of communication, implemented through presentation of speeches, with some attention to group discussion and message evaluation. CAS 100B Effective Speech (3) (GWS) This general education course designed to introduce students to principles of effective public speaking, implemented through the design and presentation of individual speeches and through practice in message analysis and evaluation. Class size is limited and class meetings involve considerable attention to developing public speaking skills through in-class activities, collaborative learning, peer critiques, and analysis of public speeches and other messages. At least three individual, graded speeches are required in this course. Additional presentations (graded or non-graded) may be required by some instructors. Course work may also include instruction and practice in group decision making. Assessment includes evaluation by examination (one or two; no final exam is given in the course) and by occasional quizzes and other activities, all of which emphasize the mastery and application of the conceptual content of the course. Public presentations are evaluated for content, organization, and presentation.
evaluated for process effectiveness and outcomes; critical evaluation of messages is assessed in individual assignments; and all course content is covered on exams. There is one midterm exam and one final exam, with the possibility of quizzes on lecture and reading materials throughout the semester.

Changes Effective Spring 2021:
- Recertification
- Description

CAS 100C: Effective Speech (3 Credits) (GWS)
Old Listing Effective Through Fall 2020:

Principles of communication, implemented through analysis and evaluation of messages, with some attention to formal speaking and group discussion. CAS 100CCAS 100C Effective Speech (3) (GWS) This is a general education course designed to introduce students to principles of effective communication with a specific focus on the analysis and evaluation of messages. Toward the end, class size is limited and class meetings will involve considerable attention to individual and group work in message analysis and critique. Through in-class activities, lecture, and discussion, this course focuses on the critical analysis of persuasive messages. This course will enable student to be better prepared to analyze both written and oral messages, work in groups, and develop effective presentations. Students will deliver a minimum of two public speeches and work on at least one group assignment. Public presentations will be evaluated for content, organization, and presentation. Exams will test students ability to synthesize and apply course concepts from the textbook and lectures.

Changes Effective Spring 2021:
- Recertification
- Description

CAS 100S: Effective Speech
Old Listing Effective Through Fall 2020:

Principles of communication, implemented through presentation of speeches, with some attention to group discussion and message evaluation.

Changes Effective Spring 2021:
- General Education Recertification
- Description

CAS 214W: Speech Writing
Old Listing Effective Through Fall 2020:

Due to time pressures, media scrutiny, and sadly under-developed rhetorical talents, powerful people in the public and private sectors need speechwriters. Because writing in the character of someone else and writing for the ear present the two biggest challenges for speechwriters, this course trains students in speech analysis and oral/aural composition. Throughout, students apply what they are learning, writing several genres of public speech in the voices of others and for various audiences and occasions. In accordance with the 'WAC' designation, students work through various drafts during structured and facilitated peer-review sessions. The majority of assessments is comprised of original, written work.

Prerequisites: CAS 137H; ENGL 137H OR CAS 100

Changes Effective Spring 2021:
- Prerequisites

CAS 215: Argumentation
Old Listing Effective Through Fall 2020:

This course provides an in-depth examination of argumentation in both public and private contexts. The course requires students to investigate the process of researching sound evidence, constructing legitimate argumentative claims, and participating in live debates. Fundamental to this endeavor is a strong attention to research, ethics, and strategy. Major topics may include essential components of effective arguments, in-depth examination of different types of evidence, introduction to forms of reasoning, negative and affirmative cases, and debate rules or strategies. Students may be evaluated with a range of assignments, from oral debates or presentations to written assignments, quizzes, and exams. This course thereby offers students opportunities to enhance their skills in effective inquiry and advocacy, useful for academic as well as professional success. Understanding the theoretical foundation of argumentation will enable students to accomplish four objectives: 1) to understand the significant role argumentation plays in public and private discourse, 2) to research, gather and organize supporting material into argumentative discourse so as to become a skilled advocate, 3) to be familiar with the physical and virtual PSU libraries, and 4) to become an effective critic of argumentative discourse.

Changes Effective Spring 2021:
- Prerequisites

CAS 222N: Foundations: Civic and Community Engagement
Old Listing Effective Through Fall 2020:

Through readings, discussion, deliberation, listening, and individual as well as collaborative action, this course gives students the opportunity to learn about and practice theories and habits of civic and community engagement and public scholarship with the goal of helping to build democratic capacity and sustain participatory democracy. This course emphasizes concepts and case studies that focus on the role of students and other citizens in sustaining and transforming their communities, the historical and contemporary mission of Land Grant universities, the centrality of rhetoric and communication to collaborative judgment, and the relationship among media, cultures, and politics as they affect civic and community engagement. Students also learn together about the range of ways that citizens do, can, and might participate in democratic decision-making and will observe and practice these forms in several communication media and across a range of differences. Finally, learn about models of and opportunities for engaging other citizens across and beyond Penn State, including in global environments.

Changes Effective Spring 2021:
- Prerequisites

CAS 315: Debate and Civic Life (3 Credits: Maximum of 3 Credits)
Old Listing Effective Through Fall 2020:
This course provides historical background on debate in politics and in civic life, examining both public and competitive debate practices. Debate has been a vital part of democratic engagement in the United States since the founding of the country. This course explores the role debate has played in the United States, focusing primarily on debate practices in the 20th and 21st century. This course provides historical background on debate in politics and in civic life, examining both public and competitive debate practices. Course material will expose students to theories and practices of debate including the history of important debate moments in the United States, analysis of contemporary political debates, and practical debate techniques inside the classroom and in a public setting.

Changes Effective Spring 2021:

- Add GH Attribute
- Abbreviated Title
- Credits Repeatable

CAS 403: Interpersonal Communication Theory and Research
Old Listing Effective Through Fall 2020:

CAS 403 is an advanced introduction to social scientific theory and research on interpersonal communication. Course foci center on contemporary theory and research, interpersonal communication in personal and professional relationships, and a research practicum in which students conduct an original research study. The course is intended for juniors and seniors in Communication Arts and Sciences and other liberal arts majors who have a serious interest in interpersonal communication processes. CAS 203 is a prerequisite for this course. Assignments and readings address theory, research, and practical application.

Prerequisites: CAS 203

Changes Effective Spring 2021:

- Prerequisites
- Recommended Preparations

CAS 404: Conflict Resolution and Negotiation
Old Listing Effective Through Fall 2020:

Conflict and its management are critical issues that pervade the fabric of our society. This class is designed as an opportunity to explore the complexities of conflict, to understand the forces that make conflict challenging, and to develop a repertoire of skills for thinking about and managing conflict more effectively. In this pursuit, we first examine the features that define and set the stage for conflicts. We then turn to the communication behaviors that people use to manage conflicts. Finally, we consider some of the dynamics that make constructive conflict management a challenge. The objective of this course is to expose students to the scholarly study of interpersonal communication in a way that both captures the vitality of the discipline and enhances interpersonal communication skills. As a General Education course contributing to the social and behavioral science requirement, this class is also expected to (a) survey existing knowledge in the subject domain, (b) promote an understanding of social scientific methods, (c) clarify the multiple nature of causality in social settings, (d) demonstrate the relationships between the study of interpersonal communication and other disciplines, and (e) encourage students to integrate empirical knowledge and theoretical views of the social world. The course content, assignments, and exams were developed to attend to these concerns.

Prerequisites: 5th semester standing

Changes Effective Spring 2021:

- Prerequisites

CAS 405: Family Communication Theory and Research
Old Listing Effective Through Fall 2020:

Explores the nature and functions of communication in family life; emphasis on meaning, patterns, and styles of family communication.

Prerequisites: CAS 101, CAS 202

Changes Effective Spring 2021:

- Description
- Prerequisites
- Recommended Preparation

CAS 406: Honors Course in Communication Arts and Sciences
Old Listing Effective Through Fall 2020:

Individual study and seminar in selected areas or issues of speech communication.

Prerequisites: an all-University average of B; approval of the departmental Honors Committee

Changes Effective Spring 2021:

- Prerequisites

CAS 409: Democratic Deliberation
Old Listing Effective Through Fall 2020:

Explores the theory and practice of democratic deliberation in elections, town meetings, juries, legislatures, and other public institutions. CAS (PL SC) 409 Democratic Deliberation (3) Many modern democracies have made strides to become more deliberative in how they make decisions. This course looks closely at the most promising innovations in self-government while also reviewing the persistent anti-deliberative and undemocratic features of modern societies and governments. Topics covered in the course include deliberative democratic theory, political conversation, common forms of public meetings, mediated deliberation, campaigns and elections, the jury system, and deliberative democracy on larger social scales.

Prerequisites: CAS 137, CAS 175, CAS 201, CAS 202, CAS 216, CAS 250, CAS 272 or PL SC001, PL SC017, PL SC112, PL SC130

Changes Effective Spring 2021:

- Prerequisites

CAS 411: Rhetorical Criticism
Old Listing Effective Through Fall 2020:

Principles of rhetorical criticism examined through analysis of selected texts and critics.

Prerequisites: CAS 201 or CAS 100

Changes Effective Spring 2021:
CAS 415: Rhetoric of Film and Television
Old Listing Effective Through Fall 2020:
Rhetorical analysis of the artistic forms and cultural structures of film and television; intensive study of selected examples.
Prerequisites: CAS 100 or COMM 150
Changes Effective Spring 2021:
- Abbreviated Title
- Prerequisites
- Recommended Preparation

CAS 420: Rhetorical Theory
Old Listing Effective Through Fall 2020:
Ancient, medieval, Renaissance, Enlightenment, and contemporary theories of rhetoric.
Prerequisites: CAS 201
Changes Effective Spring 2021:
- Prerequisites
- Recommended Preparation

CAS 421: Communication and Aging
Old Listing Effective Through Fall 2020:
Concentrates on the pivotal role that communication plays in the social process of aging. CAS 421 CAS 421 Communication and Aging (3) Communication and Aging is a course that concentrates on the pivotal role that communication plays in the social process of aging. An understanding of the communicative behavior of older adults can result in significant improvements in our ability not only to describe the essential components of a quality life, but to actively intervene in the various factors that help each of us adapt to the many physiological, psychological, social and economic challenges of the aging process. Topics covered in this course include: the theories of social aging; attitudes and ageism; mass media use and portrayals; work, leisure, and retirement; family relationships such as siblings, grandparent-grandchild, parent-child; friendships; health and aging; death and dying; and successful aging. This course places communication and our interactive behavior at the heart of the aging process and helps us combine the growing bodies of literature in physical, psychological and social aging as we attempt to grasp the process of life long development.
Prerequisites: Three credits of CAS
Changes Effective Spring 2021:
- Prerequisites
- Recommended Preparation

CAS 426W: Communication Ethics
Old Listing Effective Through Fall 2020:
Ethical issues in public and private communication; role of communication in expressing and realizing individual and social values.
Prerequisites: CAS 100
Changes Effective Spring 2021:
- Prerequisites

CAS 438: Rhetoric of Documentary
Old Listing Effective Through Fall 2020:
Rhetorical analysis of the documentary in film, television, and other media; historical and critical analysis of functions and form.
Prerequisites: CAS 201
Changes Effective Spring 2021:
- Prerequisites
- Recommended Preparation

CAS 450W: Group Communication Theory and Research
Old Listing Effective Through Fall 2020:
Selected theories of problem solving through group discussion emphasizing participation and leadership. CAS 450W Group Communication Theory and Research (3)(BA) This course meets the Bachelor of Arts degree requirements. CAS 450W: Group Communication Theory and Research is a writing-intensive course in which students study a broad range of theories and perspectives concerning the role of communication in decision-making and problem-solving groups through a variety of writings by leading scholars in the area of Group Communication. The objectives of CAS 450W are: (1) to expose students to various facets of group life and theories that account for their performance; (2) to provide a summary knowledge of representative findings from research on group interaction; (3) to develop critical skill in the assessment of theoretical arguments and the adequacy of the evidence on which they are based; and (4) to enhance students’ capacities for addressing, both orally and in writing, substantive issues posed by the subject matter. Theoretical material is examined with a view toward determining how to improve the performance of decision-making and problem-solving groups. Hence, the course has a strong concern with the identification of communication practices on which students can draw in making choices concerning how to participate in such groups. The course incorporates a discussion, rather than lecture, format. Attendance is required. Students will receive a set of questions in advance of each reading assignment that will provide a basis for discussion in the class sessions. The questions for the first five reading assignments will also serve as topics for a series of five short position papers that fulfill the writing intensive component of the course. In addition to the position papers, students are required to complete a midterm and final examination, both of the open-book, essay variety, and a course paper exploring a significant communication issue raised in the course. Among the topics covered in the course are the impact of member characteristics on interaction, the social dynamics of groups, the management of conflict, argument and decisional outcomes, leadership, and principles of meeting management. Students completing the course will have not only a better understanding of why decision-making and problem-solving groups both succeed and fail, but also a much improved basis for contributing effectively to them. CAS 450W satisfies requirements in the Communication Arts and Sciences Major and Minor, the Liberal Arts Business Minor, and the Dispute Management and Resolution Minor. It may also be used as an elective and is complementary to courses dealing with groups and group process in Psychology, Sociology, and Management.
Prerequisites: CAS 10 or CAS 250
and professional titles greets the client of formal health care. Awareness and understanding of how to assess these various roles increases the ability of students to interact competently with care providers. Family, friends, and the cultural groups that nurture our youth and sustain our adulthood interact with us about health on a regular basis as well. Awareness and understanding of the impact that interactions with these primary social network members has on interactions with health care providers increases the likelihood that both provider and client will be better understood and better served. Every message about health and health care carries an ethical dimension in its content. The course will increase students' critical thinking and informed decision-making skills associated with others efforts to influence them regarding their own health practices. It also frames discussion about the ethics of and ethical decision-making associated with health communication. Students will examine communication about health in many situations and contexts to illustrate how it reflects efforts to assign labels to illness and disease, and sometimes the environmental and political contributors to the situation. Finally, students will evaluate how communication is used to invoke personal, professional, and societal norms of conduct associated with standards of conduct that should promote health and well-being. The course is linked to the courses in interpersonal communication, organizational communication, health communication, and small group communication, as discourse about health crosses societal, cultural, and personal contexts. CAS 453 is one of the upper division courses that may be used to fulfill Major or Minor students' requirements for upper division credits.

Prerequisites: CAS 100, CAS 137H; ENGL 137H

Changes Effective Spring 2021:

• Prerequisites

CAS 452: Organizational Communication Theory and Research

Old Listing Effective Through Fall 2020:

Organizational Communication Theory and Research explores the nature and function of communication in organizations; emphasis is placed on theoretical concepts, tools, and skills for effective management of communication. The goal is to open students' minds to the importance and centrality of the communicative process within formal and informal organizations. The course explores communication theories which focus on and help explain the complex interactions that occur at numerous levels within modern organizations. The course culminates in a semester long "communication audit" of an organization to test the explanatory power of communication theories in the working world. There is also a writing intensive version of this course, CAS 452W. Students may only receive credit for one of these versions of CAS 452.

Prerequisites: CAS 100, CAS 137H; ENGL 137H

Changes Effective Spring 2021:

• Prerequisites

CAS 452W: Organizational Communication Theory and Research

Old Listing Effective Through Fall 2020:

CAS 452W explores the nature and functions of communication in organizations; emphasis on writing and exploring concepts, tools, and skills for effective management of communication. This course is designed to further introduce students to the field of Organizational Communication. Emphasis is placed on macro-organizational variables that can systematically affect microcommunication behaviors; in other words, how could something like the hierarchy of the organization influence who someone talks with as an organizational employee. The purpose of the course is to provide students with a basic understanding of communication-relevant behaviors and activities in organizations. This includes things like leadership, teamwork, conflict management, and diversity. Additionally, this course examines various theories of and approaches to studying communication within organizations. This version of the course is writing intensive, there is also one that is not. Students may only receive credit for one: CAS 452 or CAS 452W.

Prerequisites: CAS 100, CAS 137H; ENGL 137H

Changes Effective Spring 2021:

• Prerequisites

CAS 453: Health Communication Theory and Research

Old Listing Effective Through Fall 2020:

Principles of communication about health across the lifespan and within health-care contexts. CAS 453 Health Communication Theory and Research (3) This is an upper division course designed to provide students with a comprehensive introduction to multiple discourses about health and health care. CAS 453 emphasizes the communication about health and health care that reaches us everyday through many and varied professional, personal, and mediated forms. Interactions with health care providers were once limited primarily to physicians and nurses. Today, careers in health care are among the most rapidly expanding job areas, and a bewildering array of technicians and technical and professional titles greets the client of formal health care. Awareness and understanding of how to assess these various roles increases the ability of students to interact competently with care providers. Family, friends, and the cultural groups that nurture our youth and sustain our adulthood interact with us about health on a regular basis as well. Awareness and understanding of the impact that interactions with these primary social network members has on interactions with health care providers increases the likelihood that both provider and client will be better understood and better served. Every message about health and health care carries an ethical dimension in its content. The course will increase students' critical thinking and informed decision-making skills associated with others efforts to influence them regarding their own health practices. It also frames discussion about the ethics of and ethical decision-making associated with health communication. Students will examine communication about health in many situations and contexts to illustrate how it reflects efforts to assign labels to illness and disease, and sometimes the environmental and political contributors to the situation. Finally, students will evaluate how communication is used to invoke personal, professional, and societal norms of conduct associated with standards of conduct that should promote health and well-being. The course is linked to the courses in interpersonal communication, organizational communication, health communication, and small group communication, as discourse about health crosses societal, cultural, and personal contexts. CAS 453 is one of the upper division courses that may be used to fulfill Major or Minor students' requirements for upper division credits.

Prerequisites: CAS 100

Changes Effective Spring 2021:

• Prerequisites

CAS 470: Nonverbal Communication

Old Listing Effective Through Fall 2020:

Examining ways nonverbal messages, such as gestures, posture, vocal intonation, and facial expressions, affect us on a daily basis.

Prerequisites: 6 credits in Communication Arts and Sciences

Changes Effective Spring 2021:

• Prerequisites

CAS 471: Intercultural Communication Theory and Research (3 Credits) (US; IL)

Old Listing Effective Through Fall 2020:

Intercultural and cross-cultural communication research theory and practice as applied within and across national boundaries. CAS 471 Intercultural Communication Theory and Research (3) (US; IL) This course is designed to introduce theoretical approaches to cross-cultural communication from a variety of disciplines, e.g., speech communication, anthropology, linguistics, sociology, sociolinguistics, psychology, and has a double aim of combining theory with practical application and empirical observation. We will be utilizing a number of readings, films, and such mass media elements as films, magazines, newspapers, and television programs and commercials, as well as actual interviews with people from other cultures. Classes will be conducted through lecture sessions, class discussions, and small group activities. Specific: To examine characteristics of communication, language, and culture; to consider
which aspects of language, communication, and culture may be universal, culture-specific or individual characteristics of speakers; to examine cultural values and their relationships to communication involving members of the same cultural group and members of groups outside of that culture; to raise awareness of both similarities and differences within and between cultural groups; to analyze how effective communication is achieved and to identify potential sources of miscommunication and/or misunderstanding; to raise awareness of our own cultural norms, preferences, and expectations; to increase acceptance, understanding, and appreciation of similarities and dissimilarities among people. Students will be evaluated on two midterm exams (undergrads) or two extended analytic journals (grads) 25%, observation journals (6 total) 15%, thought journals (4 total) 15%, article presentation and critique 15%, final paper and oral report 25%, and participation 5%. The content and focus of this course is related to any field which has the potential of dealing with persons of other cultures, including but not limited to biobehavioral health, business and marketing, and education. This course is inherently related to Speech Communication Majors and Minors, but is also valuable from a cross-disciplinary perspective since we deal squarely with issues of humanity, tolerance, values, and communication.

**Prerequisite:** CAS 271

**Changes Effective Spring 2021:**

- Abbreviated Title
- Description
- **Prerequisites**

**CAS 475: Studies in Public Address**

**Old Listing Effective Through Fall 2020:**

History and criticism of public discourse; intensive analysis of selected public addresses and social movements.

**Prerequisites:** CAS 100

**Changes Effective Spring 2021:**

- **Prerequisites**

**CAS 478: Contemporary U.S. Political Rhetoric**

**Old Listing Effective Through Fall 2020:**

In this course students will learn how to analyze selected discourses and movements in recent U.S. political history and to compose and deliver their own discourses—written, spoken, and mediated by digital information technologies. The discourses students will learn to analyze include speeches, debates, news stories, commentaries and other written arguments; audio, visual, and video messages; and persuasive campaigns. This course provides students the opportunity to study contemporary U.S. political rhetoric in order to contribute to improving its quality. Using rhetoric’s analytic and productive capacities, students will read, listen to, and view examples of public discourse on vital issues of the day. Informed by the diverse, millennia-long history of rhetorical theory in general and argumentation and public memory studies in particular, this course offers various mediated texts as points of departure to enable students to learn and deliberate together about the causes and consequences of and the possible remedies for the state of U.S. political rhetoric in the past, present, and future. This course thus serves as one kind of culmination of undergraduate rhetorical study, equipping students with the skills, habits, and practices they need to be informed and capable citizens of a democratic republic. Further, the course enables students to synthesize what they have studied in various disciplines across their undergraduate education because the course focuses on public problems and public memory. While different sections of the course will focus on different public problems and political issues, the rhetorical theory and criticism core of the course will remain consistent across sections. Over the course of the semester students will learn through practice how to compose and deliver factually correct and rhetorically credible discourses for different audiences. Students will learn through practice how to analyze and produce rhetorically sound arguments. Students will learn the histories of social and political movements in the United States as those histories pertain to contemporary political discourses and controversies.

**Prerequisites:** CAS 100

**Changes Effective Spring 2021:**

- **Prerequisites**

**CAS 483: Communication and Information Technology II**

**Old Listing Effective Through Fall 2020:**

Theory and application of interactive internet-based communication and information management; for students who want a Liberal Arts approach.

**Prerequisites:** CAS 283

**Changes Effective Spring 2021:**

- **Prerequisites**

**CC 200: Introduction to Corporate Communication**

**Old Listing Effective Through Fall 2020:**

Introduces fundamental concepts, theories, and practices in Corporate Communication and is a lower division gateway to the major. As a field, Corporate Communication involves taking organizational goals and translating them into communication strategies and tactics inside and outside the organization as well as managing communication processes on an ongoing basis. Corporate Communication is complex, dynamic, and involves various media.

**Prerequisites:** ENGL 15, Student may not enroll if enrolled in or has successfully completed CC 300

**Changes Effective Spring 2021:**

- **GS Attribute**
- **Description**
- **Prerequisites**

**CED 201: Introductory Environmental and Resource Economics (3 Credits)**

**Old Listing Effective Through Fall 2020:**

Apply principles of economics to analyze environmental protection policies and natural resource use decision. Examine contemporary policy issues. E RRE (AG EC) 201 Introductory Environmental and Resource Economics (3) An introduction to the concepts, theories, and applied methods used in the economic analysis of environment and natural resource issues. The course covers topics such as the principles of market efficiency, why the market often fails where environmental and natural resource issues are concerned, and environmental policy prescriptions and tools designed to correct this market failure. These principles and tools are explored with respect to air and water pollution, management and use of renewable natural resources such as forests.
and fisheries, and the unique problems of managing nonrenewable resources such as minerals and oil. The course aims to give students an understanding of how traditional economic principles can be used to suggest and evaluate possible responses to the environmental and resource problems facing society.

Prerequisite: AG BM 101 or ECON 102

Changes Effective Spring 2021:

• Remove Prerequisite and Add Concurrent

CED 230: Development Issues in the Global Context (3 Credits)
Old Listing Effective Through Fall 2020:

Exploration of issues related to economic development in national and international contexts, where key interrelationships between and among developed and developing regions are made explicit. CED 230 Development Issues in the Global Context (3) Local communities – in both developed and developing countries – are influenced by strong global forces that affect the well-being of their residents. Community economic development is one approach to enhance improve economic outcomes. This course will use an issue-oriented approach to help students understand economic development patterns and resultant issues in the U.S. as compared to what is observed and what is of critical concern in other places. Topics will include the concept of globalization, economic restructuring trends, investment in human capital and the ability to retain this often mobile form of capital, migration and change in patterns of migration, and environmental effects of development in different contexts. Each year that the course is taught, there will be a focus on patterns of economic development by region in the U.S. but with comparisons to three other selected countries – one in Latin America, one in Asia and one in Africa. Students will be encouraged to compare and contrast economic and related social issues that arise in these contexts, with particular emphasis given to recent economic trends and events and to the rate of change compared to the past.

PREREQUISITE: ECON 102, ECON 104, RSOC 11 or SOC 1

Changes Effective Spring 2021:

• Description
• Prerequisites

CED 409: Land Use Planning and Procedure (3 Credits)
Old Listing Effective Through Fall 2020:

General land use planning laws and procedures. CED 409 Land Use Planning and Procedure (3) This course provides students with an understanding of the legal and procedural aspects of land use planning as found in the United States. The emphasis of the course is to explain the sources of land use planning authority, the processes by which it is applied and the potential conflicts that arise in the application of this authority. As a result of taking this course, students will be expected to learn and explain a) the objectives of land use planning systems and a comparative analysis of these systems; b) the bases on which land use planning law and procedure is applied across the U.S.; c) policies, strategies and principles that can be applied to land use planning decisions; d) several land use planning models currently applied in American jurisdictions, including the structure of each land use planning system; e) the procedural steps used to engage the land use planning system by property owners and government officials; f) typical conflicts that arise in creating, changing or enforcing land use planning measures; g) how land use planning conflict is resolved in various systems. Student performance will be measured in two midterm exams and a final exam. The instructor reserves the right to give additional exams to aid in measuring student knowledge and understanding of course material. Each test will primarily be short essays questions that ask for an explanation, discussion, comparison or application of specific concepts and principles. Case studies also will be used to present students with situations to hone their analytical, organizational and problem solving skills on specific problem situations. This will ask students to analyze a given set of facts, assess the issues raised by the facts from the perspectives of individuals who are described in the situation and form and present a response that addresses a specific question posed to the student.

PREREQUISITE: 6 credits of BLAW, CED, ECON, ERM, ERRE, PLSC, REST, SOC, STS (any combination)

Changes Effective Spring 2021:

• Description
• Prerequisites

CED 417: Power, Conflict, and Community Decision Making (3 Credits)
Old Listing Effective Through Fall 2020:

Impact of institutions on human interdependence and behavior, the structure of power, and community decision making and public policy. CED 417 Power, Conflict, and Community Decision Making (3) Community decision making and public choice is the result of collective action among individuals. The purpose of this course is to develop frameworks for analyzing conflict, power, and public choice. This course enables students to understand how culture and institutions affect the nature of human interdependence and behavior, shape patterns of influence and power, and impact community decision making and policy.

PREREQUISITE: RSOC 11 or SOC 1

Changes Effective Spring 2021:

• Description
• Prerequisites

CED 430W: Principles of Community Economic Development (3 Credits) (WF)
Old Listing Effective Through Fall 2020:

This course is designed to introduce the issues giving rise to concern for rural and regional economies, and the theories, concepts and tools of rural and regional economic development. The goal is to integrate theory and practice and apply them to economic development problems. Tools are presented in a "how to" manner. Topics include what is meant by 'Economic Development' and how perspectives on it vary; national and state policies on economic development; economic development theory, including Economic Base, Product Cycle, Central Place Theory, and Attraction Models, and their implications; basic analytical tools for community economic development, including Location Quotients, Shift Share, and Input-Output analysis; basic retention, expansion, and location; and economic development strategies, such as entrepreneurship, business development, locality development, and human resources. As a writing-intensive course, strong emphasis is placed on using the written word to apply these concepts and tools to real world situations, with most homework assignments modeled on
the types of analysis and reports conducted by economic development practitioners.

Prerequisite: ENGL 15

Changes Effective Spring 2021:

- Prerequisite

CED 475: CED Integrated Capstone Experience (3 Credits)
Old Listing Effective Through Fall 2020:

An experiential-learning course that provides a capstone learning experience for seniors graduating from the Community, Environment and Development major. CED 475 CED Integrated Capstone Experience (3)
A well-designed capstone experience provides students with a valuable reflective and integrative experience as they complete their baccalaureate degree programs. This course is designed to encourage students to reflect, integrate and apply the knowledge that they have learned in previous coursework for the CED major. The course is built on discussion and exercises that require integration. Like the CED program more generally, this course relies on case studies to help students apply the skills that they have learned to actual cases that challenge communities and regions in developed and developing areas of the world. The CED program is also designed to include experiential-learning exercises throughout the program; this course engages students in a significant in-depth experience or project that will vary year-by-year. The experience could be in the United States or in another country. The project will be hands-on and action-oriented. Evaluation is based on assessment of active participation in class discussions, papers that provide critical assessments of the case studies assigned to the class, and a final project conducted in the field, either in the U.S. or internationally.

PREREQUISITE: senior status only

Changes Effective Spring 2021:

- Description
- Prerequisites

CHE 210: Introduction to Material Balances
Old Listing Effective Through Fall 2020:

An integrated approach to the study of material balances and industrial chemical processes important in chemical engineering. CHE 210 Introduction to Material Balances (3) The objective of this course is to present an introduction to chemical engineering calculations, establish mathematical methodologies for the computation of material balances and to present an overview of industrial chemical processes. The course reviews the fundamentals of chemistry and physics as they pertain to chemical problems and applies mathematics to the development of time-dependent equations to describe materials flow through a process. Examples of the processes studied include stoichiometry in combustion and other reactions, material flow with recycle streams, humidification and drying process, and the analysis of non-steady systems. The Honors version of the course places emphasis on the use of computational methods in the solution of chemical engineering problems through the use of advanced mathematical packages.

Prerequisites: MATH 251

Changes Effective Spring 2021:

- Description
- Prerequisites

CHE 210H: Introduction to Material Balances (Honors)
Old Listing Effective Through Fall 2020:

An integrated approach to honor-level study of material balances and industrial chemical processes important in chemical engineering.
CHE 210H CHE 210H Introduction to Materials Balances (Honors) (3) The objective of this course is to present an introduction to chemical engineering calculations, establish mathematical methodologies for the computation of material balances and to present an overview of industrial chemical processes. The course reviews the fundamentals of chemistry and physics as they pertain to chemical problems and applies mathematics to the development of time-dependent equations to describe materials flow through a process. Examples of the processes studied include stoichiometry in combustion and other reactions, material flow with recycle streams, humidification and drying process, and the analysis of non-steady systems. The Honors version of the course places emphasis on the use of computational methods in the solution of chemical engineering problems through the use of advanced mathematical packages.

Prerequisites: MATH 251

Changes Effective Spring 2021:

- Description
- Prerequisites

CHE 220: Introduction to Chemical Engineering Thermodynamics
Old Listing Effective Through Fall 2020:

Chemical process applications of energy balances, equations of state, thermodynamic properties of real fluids, second law of thermodynamics, cycles. CH E CHE 220 Introduction to Chemical Engineering Thermodynamics (3) This course is the introductory course in chemical engineering thermodynamics. It is normally scheduled in the sophomore year and is continued by a second course which covers the thermodynamics of phase transformations and chemical reactions. The emphasis of this course is in the development of the theory of thermodynamics and its application to pure substances. The theory is applied on the thermodynamic analysis of small- and large-scale processes with multiple streams and energy exchanges, how to compute heat and work loads, and how to assess the efficiency of the process with respect to energy utilization. Starting from small units, such as pumps, compressors, turbines, and heat exchangers, examples grow to include large systems such as power plants and refrigeration cycles, that may involve many interconnecting units and recycle streams. A parallel focus of the course is in the computation of thermodynamic properties through the use of charts, tables, and equations of state with emphasis on non-ideal systems.

Prerequisites: MATH 231

Changes Effective Spring 2021:

- Description
- Prerequisites
The list of topics discussed in this course include the mechanical mechanics that are of fundamental importance to chemical engineers.

**Process Fluid Mechanics (3)** This course introduces the principles of fluid techniques involving flow of fluids in chemical processes. CH E 330

An integrated study of the fundamentals and the quantitative design old listing effective through fall 2020:

**CHE 330H: Process Fluid Mechanics (Honors)**

Old Listing Effective Through Fall 2020:

Chemical process applications of energy balances, equations of state, thermodynamic properties of real fluids, second law of thermodynamics, cycles. CHE 220H CHE 220H Introduction to Chemical Engineering Thermodynamics (Honors) (3) CHE 220H is the introductory course in chemical engineering thermodynamics. The emphasis of this course is in the development of the theory of thermodynamics and its application to pure substances. The theory is applied on the thermodynamics analysis of small- and large-scale processes in closed and open systems. Students learn how to formulate the energy balance for a process with multiple streams and energy exchanges, how to compute heat and work loads, from small units, such as pumps, compressors, turbines, and heat exchangers, examples grow to larger systems such as power plants and refrigeration cycles, that may involve many interconnecting units and recycle streams. The Honors version of the course places special emphasis on (a) the connection between thermodynamics and molecular properties and (b) on the use of computational methods for the calculation of thermodynamic properties under non-ideal conditions.

Prerequisites: MATH 231

Changes Effective Spring 2021:

- Description
- Prerequisites

**CHE 320: Phase and Chemical Equilibria**

Old Listing Effective Through Fall 2020:

Pure component phase properties, solution properties, equilibria among phases, equilibrium stage separations, chemical reaction equilibria. CH E 320 Phase and Chemical Equilibria (3) The course covers the fundamentals of phase and chemical equilibrium with emphasis on vapor/liquid systems and their applications to separation processes. It is the second course in chemical engineering thermodynamics and leads to the study of separations and reacting systems. Computational methodologies are presented for the calculation of the properties of mixtures and the construction of phase diagrams (P-x-y, T-x-y) using activity coefficients or equations of state. The theory is applied to the analysis of equilibrium stage separation such as distillation and extraction including the construction of McCabe-Thiele diagrams. In the last portion of the course the principles of equilibrium are further applied to chemically reacting systems.

Prerequisites: CHE 210 with minimum grade of “C”, CHE 220 with minimum grade of “C”

Changes Effective Spring 2021:

- Description
- Prerequisites

**CHE 330: Process Fluid Mechanics**

Old Listing Effective Through Fall 2020:

An integrated study of the fundamentals and the quantitative design techniques involving flow of fluids in chemical processes. CH E 330 Process Fluid Mechanics (3) This course introduces the principles of fluid mechanics that are of fundamental importance to chemical engineers. The list of topics discussed in this course include the mechanical principles governing fluid flow, stress in a fluid, conservation of mass and momentum, using differential and integral balances, elementary constitutive equations, hydrostatics, exact solutions of the Navier-Stokes equations, approximate solutions using control volume analysis, mechanical energy balances and Bernoulli’s equation, dimensional analysis and dynamic similarity, and introduction to boundary-layer theory and turbulence.

Prerequisites: CHE 210 with a minimum grade of “C”

Changes Effective Spring 2021:

- Description
- Prerequisites

**CHE 330H: Process Fluid Mechanics (Honors)**

Old Listing Effective Through Fall 2020:

An integrated study of the fundamentals and the quantitative design techniques involving flow of fluids in chemical processes.CH E 330H Process Fluid Mechanics (3) This course introduces the principles of fluid mechanics that are of fundamental importance to chemical engineers. The list of topics discussed in this course include the mechanical principles governing fluid flow, stress in a fluid, conservation of mass and momentum, using differential and integral balances, elementary constitutive equations, hydrostatics, exact solutions of the Navier-Stokes equations, approximate solutions using control volume analysis, mechanical energy balances and Bernoulli’s equation, dimensional analysis and dynamic similarity, and introduction to boundary-layer theory and turbulence.

Prerequisites: CHE 210 with minimum grade of “C”

Changes Effective Spring 2021:

- Description
- Prerequisites

**CHE 340: Introduction to Biomolecular Engineering**

Old Listing Effective Through Fall 2020:

Introduction to concepts and principles of biomolecular engineering, with emphasis on biotechnology and pharmaceutical industries. CHE 340 Introduction to Biomolecular Engineering (3) This course introduces students to the concepts and principles needed to apply chemical engineering principles to the analysis of biological systems, with particular emphasis on the biotechnology and pharmaceutical industries. Students will learn to use appropriate search engines to identify and characterize specific genes and proteins, discuss similarities and differences between biological and chemical processes, perform statistical analyses of biological data, and estimate rates of enzymatic reactions and bioreactor mass transfer. This course is required for the B.S. degree in Chemical Engineering.

Prerequisites: CHE 210 with “C” or better, BMB 251, CHEM 212

Changes Effective Spring 2021:

- Description
- Prerequisites

**CHE 350: Process Heat Transfer**

Old Listing Effective Through Fall 2020:

An integrated study of the fundamentals and the quantitative design techniques involving heat transfer in chemical processes. CH E 350
Process Heat Transfer (3) The objective of the course is to introduce to students heat transfer mechanisms in solids and fluids and their chemical process applications. At the conclusion of the course, the student should possess the ability to model steady and unsteady heat transfer in simple systems, and design heat exchangers and simple heat exchanger networks. The development of the material of this course requires use of thermodynamics and fluid mechanics, scheduled earlier in the curriculum, and sets the basis for the design of reactors and separation processes, which are covered in subsequent courses.

Prerequisites: CHE 210 with minimum grade of “C”

Changes Effective Spring 2021:

• Description
• Prerequisites

CHE 410: Mass Transfer Operations
Old Listing Effective Through Fall 2020:

Introduction to principles and applications of mass transfer, with focus on the design of equilibrium stage and continuous contacting separation processes. CH E 410 Mass Transfer Operations (3) The objective of this course is to present the principles of mass transfer and their application to separation and purification processes. The course integrates fluid dynamics and thermodynamics and proceeds to develop rate expressions for mass transfer in multiphase, multicomponent systems. Starting with Fick’s law and macroscopic balances the course moves to the design of large scale separation processes such as equilibrium stage separations (distillation, extraction) and continuous separation (absorption towers, scrubbers) for the separation and purification of chemical compounds. The course also introduces the use using modern software tools such as HySys, used in the actual design of such processes and also in the capstone design course.

Prerequisites: CHE 320 and either CHE 330 or CHE 350

Changes Effective Spring 2021:

• Description
• Prerequisites

CHE 430: Chemical Reaction Engineering
Old Listing Effective Through Fall 2020:

Chemical reaction rates and equilibria, reactors, reactor design; emphasis on industrial chemical processes. CH E 430 Chemical Reaction Engineering (3) This course teaches the principles of reaction engineering and reactor design. It is one of the core subjects in the chemical engineering curriculum and it is normally scheduled in the senior year. Students learn how to apply stoichiometry in combination with a rate law to design a chemical reactor that produces the desired conversion of reactants. The design of various types of chemical reactors is discussed at length, including continuous stirred-tank (CSTR), plug-flow (PFR), continuous-operation and batch-operation reactors. Additional topics include heterogeneous reactors, catalytic systems and fluidized beds, the design and optimization of reactor networks, and safety. The course integrates fluid mechanics and heat transfer to the design and analysis of isothermal and non-isothermal reactors. It leads to the capstone design course in which chemical reactors are integrated into a chemical plant.

Prerequisites: CHE 320

Changes Effective Spring 2021:

• Description
• Prerequisites

CHE 470: Design of Chemical Plants
Old Listing Effective Through Fall 2020:

Lectures and practicum on methods and calculations, including economic evaluations for the design of chemical plants; formal technical report required. CH E 470 Design of Chemical Plants (3) The chemical engineering capstone design course introduces the principles of process design and economic evaluation utilizing various industry computer tools, with special emphasis on process simulators. The student will develop critical design logic to evaluate a process, starting with block flow diagrams and simple material balances utilizing practical heuristics and then build the process flowsheet through computer simulation, flowsheet optimization, and detailed equipment design.

Prerequisites: CHE 410, CHE 430

Changes Effective Spring 2021:

• Description
• Prerequisites

CHEM 3: Molecular Science With Laboratory (3 Credits) (BA) (GN)
Old Listing Effective Through Fall 2020:

Selected concepts and topics designed to give non-science majors an appreciation for how chemistry impacts everyday life. Students who have received credit for CHEM 001, 101, or 110 may not schedule this course. CHEM 003 CHEM 003 Molecular Science with Laboratory (3) (BA) This course meets the Bachelor of Arts degree requirements. CHEM 003 is a course that includes both lecture and laboratory. It is designed for students who want to gain a better appreciation of chemistry and how it applies to everyone’s everyday life. You are expected to have an interest in understanding the nature of science, but not necessarily to have any formal training in the sciences. During the course, you will explore important societal issues that can be better understood knowing some concepts in chemistry. The course is largely descriptive, though occasionally a few simple calculations will be done to illuminate specific information. The course does rely on your ability to think systematically, and to relate things to each other. From year to year and instructor to instructor, the course may cover any number of a large variety of topics related to current events, including but not limited to: air and water pollution, ozone depletion, global warming, acid rain, new and old methods of energy generation and energy use in modern society, examples of production and use of modern polymers, examples of production and use of modern drugs, examples of the chemistry of nutrition, examples of advances in biochemistry and how they affect us. In the laboratory component, students will conduct experiments that are related to the lecture material being covered.

Changes Effective Spring 2021:

• Recertification
• Description

CHEM 106: Introductory and General Chemistry (5 Credits) (BA) (GN)
Old Listing Effective Through Fall 2020:

Introductory chemistry and chemical principles for students who are required to take additional chemistry, e.g., CHEM 112, but are unprepared for CHEM 110. CHEM 106 Introductory and General Chemistry (5) (GN)
(BA) This course meets the Bachelor of Arts degree requirements.
CHEM 106 is an extended version of the first-semester comprehensive general chemistry course. It includes more class time for preparing students so that they learn introductory chemistry and general college level chemistry in one semester. As in CHEM 110, CHEM 106 introduces students to the basic principles of chemistry with an emphasis on the relationships between the microscopic structure and macroscopic properties of matter. Principles are illustrated with a wide variety of examples from the sciences, from engineering and technology, and from everyday life. The course covers the following topics: matter and measurement, molecules and molecular compounds, ions and ionic compounds, chemical reaction types, atomic and molecular weights, the mole, quantitative calculations with chemical reactions, the periodic table, nomenclature, aqueous reactions and solution stoichiometry, thermochemistry, electronic structure of atoms, periodic properties of the elements, chemical bonding, molecular geometry, the gaseous, liquid, and solid states of matter, properties of solutions, some basic aspects of chemical equilibrium, and applications to the real world including environmental chemistry. GN credit for CHEM 106 requires that CHEM 111 also be completed.

Prerequisites: Completion or placement of MATH 22 or higher

Changes Effective Spring 2021:

• Add General Education Recertification
• Credits
• Description
• Corequisite

CHEM 110H or CHEM 106 Fundamentals of Organic Chemistry I (3 Credits)
Old Listing Effective Through Fall 2020:

Introduction to organic chemistry, with emphasis on the properties of organic compounds of biochemical importance. Because of duplication of subject matter, students may not receive credit for both CHEM 202 and CHEM 210. CHEM 202 CHEM 202 Fundamentals of Organic Chemistry I (3) CHEM 202 is a one-semester, comprehensive course that introduces the students to the fundamental principles of organic chemistry including relationships between the molecular structure of organic compounds and their macroscopic properties. Some of the principles are illustrated with a variety of examples from nature and everyday life. The course covers the following topics: alkanes; alkenes, including polymers; alylens; benzene and aromaticity; alcohols and phenols; ethers; aldehydes; ketones; carboxylic acids and their acyl derivatives; amines; alkyl halides; nomenclature; stereochemistry, including conformational analysis and chirality. Chemical reactions of the functional groups will be discussed along with the mechanistic details, including stereospecificity, of some of these processes. Biological molecules such as carbohydrates, lipids, steroids, peptides/proteins and nucleic acids, along with their importance in living systems, will be surveyed.

Approved Start: 201819FA

Prerequisites: Enforced Prerequisite at Enrollment: CHEM 101 or CHEM 110 CHEM 110H or CHEM 106

Changes Effective Spring 2021:

• Prerequisites

CHEM 113B: Experimental Chemistry II–Bioscience (1 Credit) (GN)
Old Listing Effective Through Fall 2020:

A continuation of CHEM 111 with emphasis on topics related to CHEM 112 in the context of bioscience. CHEM 113B Experimental Chemistry II – Bioscience (1) CHEM 113B is a one-credit introductory general chemistry laboratory course meant to complement the lecture course CHEM 112. This course builds on material learned in CHEM 111. It has the same goals, and covers similar topics to CHEM 113, and for this reason should count as CHEM 113, regardless of major. The main difference is that CHEM 113B covers chemical topics in the context of experiments with biological relevance. The emphasis is on quantitative analytical procedures. Essential material covered includes proper use of a laboratory notebook, writing of a formal laboratory report, use of the chemistry literature, experimental design, interpretation of data using statistics, laboratory safety procedures, and an appreciation for what instruments can and cannot do. The course introduces laboratory experimentation in the context of a variety of specific topics, for example: alcohols; enzyme kinetics; acid-base equilibria and titrations; separations of compounds using paper and liquid chromatography, separations using gas chromatography. GN credit for CHEM 113B requires that CHEM 112 or CHEM 112H also be completed.

Prerequisite: CHEM 111. Prerequisite or Concurrent: CHEM 112 or CHEM 112H

Changes Effective Spring 2021:

• Recertification
• Description

CHEM 202: Fundamentals of Organic Chemistry I (3 Credits)
Old Listing Effective Through Fall 2020:

CHEM 202 is an extended version of the first-semester comprehensive general chemistry course. It includes more class time for preparing students so that they learn introductory chemistry and general college level chemistry in one semester. As in CHEM 110, CHEM 202 introduces students to the basic principles of chemistry with an emphasis on the relationships between the microscopic structure and macroscopic properties of matter. Principles are illustrated with a wide variety of examples from the sciences, from engineering and technology, and from everyday life. The course covers the following topics: matter and measurement, molecules and molecular compounds, ions and ionic compounds, chemical reaction types, atomic and molecular weights, the mole, quantitative calculations with chemical reactions, the periodic table, nomenclature, aqueous reactions and solution stoichiometry, thermochemistry, electronic structure of atoms, periodic properties of the elements, chemical bonding, molecular geometry, the gaseous, liquid, and solid states of matter, properties of solutions, some basic aspects of chemical equilibrium, and applications to the real world including environmental chemistry. GN credit for CHEM 202 requires that CHEM 111 also be completed.

Prerequisites: Completion or placement of MATH 22 or higher

Changes Effective Spring 2021:

• Add General Education Recertification
• Credits
• Description
• Corequisite

CHEM 202 is an extended version of the first-semester comprehensive general chemistry course. It includes more class time for preparing students so that they learn introductory chemistry and general college level chemistry in one semester. As in CHEM 110, CHEM 202 introduces students to the basic principles of chemistry with an emphasis on the relationships between the microscopic structure and macroscopic properties of matter. Principles are illustrated with a wide variety of examples from the sciences, from engineering and technology, and from everyday life. The course covers the following topics: matter and measurement, molecules and molecular compounds, ions and ionic compounds, chemical reaction types, atomic and molecular weights, the mole, quantitative calculations with chemical reactions, the periodic table, nomenclature, aqueous reactions and solution stoichiometry, thermochemistry, electronic structure of atoms, periodic properties of the elements, chemical bonding, molecular geometry, the gaseous, liquid, and solid states of matter, properties of solutions, some basic aspects of chemical equilibrium, and applications to the real world including environmental chemistry. GN credit for CHEM 202 requires that CHEM 111 also be completed.

Prerequisites: Completion or placement of MATH 22 or higher

Changes Effective Spring 2021:

• Add General Education Recertification
• Credits
• Description
• Corequisite

CHEM 202 is an extended version of the first-semester comprehensive general chemistry course. It includes more class time for preparing students so that they learn introductory chemistry and general college level chemistry in one semester. As in CHEM 110, CHEM 202 introduces students to the basic principles of chemistry with an emphasis on the relationships between the microscopic structure and macroscopic properties of matter. Principles are illustrated with a wide variety of examples from the sciences, from engineering and technology, and from everyday life. The course covers the following topics: matter and measurement, molecules and molecular compounds, ions and ionic compounds, chemical reaction types, atomic and molecular weights, the mole, quantitative calculations with chemical reactions, the periodic table, nomenclature, aqueous reactions and solution stoichiometry, thermochemistry, electronic structure of atoms, periodic properties of the elements, chemical bonding, molecular geometry, the gaseous, liquid, and solid states of matter, properties of solutions, some basic aspects of chemical equilibrium, and applications to the real world including environmental chemistry. GN credit for CHEM 202 requires that CHEM 111 also be completed.

Prerequisites: Completion or placement of MATH 22 or higher

Changes Effective Spring 2021:

• Add General Education Recertification
• Credits
• Description
• Corequisite

CHEM 202 is an extended version of the first-semester comprehensive general chemistry course. It includes more class time for preparing students so that they learn introductory chemistry and general college level chemistry in one semester. As in CHEM 110, CHEM 202 introduces students to the basic principles of chemistry with an emphasis on the relationships between the microscopic structure and macroscopic properties of matter. Principles are illustrated with a wide variety of examples from the sciences, from engineering and technology, and from everyday life. The course covers the following topics: matter and measurement, molecules and molecular compounds, ions and ionic compounds, chemical reaction types, atomic and molecular weights, the mole, quantitative calculations with chemical reactions, the periodic table, nomenclature, aqueous reactions and solution stoichiometry, thermochemistry, electronic structure of atoms, periodic properties of the elements, chemical bonding, molecular geometry, the gaseous, liquid, and solid states of matter, properties of solutions, some basic aspects of chemical equilibrium, and applications to the real world including environmental chemistry. GN credit for CHEM 202 requires that CHEM 111 also be completed.

Prerequisites: Completion or placement of MATH 22 or higher

Changes Effective Spring 2021:

• Add General Education Recertification
• Credits
• Description
• Corequisite
advocacy, prosecution, and prevention of child maltreatment as well as the treatment of adverse health outcomes for children who have been maltreated. Specific topics include the causes, correlates, and consequences of child maltreatment, best practices for reporting and investigating an allegation of child maltreatment, evidence-based prevention and intervention programs, the Child Welfare System, and relevant legal issues (e.g., termination of parental rights, children’s testimony in court, etc.). By definition, this course will detail issues related to the abuse and neglect of children. This material can be difficult to hear, view, and discuss. This course is a required course, and a prerequisite for all advanced courses, for a Minor in Child Maltreatment and Advocacy Studies.

Cross-Listed Courses: HDFS 258 SOC 258

CHANGES effective Spring 2020:
- Add GHW and GS Attribute
- Inter-Domain

CMLIT 10U: The Forms of World Literature: A Global Perspective (3 Credits) (H) (IL) (GH) (BA)
Old Listing Effective Through Fall 2020:
The development of literature around the world—from epic, legend, lyric, etc. in the oral tradition to modern written forms. CMLIT 10U The Forms of World Literature: A Global Perspective (3) (GH;IL)(BA) This course meets the Bachelor of Arts degree requirements. As a one-semester introduction to the range and diversity of world literature from the ancient past to the present, CMLIT 10U is intended to help you read (or listen to) a work of literature from any time or place and to appreciate it more fully—whether it belongs to the more familiar types of literature you may have read in the Western tradition or is a fable, folktale, hero story, play, or narrative from another cultural tradition. You will practice expressing your ideas through written exams and in-class and on-line discussions/activities. Discussion sessions allow interaction with the instructor and with other students in the class. This course presents a global sampling of masterpieces of world literature. Students will become familiar with various literary genres and become proficient in the analysis of the similarities and differences between texts from many different time periods and cultures. CMLIT 10U is one of the choices of survey courses which can count toward the Comparative Literature major and the World Literature minor. This course also fulfills the General Education humanities requirement, the Bachelor of Arts humanities requirement, and the United States and International requirement.

Changes Effective Spring 2021:
- General Education Recertification
- Description

CMLIT 11: The Hero in World Literature (3 Credits) (IL) (BA) (GH)
Old Listing Effective Through Fall 2020:
The figure of the hero/heroine examined in world literature as a vehicle for expressing social and cultural values. CMLIT 011 The Hero in World Literature (3) (GH;IL)(BA) This course meets the Bachelor of Arts degree requirements. This course will examine the concept of heroism and of heroes throughout the world in different time periods and different literary genres. We will examine different types of heroes and theories of heroism, as well as gender relations involved in concepts of heroes/heroines, and the roles of anti-heroes, villainous heroes, and the enemies of heroes. Heroes represent the most ideal values of a particular society. By examining heroes revered by a variety of societies, a greater awareness of values both specific to individual cultures and universal across cultures can be reached. Through comparisons of a variety of heroes, literary and social roles in the formulation and manipulation of heroic types can be assessed. The objectives of this course include expanding your awareness of the values of different cultures, examining the consequences of value systems as explored in literature, and increasing your skills of critical analysis on a body of literature designed to encourage you to accept, reject, or question specific ideas of good and evil, proper behavior, and appropriate action within cultural contexts. CMLIT 011 is one of the many choices of survey courses which count towards the Comparative Literature major and the World Literature minor. This course also fulfills the General Education Humanities requirement, the Bachelor of Arts Humanities requirement, or the United States and International requirement.

Changes Effective Spring 2021:
- General Education Recertification
- Description

CMLIT 83: First-Year Seminar in Comparative Literature (3 Credits) (IL) (FYS) (GH) (BA)
Old Listing Effective Through Fall 2020:
International topics in literature and culture; each seminar will have a specific topic as announced (see the Comparative Literature Web site). CMLIT 083S First-Year Seminar in Comparative Literature (3) (GH;FYS;IL) (BA) This course meets the Bachelor of Arts degree requirements. One of the most important trends of our time is the increasing emphasis on internationalism and globalization. This course offers an international, intercultural approach to the study of literature, crossing the boundaries of time, place, nationalities, languages, and cultures. The range of literature taught in Comparative Literature as a discipline draws from every continent of the globe and from the ideas, experiences, and inspiration of women and men across thousands of years. With an entire world of literature to choose from, the content of the course varies with the expertise and interests of the faculty member. Sample topics include ‘Literature and Illness,’ ‘Literary Reflections of Biblical Themes,’ ‘The Power of Literature to Change Our Lives,’ and America Seen Through Foreign Eyes.’ Each seminar focuses on a specific topic that highlights the nature of literary study and research, presents debates in the discipline, and opens the way to further investigations. Topics for each semester are posted on the department’s website: . At the end of the seminar, students will be acquainted with representative texts from multiple literatures, with the methods of comparative literature study, and with selected important literary genres, themes, periods, and styles. This seminar can be used to fulfill the General Education or Bachelor of Arts Humanities requirement, the Intercultural/International Competence requirement, and the first-year seminar requirement. Students will have gained experience in writing, speaking, information synthesis, and international approaches. The seminar will help prepare students for a variety of additional courses in literature and the humanities generally.In addition to the academic topic of this course, students should gain a general introduction to the University as an academic community, including exploring their responsibilities as members of that community. They should also develop an understanding of the academic tools and resources available to them, including the opportunity to work with faculty and other students who share their academic interests.

Changes Effective Spring 2021:

CMLIT 108: Myths and Mythologies (3 Credits) (IL) (GH) (BA)
Old Listing Effective Through Fall 2020:

World mythology: myths primarily of non-Western cultures, based on
selected areas and traditions around the world. CMLIT 108 Myths and
Mythologies (3) (GH;IL)(BA) This course meets the Bachelor of Arts
degree requirements. This course offers a survey of several different
cultural traditions as expressed in myth, as well as discussion of myth
in its literary, social, geographical, political, and religious contexts.
Various theories of the evolution and analysis of myth will be examined.
Mythological traditions from around the globe will be compared in order
to determine qualities which they share and examine ways in which
they are unique. This course will help you see the world in new and
exciting ways, based on the wide variety of global myths. At the same
time, you will consider the permanent human issues which connect all
of these traditions to each other, to the modern world, and to you. CMLIT
108 is one of the choices of survey courses, which count toward the
Comparative Literature major and the World Literature minor. This course
also fulfills the General Education humanities requirement, the Bachelor
of Arts humanities requirement, the United States and International
Cultures requirement, or the B.A. other cultures requirement.

Changes Effective Spring 2021:

• Recertification
• Description

CMLIT 184: The Short Story (3 Credits) (IL) (GH) (BA)
Old Listing Effective Through Fall 2020:

The desire to tell stories and to be told stories is one of the most basic
human needs, and all cultures have been defined in part by the stories
they hear and the stories they tell. We are not born, however, knowing
how to read the short story — or any fiction for that matter. Rather it is a
skill that one acquires and must practice over time. To this end, we will
explore the historical development of the short story genre throughout
the world, and we will examine how historical contexts relate to the
content and style of the stories under discussion. We may pay particular
attention to short story cycles — groups of short stories published
together in one volume. We will become familiar with how individual
stories are put together and with the vocabulary that is used to discuss
fiction — terms such as plot, narrative, character, tone, language, closure,
irony, imagery, and so forth.

Cross Listing: ENGL 184

Changes Effective Spring 2021:

• Description

CMLIT 189: Modern Drama (3 Credits) (IL) (BA) (GH)
Old Listing Effective Through Fall 2020:

Playwrights who set the world’s stage for twentieth-century drama;
issues that continue to shape the contemporary theatrical world. CMLIT
(ENGL) 189 The Founders of Modern Drama (3) (GH)(BA) This course
meets the Bachelor of Arts degree requirements.
CMLIT/ENGL 189 will constitute a wide-ranging study of plays by authors
often credited with the making of modernist drama. The class will
approach these plays from a variety of thematic, historical, and/or generic
vantages. Authors under consideration will vary from class to class, but
may include writers such as Ibsen, Strindberg, Chekhov, Shaw, Wilde,
Galsworthy, O’Neill, Beckett, and Yeats. Topics under consideration will
vary from class to class but may include a chronological introduction
to the development of modern drama, a consideration of a principal
theme or themes in modern drama through a number of plays, or a
consideration of plays in the context of historical events or formal or
aesthetic elements. Time allotted for the study of the works under
consideration will vary. This class will prepare students for advanced
courses in dramatic literature as well as other academic courses that
engage in the verbal and written analysis of complex written texts. The
course may be used as an English or Comparative Literature major credit
or as credit toward the English or Comparative Literature minor.

Cross-Listed Courses: ENGL 189

Changes Effective Spring 2021:

• General Education Recertification
• Description

CM PEN 331: Computer Organization And Design (3 Credits)
Old Listing Effective Through Fall 2020:

INTRODUCTION TO MAJOR COMPONENTS OF A COMPUTER SYSTEM,
HOW THEY FUNCTION TOGETHER IN EXECUTING A PROGRAM, HOW
THEY ARE DESIGNED. CMPEN 331 Computer Organization and Design
(3) The goals of the course are to introduce students to the major
components of a computer system (the data path, the control path,
the memory system, the I/O system), how they function together in
executing a program, and how they are designed. The relationships
between instruction set design, addressing modes, fetch and execute
operations, and their impact on the underlying architecture are presented.
Students will develop skills both in assembly language programming and
in designing architecture components in a hardware description language
(VHDL or verilog). CMPEN 331 requires access to PCs/workstations with commercial hardware description language tools
(e.g., Synopsys VSS compiler and simulator) and a modern assembler/
debugger (e.g., SPIM MIPS assembler, simulator, and debugger).

Prerequisite: CMPEN 271 or CMPEN 270; CMPSC 121 or CMPSC 201

Changes Effective Spring 2021:

• Prerequisite

CM PEN 482W: Computer Engineering Project Design (3 Credits)
Old Listing Effective Through Fall 2020:

Computer engineering design project, project management,
documentation, reporting, and group and individual communication
skills. CMPEN 482W Computer Engineering Project Design (3) The two
principle goals of CMPEN 482W are (1) to introduce the fundamentals
of systems engineering and systems engineering management, and (2)
to develop written and oral communication skills. The course explores
the process of translating a problem statement into an effective and
economical computer system that meets the needs of the customer.
Topics include a comparison of popular process models, analysis and
derivation of requirements, requirements allocation and flow down, the
work breakdown structure, object-oriented analysis and modeling, the
design and development of the user interface, reliability engineering,
scheduling, costing, and ethics. Communication skills are developed
through oral presentations and a sequence of writing assignments,
beginning with a description of requirements and leading to a final design document. CMPEN 482W is not a Prerequisite for any other course. CMPEN 482W requires access to PCs or Unix workstations having a C++ compiler. Other specialty hardware or software may be required on a semester-by-semester basis.

Prerequisite: EE 310; EE 353; CMPSC 473; ENGL 202C

Changes Effective Spring 2021:
  • Prerequisite
  • Concurrent
  • Recommended Preparation

CMPSC 360: Discrete Mathematics for Computer Science (3 Credits)
Old Listing Effective Through Fall 2020:
Discrete mathematics and foundations for modern computer science. Topics include sets, relations, logic, algorithms, graphs, finite state machines and regular expressions.

Prerequisites: CMPSC 122

Changes Effective Spring 2021:
  • Remove Prerequisite
  • Concurrent

CMPSC 443: Introduction to Computer and Network Security (3 Credits)
Old Listing Effective Through Fall 2020:
Introduction to theory and practice of computer security with an emphasis on Internet and operating system applications.

Prerequisites: CMPSC 473, CMPEN 362

Changes Effective Spring 2021:
  • Prerequisite
  • Concurrent

CMPSC 448: Machine Learning and Algorithmic AI (3 Credits)
Old Listing Effective Through Fall 2020:
Evaluation and use of machine learning models; algorithmic elements of artificial intelligence.

Prerequisites: STAT 319 or STAT 415 and CMPSC 122 or prior programming experience

Changes Effective Spring 2021:
  • Prerequisite

CMPSC 450: Concurrent Scientific Programming (3 Credits)
Old Listing Effective Through Fall 2020:
Problems of synchronization, concurrent execution, and their solution techniques. Design and implementation of concurrent software in a distributed system.

Prerequisite: CMPSC 121, CMPSC 201 or CMPSC 202; MATH 220; MATH 230 or MATH 231

Changes Effective Spring 2021:
  • Prerequisite

CMPSC 462: Data Structures (3 Credits)
Old Listing Effective Through Fall 2020:
In-depth theoretical study of data structures such as balanced trees, hash tables, priority queues, B-trees, binomial heaps, and Fibonacci heaps. CMPSC 462 Data Structures (3) The primary goals of this course are (1) to provide the students with a set of basic data structures useful in the design of efficient algorithms, and (2) to provide the students with the ability to design and analyze new data structures as needed to solve problems. The secondary goal of this course is to introduce basic algorithm analysis techniques to prepare the students for the follow up course CMPSC 463, Design and Analysis of Algorithms. This is a required course in the BS COMP program. It is also a prerequisite for a number of other courses in the COMP program such CMPSC 463, 460, 430, etc.

Prerequisite: CMPSC 360

Changes Effective Spring 2021:
  • Prerequisite

CMPSC 465: Data Structures and Algorithms (3 Credits)
Old Listing Effective Through Fall 2020:
Fundamental concepts of computer science: data structures, analysis of algorithms, recursion, trees, sets, graphs, sorting.

Prerequisites: CMPSC 122; CMPSC 360 or MATH 311W

Changes Effective Spring 2021:
  • Prerequisite

CMPSC 483: Software Design Methods (3 Credits) (WF)
Old Listing Effective Through Fall 2020:
Applications of scientific knowledge and methods in the design and construction of computer software using engineering concepts.

Prerequisites: CMPSC 221; CMPSC 465; ENGL 202C

Changes Effective Spring 2021:
  • Prerequisite
  • Recommended Preparation

COMM 450A: Search Engine Marketing (3 Credits: Maximum of 3 Credits)
Old Listing Effective Through Fall 2020:
This project-oriented course provides students with the knowledge and skills necessary to conduct a sponsored research and keyword advertising-based marketing campaign. This course offers the students an opportunity to gain knowledge and hands on experience on sponsored search and keyword advertising. In this course, students will gain knowledge and skills to advertise products and services using keyword advertising. Strategies for developing successful advertising campaigns will be discussed, including targeting potential customers based on the geo-location, applying A/B testing to identify the feasible advertising set-up, and organizing keywords with various products and services for effective management. In addition, various tools will be introduced to students for facilitating efficient and effective performance. By
participating in a firm-based project, the students will acquire the experience of business consulting for advertising using current web-based techniques.

Prerequisite: COMM 310 or IST 310
Cross-Listing: IST 450A

Changes Effective Spring 2021:

• Enforced Prerequisite

COMM 470B: Convergent Media News Service: TV
Old Listing Effective Through Fall 2020:

Practicum emphasizing television news package production for periodic campus news program and for additional media formats. The digital revolution and cross media ownership has challenged all areas of communications, especially the electronic and print news media. Post media outlets now have an online presence along with their traditional operations. Increasingly news outlets are producing news packages for more than one media outlet, which can include online production of breaking news reports presented with text, images, movies and/or sound bites. Currently students preparing for news careers must have traditional news skills across media along with multimedia computerbased skills to develop versatility in reporting and production. This practicum in streaming radio and online news provides opportunities to produce pieces for streaming radio and online publications and also to reformat these pieces for other media outlets such as the newspaper or television. It will also give students the opportunity to produce news pieces suitable for a crossmedia portfolio.

Prerequisites: Enforced Prerequisite at Enrollment: (COMM 260W and COMM 242) or COMM 282 or permission of the program.

Changes Effective Spring 2021:

• Description
• Enforced Prerequisites

COMM 470C: Convergent Media News Service: Radio and Online Publications
Old Listing Effective Through Fall 2020:

Practicum emphasizing streaming radio news package production or production of news pieces for online publications and for additional media formats. The digital revolution and cross media ownership has challenged all areas of communications, especially the electronic and print news media. Most media outlets now have an online presence along with their traditional operations. Increasingly news outlets are producing news packages for more than one media outlet, which can include online production of breaking news reports presented with text, images, movies and/or sound bites. Currently students preparing for news careers must have traditional news skills across media along with multimedia computerbased skills to develop versatility in reporting and production. This practicum in streaming radio and online news provides opportunities to produce pieces for streaming radio and online publications and also to reformat these pieces for other media outlets such as the newspaper or television. It will also give students the opportunity to produce news pieces suitable for a crossmedia portfolio.

Prerequisites: Enforced Prerequisite at Enrollment: (COMM 260W and COMM 270) or COMM 374 or permission of program.

Changes Effective Spring 2021:

• Description
• Enforced Prerequisites

COMM 490A: Convergent Media Seminar
Old Listing Effective Through Fall 2020:

This seminar examines media convergence issues, trends, and effects on society through discussions, presentations, and creation of a capstone project.

Prerequisites: Enforced Prerequisite at Enrollment: (COMM 470A and COMM 470B) or COMM 470C and seventh semester or higher.

Changes Effective Spring 2021:

• Enforced Prerequisites

CRIM 12: Criminology (3 Credits) (GS) (BA)
Old Listing Effective Through Fall 2020:

Explanations and measurement of crime; criminal law; characteristics of criminals and victims; violent, property, white-collar, organized, and sexual crimes. SOC (CRIMJ /CRIM) 012 Criminology (3) (GS) (BA) This course meets the Bachelor of Arts degree requirements.Criminology is the study of the causes of criminal behavior. As such this course is an introduction to the topic with special focus on the major theories explaining criminal behavior including differential association, anomie, control theory and labeling theory. A key focus of the class is examining the most recent scientific research testing the basic theories. The students learn the various research techniques that have been used to study criminal behavior including crime statistics such as the Uniform Crime Report that serves as a monitor on crime trends. Several important areas of study that link understanding criminal behavior and its distribution across the social system are investigated including age, gender, race and ethnicity. One goal of the course is to promote a more complete understanding of crime and how it is enmeshed in human social life. The course concludes by using the knowledge base generated in the course to study the link of our understanding of criminal behavior and the emerging crime control policies of the past few decades. Finally, the course reviews the impact and effectiveness of some of these policies. Throughout the course, the lectures as well as the readings emphasize the complexity of explaining human behavior and criminal behavior in particular. One aspect of the course is the use of a term paper on the objective and subjective availability of crime to the student. This paper emphasizes the complexity of the student’s social life and the role that these factors may have on whether they have engaged in criminal behavior and their analysis of the causes of their criminal behavior. This project personalizes the various theories and helps the student understand the importance of their social environment in whether they have or will engage in crime. Discussion and questions are encouraged in all sections. Sections of this course may include group research projects, debates, and library or internet-based research. Along with personal contact, students have the opportunity to communicate with teaching assistants and faculty members via e-mail. Writing assignments, along with in-class examinations, are required in all sections. This course meets a General Education requirement in the Social and Behavioral Sciences for non majors, is required for the CLJBA and CLJBS majors, and may be used in the SOC majors and minors.

Cross Listing: SOC 12; CRIMJ 12

Changes Effective Spring 2021:
CRIM 201: Presumed Innocent? Social Science of Wrongful Conviction (3 Credits) (GS)
Old Listing Effective Through Fall 2020:

Social science of how wrongful convictions occur; disparities in the criminal justice system; risks, factors, and policies.

Cross Listing: SOC 201

Changes Effective Spring 2021:

- Recertification
- Description

CRIM 250W: Research Methods in Criminology (3 Credits) (WAC)
Old Listing Effective Through Fall 2020:

The purpose of this writing-intensive course is to engage students in the social scientific research process used by criminologists to answer empirical research questions. It is the second course (after CRIM 249) that overviews theory and research in criminology. Students learn to use social science research methods through instructor-led demonstrations and applications of research methods, data analysis exercises, and critical reading of published research. Students apply their research knowledge and skills to an empirical research project completed in a sequence of steps producing written drafts that receive instructor feedback. After completion of this course, students will have acquired the following knowledge and skills: (1) The ability to generate a research question and effectively and efficiently search and review the relevant research literature. (2) A working knowledge of how to apply social science research methods and research designs to answer research questions. (3) The ability to strategically read published research articles to extract different types of information. (4) An understanding of the inductive and deductive aspects of the research process. (5) The ability to collect, analyze, and interpret quantitative and qualitative data. (6) The ability to design a quantitative research project to test hypotheses of interest to criminologists. (7) The ability to summarize and explain in writing the methods used and results derived from studies seeking answers to a common research question. (8) An understanding of social science research methods needed to be critical consumers of research and claims about crime, criminal behavior, and social response to them. (9) A certified knowledge about ethical issues in social science research.

Prerequisite: CRIM 249, STAT 200

Changes Effective Spring 2021:

- Add Cross-Listing

CRIMJ 100: Introduction to Criminal Justice
Old Listing Effective Through Fall 2020:

Overview of the criminal justice system, including legal foundations, processing and correction of offenders, extent and types of crime, victims. CRIMJ 100 CRIMJ (CRIM) 100 Introduction to Criminal Justice (3)(BA) This course meets the Bachelor of Arts degree requirements. This course provides an overview of the criminal justice system in the United States. Topics to be covered include: the extent of crime in the United States; competing and complementary goals of the criminal justice system; sources of criminal law; the history and development of the system; the functions of police, attorneys, courts and correctional agencies; the interactions between different parts of the system; and the impact of crime on the victim. Students are evaluated on two exams (20% each), two written assignments (30%), and a final exam (30%). This course is a prescribed course in the CLJBA, CLJBS, ADM J BS and ADM J BA majors, and it is also a prerequisite for most 400-level courses in Crime, Law, and Justice.

Cross-Listed Courses: CRIM 100

Changes Effective Spring 2021:

- General Education Recertification
- Description

CSD 269: Deaf Culture (3 Credits) (US) (IL) (GS)
Old Listing Effective Through Fall 2020:

Explores the economic, social, psychological, and political aspects of the deaf culture and its interaction with the majority hearing culture. CSD 269 CSD 269 Deafness and Society (3) (GS;US;IL) explore this community as being a distinct culture having its own rules of social interaction, values, group norms, and identity. The educational objectives are that the student will acquire an understanding of: 1) the development of the American Deaf Community, 2) factors affecting an individual's choice to affiliate with the Deaf Community, 3) history and current trends in deaf education, 4) American Sign Language (ASL) and other forms of communication used by Deaf Americans, 5) social, emotional, and psychological aspects of deafness, 6) diversity with the Deaf Community, and 7) deafness in the literature, media, and the arts.

Changes Effective Spring 2021:

- General Education Recertification

CSD 462: Clinical Bases of Language Disorders (3 Credits: Maximum of 3 Credits) (US) (IL)
Old Listing Effective Through Fall 2020:

Description of pathological language and cognitive development, and principles of assessment and remediation among individuals with communication disorders. The course is required for Communications Sciences and Disorders majors, and should be taken during the third or fourth year. The course is designed to be an overview of language disorders with emphasis given to child language disorders. Specifically, the course provides information with a wide range of language disorders that affect individuals having different disabilities such as autism, hearing impairment, mental retardation, cerebral palsy, specific language impairment, learning disabilities, and traumatic brain injury. Through lecture, active learning experiences, and out-of-class assignments, students will learn to differentiate communication characteristics and associated problems for specific populations and become familiar with basic assessment and intervention principles. In addition, students will gain information of associated educational and medical problems common to individuals with language disorders.

Enforced Prerequisite at Enrollment: CSD 300

Changes Effective Spring 2021:

- Abbreviated Title
- Description
DANCE 100: Dance Appreciation (3 Credits) (IL) (US) (GA)
Old Listing Effective Through Fall 2020:

Explore dance as a vital, communicative and performing art, reflecting social values and cultural beliefs. DANCE 100 Dance Appreciation (3) (GA;US;IL) (BA) This course meets the Bachelor of Arts degree requirements. An introduction to dance as a vital, communicative and performing art reflecting social values and cultural beliefs. Through a combination of lectures, video samples, and active participation in scheduled movement classes, lecture demonstrations and live performances, this course will examine a wide range of dance across cultures and time periods. Students will learn to identify the key components of movement: time, space, shape and effort. Once identified, these elements will become the building blocks for further analysis and understanding of the myriad forms of movement that can be called dance. Emphasis will be placed on the integration of dance within various cultural belief systems and the relationship between dance and cultural identity. The influence of social and political values as they relate to the development of specific dance forms will also be examined. Students will be graded on their ability to clearly and intelligently articulate their observations and analysis through participation in threaded discussions and on-line quizzes. Students will also be graded on their level of participation in scheduled movement classes, lecture demonstrations and attendance at live performances. The mid term and final exams will assess the students ability to integrate and synthesize the experiential components of the course.

Changes Effective Spring 2021:

• Recertification
• Description

DANCE 170: Conditioning for Dancers (1.5 Credits: Maximum of 3 credits) (GHA)
Old Listing Effective Through Fall 2020:

This course is designed to improve technique through strengthening, toning, improving coordination, increasing balance, and helping alignment. The course also addresses common areas of injury.

Prerequisite: and dance course

Changes Effective Spring 2021:

• Recertification
• Abbreviated Title
• Title
• Description
• Remove Prerequisite

DANCE 220: Mojah Fusion Dance (1.5 Credits: Maximum of 3 Credits)
Old Listing Effective Through Fall 2020:

Mojah introduces intermediate/advanced level dance students to a unique dance technique that blends Horton, Dunham, West African and jazz movements in one form. DANCE 220 Mojah Fusion Dance (1.5 per semester/maximum of 3) DANCE 282 is an introduction to the Mojah dance form. Mojah is a Swahili term meaning one. Mojah fuses various forms to create a unique style of modern African dance that blends Horton, Dunham, West African and jazz movements into one form. The objectives of the course include: learning/executing Mojah terminology and technique; and learning/executing the techniques from which Mojah is derived. Mojah is a dance course and is directly related to other dance courses, theatre/arts courses and African American studies courses.

Prerequisite: DANCE 231, DANCE 241 or DANCE 261 or permission of the program

Changes Effective Spring 2021:

• Prerequisites

DANCE 232: Beginning Ballet II (1.5 Credits)
Old Listing Effective Through Fall 2020:

A continuation of Beginning Ballet I to augment technical proficiency. DANCE 232 Beginning Ballet II (1) DANCE 232 allows the student who has successfully completed DANCE 231 to continue broadening their knowledge of fundamental movements in ballet. The barre warm-up and the center floor work is more demanding and challenges the student to learn the combinations of movement quicker. Choreography is more complex, involving more different kinds of turns, large jumps, and adding beats to the petit allegro. Adagios are longer and demand more stamina to sustain. The ability to communicate character and mood through dance is emphasized more strongly. The student will deepen their knowledge of the Zena Rommett floor barre techniques and Pilates techniques to develop more strength and flexibility. The development of increased self-awareness and discipline is stressed. The student's grade is determined by their attendance, attitude, and progress. Also, to supplement their understanding of the variety of ways ballet can be performed, the student is required to write two papers, expressing their reactions to two different dance concerts viewed during the semester. Classical ballet concerts are preferred, but the student is encouraged to consult the instructor concerning a performance they are interested in viewing. Dates will be designated for the completion of these papers. No late papers will be accepted. Attendance is mandatory; more than three absences or lateness will affect the grade. The attitude should be positive, receptive to correction, and exhibit an eagerness to work, and the student's progress should reflect growth in their ability to perform the choreography and to know the terms used. The student will be required to identify and explain the meaning of the terms used in class, as well as perform choreography with confidence and a sense of character. Students enrolling in this course should have successfully complete DANCE 231 or have received the permission of the instructor. For the BFA Music Theatre candidate, this course serves as a prerequisite for DANCE 241, Beginning Jazz I. Part of the final exam for this course will be a performance juried by members of the School of Theatre Performance Faculty. Their evaluation will help to determine whether the candidate may be allowed to enroll into the next level of the performance course sequence. Required dress for this course for women is black leotard, pink or tan tights, pink ballet shoes and for men is black tights, white t-shirt, black ballet shoes, and dance belt. Belts, suspenders, leg warmers are optional. Sweat clothes are not to be worn. All hair must be secured so that it cannot fly into the face.

Prerequisite: DANCE 231

Changes Effective Spring 2021:

• Prerequisites

DANCE 251: Beginning Tap I (1.5 Credits)
Old Listing Effective Through Fall 2020:

An introduction to the technique of tap dance. DANCE 251 Beginning Tap I (1) DANCE 251 is an introduction to basic tap techniques. The course
is designed for any beginning student with an interest in tap dance, those who are BFA Music Theater candidates, and Dance Minors. The work will include awareness of space, sound, rhythm, and tempo. The work will also introduce counting, executing rhythm, and developing confidence for a beginner level tap dancer. The student will learn basic tap vocabulary as well as the awareness of space and stage elements such as audience, direction, focus, and energy. The student's grade will be based on attendance, attitude, and progress of learning and performing dance combinations. More than three absences or lateness will affect the grade. Maintaining a positive attitude, proper discipline, and willingness to work and learn are essential. The student is required to perform individual rehearsal hours (as homework). Students are responsible for learning and executing all material taught in class. This course serves as a prerequisite for DANCE 252. Together, the two semesters of jazz satisfy requirements for the BFA Music Theater option and the Dance Minor. The BFA Music Theater student will be juried by the School of Theatre Performance Faculty as a part of their final grade. The jury will consist of a showing of the pieces taught in class. This evaluation will help to determine whether the candidate may be allowed to enroll into the next level of the performance sequence. The required dress for men: tap shoes, or hard soled shoes with taps attached. T-shirt or muscle shirt, dance belt, Jazz pants or tights. For women: tap shoes, leotard and tights (possible character tap shoes). The clothing must allow movement, and still be able to distinguish an outline of the dancer's body.

Prerequisites: DANCE 232

Changes Effective Spring 2021:
• Prerequisites

DANCE 280: Improvisation

Old Listing Effective Through Fall 2020:

Introduction to the concepts and techniques of dance improvisation.

Prerequisites: DANCE 261

Changes Effective Spring 2021:
• Remove Prerequisites

DANCE 331: Intermediate Ballet I (1.5 Credits: Maximum of 6 Credits)

Old Listing Effective Through Fall 2020:

A continuation of the course work established in Beginning Ballet II. DANCE 331 Intermediate Ballet I (1) Dance 331 allows the student who has had a solid introduction to the fundamental movements and style of ballet to develop more strength and flexibility in their technique. The pace of the class is faster. Choreography is more complex and taught more quickly. The student is expected to know the elements that constitute a ballet class and is ready to embrace seriously the study of the skill and artistry required to perform ballet. The student is expected to be able to execute a double pirouette and simple beats in petit allegro. Interpretation of choreography taught for exams is emphasized more strongly than in the previous courses. The attitude should be positive, receptive to correction, and exhibit an eagerness to work, and the student's progress should reflect growth in their abilities to perform the choreography and to know the terms used. The student will be required to identify and explain the meaning of the terms used in class, as well as perform choreography with confidence and a sense of character. Required dress for the course for women is black leotard, pink or tan tights, pink ballet shoes and for men it is black tights, white T-shirt, black ballet shoes, and dance belt. Belts, suspenders, leg warmers are optional. Sweat clothes are not to be worn. All hair must be secured so that it cannot fly into the face.

Prerequisite: DANCE 230 or permission of the program

Changes Effective Spring 2021:
• Prerequisites

dANCE 332: Intermediate Ballet II (1.5 Credits: Maximum of 6 Credits)

Old Listing Effective Through Fall 2020:

A continuation of the course work established in Intermediate Ballet I. DANCE 332 Intermediate Ballet II (1) Dance 332 allows the student who has a strong background in the basics of ballet technique to be challenged with more difficult movements and choreography and to develop a more mature approach to healthy alignment. The Zena Rommett floor barre and the Pilates techniques will be explored with more emphasis than in the beginning semesters of ballet study. The student is expected to know the terms used in ballet in French, their meaning, and how to execute them. The student should be able to perform choreography with a sense of character and style, as well as strong technique. The attitude should be positive, receptive to correction, and exhibit an eagerness to work, and the student's progress should reflect growth in their abilities to perform the choreography and to know the terms used. Required dress for the course for women is black leotard, pink or tan tights, pink ballet shoes and for men it is black tights, white T-shirt, black ballet shoes, and dance belt. Belts, suspenders, leg warmers are optional. Sweat clothes are not to be worn. All hair must be secured so that it cannot fly into the face.

Prerequisite: DANCE 230 or permission of the program

Changes Effective Spring 2021:
• Prerequisites

DANCE 341: Intermediate Jazz I (1.5 Credits)

Old Listing Effective Through Fall 2020:

A continuation of the course work established in DANCE 242, Beginning Jazz II. DANCE 341 Intermediate Jazz I (1) Dance 341 allows the student who has successfully completed Beginning Jazz II to continue to broaden their knowledge of Intermediate Jazz Dance. The purpose of this course is to improve the beginner's knowledge of jazz dance. Technique will be stressed, but performance and interpretation will be emphasized with the following in mind: to develop character, mood and ability to improvise and choreograph Jazz Dance. A variety of choreographed dances ranging from pop, jazz, to musical theatre styles will be taught. The student's grade will be based on attendance, attitude, and progress of learning and performing dance combinations. A positive attitude and maintaining proper discipline and willingness to work and learn are essential. The student is required to perform individual rehearsal hours (as homework). They are responsible for learning and executing all material taught. Jazz Dance 341 satisfies the requirement for the BFA Music theatre option and fulfills one of the requirements for the Dance Minor. The BFA musical theatre student will be juried by the School of Theatre Performance Faculty as a part of their final grade. The jury will consist of a showing of the pieces taught in class. This evaluation will help to determine whether the candidate may enroll into the next level of the performance sequence. The required dress for men: Jazz shoes, T-shirt or muscle shirt, dance
belt, Jazz pants or tights. For women: Jazz shoes, leotard and tights (possible character shoes).

Prerequisite: DANCE 242

Changes Effective Spring 2021:

• Prerequisites

DANCE 342: Intermediate Jazz II (1.5 Credits)
Old Listing Effective Through Fall 2020:

A continuation of the course work established in DANCE 341, Intermediate Jazz I. DANCE 342 Intermediate Jazz II (1) Dance 342 allows the student who has successfully completed Intermediate Jazz Dance I to continue to broaden their knowledge of Jazz Dance. The purpose of this course is to continue to improve the dancer's technical aspect of Jazz Dance. Combinations will be taught at a faster pace. Techniques will be stressed, but performance and interpretation will be emphasized with the following in mind: to develop character, mood and the ability to improvise and choreograph Jazz Dance. A variety of challenging choreographed dances ranging from pop, jazz, to musical theatre styles will be taught which the student will be expected to perform. The student’s grade will be based on attendance, attitude, and progress of learning and performing dance combinations. A positive attitude and maintaining proper discipline and willingness to work and learn are essential. The student is required to perform individual rehearsal hours (as homework). They are responsible for learning and executing all materials taught. Jazz Dance 342 satisfies the requirement for the BFA Music Theater option and fulfills one of the requirements for the Dance Minor. The BFA musical theatre student will be juried by the School of Theatre Performance Faculty as a part of their final grade. The jury will consist of a showing of the pieces taught in class. This evaluation will help to determine whether the candidate may be allowed to enroll into the next level of the performance sequence. The required dress for men: Jazz shoes, T-shirt or muscle shirt, dance belt, Jazz pants or tights. For women: Jazz shoes, leotard and tights (possible character shoes).

Prerequisite: DANCE 341

Changes Effective Spring 2021:

• Prerequisites

DANCE 361: Modern Dance I
Old Listing Effective Through Fall 2020:

This course is a development of techniques and principles of modern dance at the intermediate level. DANCE 361 Intermediate Modern Dance I (1.5), continues to build on the technical foundation from Beginning Modern I and Beginning Modern II in relation to a release-based modern dance technique. Along with technique, students should develop greater flexibility, strength, and alignment. The concepts of weight, time, energy, and space are central to the class. The body as a tool of expression and communication and using dance as a language is stressed.

Prerequisite: DANCE 262

Changes Effective Spring 2021:

• Prerequisites

DANCE 362: Intermediate Modern Dance II (1.5 Credits: Maximum of 6 credits) (BA) (GA)
Old Listing Effective Through Fall 2020:

A continuation of Modern Dance I to augment technical proficiency. DANCE 362 Intermediate Modern Dance II (1:5) DANCE 362, Intermediate Modern Dance II, continues to build on the technical foundation from Intermediate Modern Dance I in relation to a release-based modern dance technique. This intermediate level class centers on developing a strong technical foundation in modern dance. Along with technique, students should develop greater flexibility, strength, and alignment. The concepts of weight, time, energy, and space are central to the class. The body as a tool of expression and communication and using dance as a language is stressed.

Prerequisite: DANCE 361

Changes Effective Spring 2021:

• Recertification

DANCE 365: Contemporary Movement Lab I
Old Listing Effective Through Fall 2020:

An intermediate level modern dance technique utilizing improvisation to enhance technical and performance issues: alignment, connection, balance, transition, expression, discovery. DANCE 365 Contemporary Movement Lab I (3) DANCE 365 is an intermediate level modern dance course utilizing improvisation as a tool for understanding technique and performance. This class is designed specifically for the Dance Studies Minor student to enhance the efficient and expressive use of the body as a vehicle for expression. The student will not only develop greater flexibility, strength, and alignment, but also will gain self-awareness and begin to develop a personal dance vocabulary. Contemporary Movement Lab I will meet four hours a week, with an additional 1 hour studio lab for personal discovery. CML I is designed to further expose the intermediate level dancer to the style and techniques of modern dance as it uses improvisation for expression and performance. The intermediate level dancer will be developed through more thorough movement requirements, floor work, and strengthening experiences with the support of improvisation as a tool. Full articulation of body, feet and arms will be fostered through regular exercises, which will bring about stronger connections through the body to support complicated and difficult movement. Each class period will allow time to be spent in the traditional aspects of an intermediate modern dance technique class: floor warm up and connection to center of weight, center floor balance and strengthening technique exercises and combinations, traveling sequences across the floor, and final accumulative combination. An equal amount of time will be spent in the exploration of improvisation: personal introspection, group interaction based on conceptual themes, weight sharing and beginning contact improvisational techniques, and development of a group structured performance improvisation. Improvisation will be explored regularly through individual and group work. The students will experience moving without specific directions for the body, but rather with directions for content, sensing, theme, or task oriented physicality. Observation of self and others will aid in the discovery of the freedom of moving improvisationally. Outside reading and follow up discussions will further support their experience in the studio. Discussion, journals, goal setting and writing assignments will
allow for opportunities to express and share levels of comfort and personal discoveries with various experiences. This is an important aspect of the process of opening up to the act of improvisation.

Prerequisites: any 200 level technique course, or program permission

Changes Effective Spring 2021:

- Prerequisites

DANCE 366: Contemporary Movement Lab II
Old Listing Effective Through Fall 2020:

An intermediate level modern dance technique utilizing composition to enhance technical and performance issues: alignment, connection, balance, transition, expression, discovery. DANCE 366 Contemporary Movement Lab II (3) DANCE 366 is an intermediate level modern dance course utilizing the techniques, tools and theories of composition for understanding technique and performance. This class is designed specifically for the Dance Studies Minor student to enhance the efficient and expressive use of the body as a vehicle for expression. The student will not only develop greater flexibility, strength, and alignment, but also will gain self-awareness and further develop a personal dance vocabulary. Contemporary Movement Lab II will meet four hours a week, with an additional 1-hour studio lab for personal discovery. CML II is designed to further expose the intermediate level dancer to the style and techniques of modern dance as it uses composition for expression and performance. The intermediate level dancer will be further developed through a more thorough level of movement requirements: floor work, and strengthening experiences while exploring the connections of technique to composition and performance. Full articulation of body, feet and arms will be fostered through regular exercises, which will bring about stronger connections through the body to support complicated and difficult movement. Each class period will allow time to be spent in the traditional aspects of an intermediate modern dance technique class: floor warm up and connection to center of weight, center floor balance and strengthening technique exercises and combinations, traveling sequences across the floor, and final accumulative combination. An equal amount of time will be spent in discovering the many theories and tools of composition: time, weight, space, rhythm/phrasing, theme based creative experiences, and dance as a tool for communication. Students will be expected to create a variety of studies regularly through individual and group work. Outside reading and follow up discussions will further support their experience in the studio. Discussion, journals, goal setting and writing assignments will allow for opportunities to share and express levels of comfort and personal discoveries with various experiences.

Prerequisites: any 200 level technique class or program permission

Changes Effective Spring 2021:

- Prerequisites

DANCE 370: Anatomy for Performers (3 Credits) (GN)
Old Listing Effective Through Fall 2020:

To provide performers with anatomical theory and concepts applicable to the disciplines of the performing arts.

Prerequisite: DANCE 270 or THEA 102

Changes Effective Spring 2021:

- Recertification
- Abbreviated Title

DANCE 385: Practicum: Dance
Old Listing Effective Through Fall 2020:

Supervised experiences in teaching and assisting with the teaching of dance techniques.

Prerequisites: DANCE 362

Changes Effective Spring 2021:

- Prerequisites

DANCE 412: Practical Applications of Movement in the Classroom
Old Listing Effective Through Fall 2020:

This course will guide the students in movement-oriented activities and explore how these activities relate to learning academic concepts. DANCE 412 Practical Applications of Movement in the Classroom (3) Moving and learning is the focus of this course. Classrooms vary in size, age, understanding, world experience and venue. Being able to recognize all these situations as learning opportunities is a talent built on experience. This class will challenge the students to see learning not just as an event that must happen in desk chairs with only the use of traditional classroom technology to support the "lesson" but also as an opportunity for expansion into the whole child, including the moving child. Experience in designing and applying movement ideas into curriculum ideas and concepts will be developed throughout the semester. The student will begin to see ideas and learning themes as opportunities to engage the child through their physicality while expressing ideas, challenging the expected way of learning and yes, even having fun. Teaching is a creative act, learning is a creative act, and designing moving opportunities to reinforce the act of learning creates a sense of knowing within the child that becomes embodied. Reading, discussion, classroom application of material, and critical assessment of self and others will create an environment, at times, modeling some of the potential venues in which the student may expect to find themselves. Using this information will be critical to their growth into visualizing movement as a viable option for teaching and learning.

Prerequisites: DANCE 261 or HDFS 229 or HDFS 239

Changes Effective Spring 2021:

- Prerequisites

DANCE 431: Advanced Ballet I (1.5 Credits)
Old Listing Effective Through Fall 2020:

An advanced ballet training course. DANCE 431 Advanced Ballet I (1)DANCE 431 allows the student who has successfully completed DANCE 232, or who has interviewed with the Instructor concerning their previous training in ballet, to develop greater proficiency in performing ballet. The barre work continues to emphasize proper alignment, supported by exercises using the Zena Rommett floor barre technique and the Pilates technique, and the floor work moves more quickly then in the beginning levels of study. The student will learn more complex steps requiring greater strength and coordination, and the class will move at a faster pace, thus enabling the student to learn choreography more quickly. The student will also develop their ability to communicate character and mood through their dancing. More advanced ballet terminology will be taught, and the student will learn the French terms,
their English meanings, be able to identify the steps and perform them. DANCE 431 can satisfy one of the two semesters of advanced dance study required by the BFA Music Theatre degree option and can satisfy requirements for the Dance Minor. The student’s grade is determined by their attendance, attitude, and progress. Attendance is mandatory. More than three absences or lateness will affect the grade. The attitude should reflect a serious focus on improving their abilities with a positive approach to applying corrections to their dancing. Their progress will be assessed through observation of their classroom work and especially the video-taped performances of their mid-term and final exam choreography. There will be a final showing at the end of the semester with an invited audience. The exams will also include an oral section, covering the terms used in class. Required dress for class is — for men, dance belt, black tights, white t-shirt, and black ballet shoes, and for women, pink or tan tights, leotard, and pink ballet shoes. All hair must be pulled back and secured away from the face. No sweat clothes may be worn, but leg warmers, belts, and suspenders are optional.

Prerequisites: DANCE 232

Changes Effective Spring 2021:

• Prerequisites

DANCE 441: Advanced Jazz I (1.5 Credits)
Old Listing Effective Through Fall 2020:

An advanced course in the techniques of jazz dance. DANCE 441 Advanced Jazz I (1)DANCE 441 allows the student who has successfully completed DANCE 242 to continue their study of jazz technique and performance. The focus of the course is to improve capability through learning and performing more challenging choreography at a faster pace. Eight combinations of choreography are taught, to music of various types — pop, jazz, and musical theatre. Performing with confidence and a sense of character will be emphasized. The student will also become familiar with the fundamentals of the Pilates technique to improve alignment, strength, and flexibility. The student will also be given opportunities to develop confidence in improvisation. DANCE 441 enables the BFA Music Theatre candidate to satisfy one semester of advanced level dance training. For the Dance Minor and other students of dance, it provides challenges in technical execution and a greater range of jazz styles. The student’s grade will be determined by their attendance, attitude, and progress at learning quickly and performing the dance combinations, as well as the completion of two projects. Attendance is mandatory; more than three absences or lateness will affect the grade. The attitude should be focused, positive, receptive to correction, and eager. Progress will be assessed in frequent performance “quizzes”. The mid-term and final exams will be video-taped and viewed by the class. The two projects consist of paper and one minute of original choreography. The paper should consist of the student’s personal analysis of jazz dancing and their abilities, based on their past and present experience. The choreography should reflect work learned in class and be performed to instrumental music. The student will perform their choreography for the class. Required dress for DANCE 441 consists of dance belt, dance pants, t-shirt and jazz shoes for men and tights and leotard, jazz and character shoes for women. Dance sneakers are not appropriate for warm-ups and certain combinations.

Prerequisites: DANCE 242

Changes Effective Spring 2021:

• Prerequisites

DANCE 442: Advanced Jazz II (1.5 Credits)
Old Listing Effective Through Fall 2020:

A continuation of Advanced Jazz I to augment technical proficiency. DANCE 442 Advanced Jazz II (1)DANCE 442 allows the student who has successfully completed DANCE 441 to continue to broaden their knowledge of advance jazz dance. The purpose of this course is to improve capability through learning and performing more challenging choreography at a faster pace. Technique will be stressed, but performance and interpretation will be emphasized with the following standard in mind: to develop character, mood, and ability to improvise and choreograph jazz dance. A variety of choreographed dances ranging from pop, jazz, to musical theaters styles will be taught. Students are responsible for learning and executing all material taught in class. The student’s grade will be based on attendance, attitude, and progress of learning and performing dance combinations. More than three absences or lateness will affect the grade. Maintaining a positive attitude, proper discipline, and willingness to work and learn are essential. The student is required to perform individual rehearsal hours (as homework). Students enrolling in this course should have successfully completed DANCE 441 or have permission of the instructor. JAZZ 442 satisfies requirements for the BFA Music Theater option and the Dance Minor. The BFA Music Theater student will be juried by the School of Theatre Performance Faculty as a part of their final grade. The jury will consist of a showing of the pieces taught in class. This evaluation will help to determine whether the candidate may be allowed to enroll into the next level of the performance sequence. The required dress for men: Jazz shoes, t-shirt or muscle shirt, dance belt, Jazz pants or tights. For women: Jazz shoes, leotard and tights (possible character shoes).

Prerequisites: DANCE 441

Changes Effective Spring 2021:

• Prerequisites

DANCE 451: Advanced Tap I
Old Listing Effective Through Fall 2020:

An advanced course in the techniques of tap dance. DANCE 451 Advanced Tap I (1)DANCE 451 allows the student who has successfully completed DANCE 251 and 252, or has permission of the instructor, to continue to broaden their knowledge to tap dance. The work will include expanding the student’s knowledge of tap vocabulary, rhythm, tempo and counting. The work introduces audition techniques from the dancer’s perspective and expands the awareness of proper rehearsal discipline. Professional conduct and behavior is now cultivated into a useful marketing tool. Material is taught faster and with greater detail to reinforce audition techniques and equate professional challenges. Audition classes will be held at the instructor’s discretion. The student’s grade will be based on attendance, attitude, and progress of learning and performing dance combinations. More than three absences or lateness will affect the grade. Maintaining a positive attitude, proper discipline, and willingness to work and learn are essential. The student is required to perform individual rehearsal hours (as homework). Students enrolling in this course should have successfully completed DANCE 251, 252 or have permission of the instructor. Tap DANCE 451 satisfies requirements for the BFA Music Theater option and the Dance Minor. The BFA Music Theater student will be juried by the School of Theatre Performance Faculty as a part of their final grade. The jury will consist of a showing of the pieces taught in class. This evaluation will help to determine whether the candidate may be allowed to enroll into
the next level of the performance sequence. The required dress for men: tap shoes, or hard soled shoes with taps attached. T-shirt or muscle shirt, dance belt, Jazz pants or tights. For women: tap shoes, leotard and tights (possible character tap shoes). The clothing must allow movement, and still be able to distinguish an outline of the dancer's body.

Prerequisites: DANCE 252

Changes Effective Spring 2021:

DANCE 452: Advanced Tap II (1.5 Credits)
Old Listing Effective Through Fall 2020:

A continuation of Advanced Tap I to augment technical proficiency. DANCE 452 Advanced Tap II (1)DANCE 452 allows the student who has successfully completed DANCE 451 to broaden their knowledge of advanced tap dance. The course will emphasize a broader dance vocabulary and more complex dance combinations. The repetition and rehearsal techniques will be reinforced and intensified. The ability to communicate character and setting through dance is strongly emphasized. Material is taught faster and with greater detail to reinforce audition techniques and equate professional challenges. The student's grade will be based on attendance, attitude, and progress of learning and performing dance combinations. More than three absences or tardiness will affect the grade. Maintaining a positive attitude, proper discipline, and willingness to work and learn are essential. The student is required to perform individual rehearsal hours (as homework). Students are responsible for learning and executing all material taught in class. Students enrolling in this course should have successfully completed DANCE 451 or have permission of the instructor. Tap DANCE 452 satisfies requirements for the BFA Music Theater option and the Dance Minor. The BFA Music Theater student will be juried by the School of Theatre Performance Faculty as a part of their final grade. The jury will consist of a showing of the pieces taught in class. This evaluation will help to determine whether the candidate may be allowed to enroll into the next level of the performance sequence. The required dress for men: tap shoes, or hard soled shoes with taps attached. T-shirt or muscle shirt, dance belt, Jazz pants or tights. For women: tap shoes, leotard and tights (possible character tap shoes). The clothing must allow movement, and still be able to distinguish an outline of the dancer's body.

Prerequisite: DANCE 451

Changes Effective Spring 2021:

DANCE 462: Advanced Modern Dance II (1.5 Credits: Maximum of 9 Credits)
Old Listing Effective Through Fall 2020:

A continuation of Advanced Modern Dance I to augment technical proficiency. DANCE 462 Advanced Modern Dance II (1.5)DANCE 462 is a continuation of Advanced Modern Dance I. This class continues the technique foundation from DANCE 261, 262, and 461 of exploring the use of weight, time, space, and energy in relation to a release based modern dance technique. DANCE 462 also works with focus, style, and performance techniques. Students should gain greater technical proficiency, flexibility, strength, and alignment. Understanding and demonstrating the different uses of weight and the concept of grounding is essential. Students should begin to develop as an individual mover (personal artistic voice) and gain greater confidence in using the body as a tool of expression and communication. Students should demonstrate an opening and willing attitude in every class situation. Students are responsible for learning and executing all material taught in class. This class serves as a prerequisite for DANCE 462. Together these two semesters serve as core technique classes for all dance minors.

Prerequisites: DANCE 461 or permission of the program

Changes Effective Spring 2021:

DANCE 466: Contemporary Movement Lab III (3 Credits: Maximum of 6 Credits)
Old Listing Effective Through Fall 2020:

An advanced exploration of modern dance techniques supported by the choreographic process. DANCE 466 Contemporary Movement Lab III (3 per semester/maximum of 6) DANCE 466 is an advanced level modern dance course using the choreographic process and experience as a way to enhance and further understand technique and performance. This class is designed specifically for the Dance Studies Minor student to enhance the efficient and expressive use of the body as a vehicle for expression. The student will not only develop greater flexibility, strength, and alignment, but also will gain ability for self-awareness and increase in personal dance vocabulary. Contemporary Movement Lab III will meet four hours a week, with a minimum additional 1-hour studio lab for personal discovery. CML III is designed to further expose the advanced level dancer to the choreographic process as a means of expression of modern dance as it influences the discovery of personal style and communication. The advanced level dancer will be further developed through higher levels of movement requirements: floor work, and strengthening experiences while exploring the connections of movement as a goal for communication and performance. Each class period will allow time to be spent in the traditional aspects of an advanced modern dance technique class: floor warm up and connection to center of weight, center floor balance and strengthening technique exercises and combinations, traveling sequences across the floor,
and final accumulative combination. An equal amount of time will be spent in discovering the choreographic process utilizing the tools of composition from Dance 366 and improvisation from Dance 365 to successfully communicate personal ideas or themes through fully explored dances. Students will be expected to create a number of dances/studies throughout the semester with the goal of producing one for the concert stage. Outside reading and follow up discussions will further support their experience in the studio. Discussion, journals, goal setting and writing assignments will allow for opportunities to express levels of comfort and personal discoveries with various experiences.

Prerequisite: DANCE 365, DANCE 366

Changes Effective Spring 2021:

DANCE 472: Introduction to Laban Movement Analysis

Observe and analyze movement elements by exploring concepts of Body, Effort, Shape, and Space to increase personal communication and expression. DANCE 472 Introduction to Laban Movement Analysis (3) Laban Movement Analysis (LMA) is a method and language for describing, visualizing, interpreting and documenting all varieties of human movement. It is one type of Laban Movement Study originating from the work of Rudolf Laban. In addition many derived practices have developed with great emphasis on LMA methods. This course focuses on elements known as Laban/Bartenieff Movement Analysis, which uses a multidisciplinary approach, incorporating contributions from anatomy, kinesiology, psychology, Labanotation and many other fields. It is used as a tool by dancers, actors, musicians, athletes, physical and occupational therapists, psychotherapy, peace studies, anthropology, business consulting, leadership development, health & wellness and is one of the most widely used systems of human movement analysis today. In this course, students will study and practice the basic categories of LMA: Body (Bartenieff Fundamentals, total-body connectivity), Effort (Energetic dynamics), Shape, and Space (Space Harmony). In addition students will discover how LMA looks at the categories in terms of Phrasing and themes of opposites. The themes are: Mobility/Stability, Inner/Outer, Function/Expression, and Exertion/Recuperation.

Prerequisites: DANCE 261

Changes Effective Spring 2021:

DMD 300: Digital Multimedia Design Studio

Students adapt skills and knowledge of digital media to solve problems and communicate ideas in producing collaborative multimedia projects. In DMD 300 Digital Multimedia Design Studio, students synthesize the concepts, theories, and applications acquired in the introductory courses and begin to think critically about their professional objectives. Students will work on projects aimed to help them understand available learning pathways and real world applications based on their scholarly and professional interests.

Students will work collaboratively to investigate a problem space, conduct a needs assessment, write a design plan or proposal, develop deliverables, and implement and evaluate the final product(s). Students will develop a sense of stewardship over the project development process by completing project milestones that reinforce time management behaviors, participating in team building activities that facilitate discussion and interaction, co-authoring project proposals that prompt critical analysis, and distributing production tasks to encourage ownership in completing both defined and open-ended assignments. Students will also be required to thoroughly document and reflect on the production process and project impact through blogging and discussions.

Through the duration of the course, students are encouraged to interact with industry advisors for feedback and direction as they work through real-world challenges in their selected digital tools and methodologies.

Prerequisites: DMD 100

Changes Effective Spring 2021:

EARTH 100: Environment Earth

This course is designed to introduce students to issues surrounding the development and maintenance of human civilization on Earth. This includes developing an understanding of how human population has grown over time, the resources required by humans and how this has changed over time, and the by-products of activities related to resource extraction on the environment and, hence, on human health and the cost of maintaining human civilization. A considerable focus is placed on developing critical thinking skills by using scientific data to describe, and evaluate the relative importance of, environmental issues. Accordingly, the course presents, and explains, scientific data in formats that students are likely to find in scientific journals, mass media, and websites. In this course, students will: * Develop an understanding of the Earth system and how it operates, * Quantify human demands on natural resources, * Learn how resource extraction and use impacts the environment, * Foster the ability to critically evaluate scientific arguments, and * Practice expressing reasoned opinions on complex problems. By the end of the semester, students will be able to: * Identify important, and human-relevant, environmental issues, * Understand the breadth and complexity of environmental issues, * Think critically about environmental issues, * Have scientifically-accurate discussions about environmental issues with others. * Propose, and evaluate critically, solutions to environmental issues.

Changes Effective Spring 2021:

EARTH 101: Natural Disasters: Hollywood vs. Reality (3 Credits)

Analysis of the causes and consequences of natural disasters; comparison of popular media portrayal of disasters with perspective from scientific research. EARTH 101 Natural Disasters: Hollywood vs. Reality (3) (GN;US) (BA) This course meets the Bachelor of Arts degree requirements. This course investigates a variety of natural hazards and disasters. We will use the popular media as a starting point for discussions and development of tools for analyzing the causes of disasters. Using excerpted segments of “disaster films” in conjunction with scientific treatments, we can identify the causes, consequences and public perceptions of natural hazards. Small group discussions and cooperative research held “real time” in the classroom will be a
major component of this course. The goal is to help students develop both an understanding of natural hazards and disasters, and enhance their understanding of scientific approaches to problem solving. During the course approximately four to five topics selected from the list of volcanoes, earthquakes, hurricanes, tornadoes, flooding, bolloïd (e.g., asteroid) impacts, and tsunami (tidal waves) will be covered. For each topic, we will incorporate the following activities: (a) short edited excerpts from disaster movies (or equivalent) of approximately 10 minutes each; (b) discussions by small groups of students (approximately 10 per group) to identify scientific issues to be addressed; (c) development of scientific background and tools via faculty lectures, tutorials, and library or web-based activities; (d) cooperative learning activities by small student groups—each group working together to address one of the identified scientific issues; (e) group presentations of results of the cooperative learning activity; and (f) individual writing activities producing focused reports on specific scientific issues. A typical topic will be covered in three weeks (six class meetings) with approximately 50 percent of the time (in class) allotted to group activities and discussion; lecturing by the faculty will involve approximately 25 percent of the time, with the remaining 25 percent of the time used for video and Web-based presentations. Grades will be based on participation in “breakout” group discussions and cooperative activities, writing assignments (two to three pages each) associated with each topic, and an annotated “disaster diary” of natural disasters which have occurred during the course. Each writing assignment will be aimed at a client audience (e.g., municipal government, businesses, or the general public) and written to explain the exposure to natural hazards or potential for disaster faced by the client. This course has no Prerequisites and should be accessible to all students. Through cooperative activities students can benefit from the range of expertise brought to the course by their colleagues and thus address scientific issues beyond the reach of any individual.

Changes Effective Spring 2021:

- General Education Recertification
- Description

EARTH 104: Climate, Energy and Our Future (3 Credits) (GN)
Old Listing Effective Through Fall 2020:

This course presents the past, present, and possible future response of Earth's climate to human energy use. EARTH 104 Climate, Energy and Our Future (3) (GN) This class explores how we can shift our society to a sustainable energy system that improves our quality of life, our economy, and our natural environment. Energy provides well-being, jobs, and a reliable 10% of our economy, while powering the rest. But, energy is also the least sustainable part of our economy—we rely on fossil fuels that we are burning about a million times faster than nature saved them for us. These fossil fuels, mostly coal, oil, and gas, help us grow food and avoid some environmental disasters, but the limited fossil-fuel supplies mean we must move toward a more sustainable system. And, we will be better off by avoiding damaging climate changes from fossil-fuel CO2 if we move before all of the fossil fuels are gone. The warming influence of fossil-fuel CO2 is shown by physics known for more than a century and really refined by the US Air Force after WWII. History, data, and models confirm the physics, giving us high confidence that burning much of the remaining fossil-fuel resource and releasing the CO2 will cause much larger climate changes than we have experienced so far. This class will explore the big issues in energy, including the value of burning oil rather than whales, and other historical insights. Then, after looking at the basic science and engineering of our energy system and how it affects climate, we will examine the multitude of options for the future, including alternative energy sources, conservation, and intentionally manipulating the climate.

The economics, policies and ethics of these options will help us consider how to build a sustainable energy system that will encourage economic growth and improved quality of life, while at the same time defending against potentially catastrophic future climate change.

Recommended Preparations: MATH 22

Changes Effective Spring 2021:

- General Education Recertification
- Add GS Attribute
- Add Inter-Domain Attribute
- Number
- Description

EARTH 107: Coastal Processes, Hazards and Society (3 Credits) (GN)
Old Listing Effective Through Fall 2020:

Processes responsible for formation, diversity, and evolution of coastal landscapes; socioeconomic and policy responses to changes in coastal regions. EARTH 107 Coastal Processes, Hazards and Society (3) (GN) Ten percent of the world's population or approximately 600 million people live on land that is within 10 meters of sea level. This low elevation coastal zone includes some of the world's most populous cities including New York, London, Miami, Calcutta, Tokyo, and Cairo. This zone is threatened by a host of environmental challenges, none less daunting than sea level rise. The overarching goal of the proposed blended course is to provide students with a global perspective of coastal landscapes, the processes responsible for their formation, diversity and change over time, as well as socioeconomic and policy responses to current biophysical changes in the coastal zones around the world. Students will use real-world coastal data sets to evaluate hazards such as hurricanes and tsunamis and effects on coastal populations. Coastal processes to be considered include tectonic settings, effects of glaciation, sediment supply, and wave and tidal energy. The impacts of sea level rise and its local effects on communities will be a focus. Engineering solutions to projected sea level rise impacts such as coastal flooding and habitat loss in coastal areas will also be examined. The students taking the course will participate in a student-centered active learning process, including analyzing real data sets such as sea level rise records, shoreline erosion rates along barriers, comparison of wave data for Hawaii versus the East Coast and other major influences affecting coastal evolution. Students will also be asked to apply critical thinking and problem solving skills to real-world coastal issues that affect human populations. An example is how communities can effectively plan for emergencies such as catastrophic flooding of densely populated low-lying areas such as the Ganges delta. Active learning elements include analyzing real data sets and applying critical thinking and problem-solving skills to real-world coastal issues that affect human populations. Students will complete a capstone project in which they consider a real-world coastal issue. The course will comprise twelve modules, each lasting 1-2 weeks. The course will initially be offered in blended format and later in 100% online format.

Changes Effective Spring 2021:

- Add General Education Recertification
- Add GS Attribute
- Add Inter-Domain Attribute
- Number
EARTH 150: Dinosaur Extinctions and Other Controversies (3 Credits) (BA) (GN)

Old Listing Effective Through Fall 2020:

Dinosaur extinctions and other major and controversial events in the history of life. EARTH 150 Dinosaur Extinctions and Other Controversies (3) (GN) (BA) This course meets the Bachelor of Arts degree requirements. One of the most dramatic developments in the Earth sciences is the suggestion that extinction of the dinosaurs was caused by a meteorite impact. Evidence for and against this controversial idea is just one of the subjects addressed by this course, dealing broadly with the history of our planet, the evolution of life upon it, and the sometimes rocky development of our understanding of Earth history. In addition to dinosaur extinction, we will discuss issues relating to catastrophic vs. gradual theories about the Earth's history, fossils and the history of life, and mass extinctions, including whether or not we're in the middle of one now. How are scientific discoveries made? What distinguishes a scientific argument from a non-scientific one? What roles do social and historical factors play in the construction and acceptance of scientific theories? Questions such as these will permeate the course. Readings will include selected texts by leading scientists, with supplements from the primary scientific literature, including current discoveries published in Science and Nature.

Changes Effective Spring 2021:

• General Education Recertification
• Abbreviated Title
• Description

EBF 200: Introduction to Energy and Earth Sciences Economics

Old Listing Effective Through Fall 2020:

Resource use decisions and their effect on local, national, and global development.

EBF 200 Introduction to Energy and Earth Sciences Economics (3) (GS)(BA) This course meets the Bachelor of Arts degree requirements. Facing the challenge of ever-increasing demand for energy, and limited energy resources to meet those demands, will be one of the great problems/opportunities of the 21st century. This class will help students understand and discuss the current event items you hear about every day, and help to prepare many of you to work to address this challenge. This class introduces the economic method of analysis to the environmental and resource questions facing society. It introduces a "paradigm," a way of thinking, that has four elements: What advantages can be gained by using market forces? What are the drawbacks of the market ("market failures") that may lead to a rationale for government intervention? What are the drawbacks of using government intervention ("government failure")? How do you apply these three concepts to real-world situations? Examples are drawn from both the United State economy and from the worldwide community. Both analytical and quantitative methods are used to understand the environmental and resource challenges faced by modern society.

Prerequisites: ECON 102 and MATH 022 or equivalent

Changes Effective Spring 2021:

• Recertification
• Prerequisites

EBF 304W: Global Management for the Earth, Energy, and Materials Industries (3 Credits) (WF)

Old Listing Effective Through Fall 2020:

This class is designed to introduce students to modern management and organization strategies for resource businesses.

Prerequisites: EBF 200 AND EME 460 AND ( STAT 401 OR EBF 472 OR ECON 306)

Changes Effective Spring 2021:

• Description
• Prerequisites

EBF 306W: Energy Land Contracts (3 Credits) (WF)

Old Listing Effective Through Fall 2020:

In almost every country in the world, governments own the mineral resources under the ground. The United States is the exception to this rule. In the U.S. landowners are free to extract value resources beneath the soil. In addition, the "rule of capture" applies, so landowners do not have to worry about where particular resources that they have extracted were located originally. This combination of property rights and the legal rule of capture as led the creation of the field of energy land law in the U.S. For petroleum and natural gas firms, especially in Pennsylvania, understanding these legal rules and what they imply are crucial to the success of drilling operations. This course addresses three areas of energy land law. In the first, using the law and economics approach, it examines the economics of energy land law contracts. It first examines the rule of capture and the challenges to that rule in Pennsylvania law. It then focuses specifically on the use of contracts to protect the sunk costs inherent in investment in energy production. The second part of the course addresses the negotiation questions that are imbedded in energy land law. Students are taught the fundamentals of negotiation through classroom simulations that model energy negotiation challenges. Classroom simulations include negotiations dealing with common pool problems, acquiring energy leases, and recontracting among production companies. The third part of the class examines the ethical issues related to energy land contracts. These problems are generally addressed to questions of who owns pieces of information and who has the authority to release that information. Students are also taught the importance of establishing a strong reputation for honesty for themselves. The writing component of this class requires students to compose essays on a series of classroom experiment that are designed to replicate challenges in the area of energy land contracts. Students will be required to write essays that show that they understand the underlying economics of the various challenges in negotiating these contracts. Contracts of course, final project, students will be required to create and describe their own classroom experiment.

Prerequisites: BLAW 243; BA 242

Changes Effective Spring 2021:

• Prerequisites

EBF 401: Strategic Corporate Finance for the Earth, Energy, and Materials Industries (3 Credits)

Old Listing Effective Through Fall 2020:
The objective of this course is to give students a working knowledge of the major tools used by financial managers for making investment and financing decisions. Topics include, but are not limited to: time value of money, trade-off between risk and expected return, Capital Asset Pricing Model, valuation and role of debt and equity, capital budgeting/project evaluation techniques, cost of capital, cash flow estimation, real and financial options, company valuation, and capital structure decisions. As an illustration of the theory, we will discuss examples and cases, with a focus on the energy industry. Students will learn the fundamentals of capital budgeting and structure analysis; how capital structure decisions affect the value of the firm; and how to develop financial statements for energy projects.

Prerequisite: E B F 200 and E B F 301 and EME 460; E B F 472 or STAT 200 or STAT 301 or STAT 401 (Junior or Senior standing)

Changes Effective Spring 2021:
- Prerequisites

**EBF 402: Energy Law and Contracts**
Old Listing Effective Through Fall 2020:

An examination of the law that applies to acquiring the property rights for exploration and drilling of energy sources. E B F 402 Energy Law and Contracts (3) This course examines the area of energy law and contracts, which is crucial to successful drilling in natural gas and oil properties. The course begins with a description of ownership and rights in the mineral estate, and how those rights have evolved over time. Students will be instructed in the how different types of land affect legal rights, and the details of the law of capture. They will also review the Statute of Frauds and examine how it applies to land drilling contracts. The second part of the course presents the basic tenets of real estate law, examining the seminal cases in this area. It will review the standard oil and gas lease used in the United States. Issues reviewed will include the nature of lease clauses and implied covenants, as well as farmout and joint operating agreements. It will also examine how royalty payments can be structured. Environmental regulation is a critical component of energy exploration. To address this topic, students will be introduced to the regulatory process. They will study regulatory compliance and how to deal with government officials. They will also be instructed in corporate liability for property clean up and pollution, and in strategies for minimizing both that liability and harm to the environment. In addition, the course will review topics of environmental due diligence and the joint and several nature of environmental liability.

Prerequisites: B LAW 243

Changes Effective Spring 2021:
- Description
- Prerequisites

**EBF 473: Risk Management in Energy Industries**
Old Listing Effective Through Fall 2020:

All major firms engage in financial risk management. In this course, we will learn the basics of how firms can use financial instruments to manage their financial risk. In particular, we will focus on risk management with respect to threats to financial viability from the weather. Specific topics to be covered include the structure and pricing of options, the theory of arbitrage, financial statistics and the use of options to hedge financial risk.

Prerequisites: MATH 140; (ECON 102 and MATH 230) or (EBF 200 and E F 301); (EBF 472 or STAT 301 or STAT 401)

Changes Effective Spring 2021:
- Description
- Prerequisites

**EBF 483: Introduction to Electricity Markets (3 Credits)**
Old Listing Effective Through Fall 2020:

This course is designed to teach students about the structure of the electricity industry, the regulatory institutions that oversee the industry, and the new market institutions that have been put into place since electricity restructuring. Much of the focus will be on the U.S. electricity industry. Since Pennsylvania has been a national leader in electricity restructuring, we will place particular emphasis on events in the Mid-Atlantic region, but will also discuss other market structures in the U.S. and in other countries. Specific topics covered will include cost models for power generation, transmission and distribution; rate of return regulation for electric utilities; the process of electricity restructuring and creation of electricity markets; Locational Marginal Pricing of electric energy; financial risk management in electric power; and detecting and mitigating market power.

Prerequisites: MATH 140; and (ECON 102 and MATH 230) or (EBF 200 and EBF 301); and (EBF 472 or STAT 200 or STAT 301 or STAT 401)

Changes Effective Spring 2021:
- Description
- Prerequisites

**EBF 484: Energy Economics**
Old Listing Effective Through Fall 2020:

What is the role of energy in the economic system? What are the implications of the energy transformation on economic welfare? How can we efficiently meet new demand while also addressing the myriad social, environmental, and regulatory challenges related to the energy system? This course will examine these questions from an intermediate microeconomics perspective. The course covers topics in the organization and conduct of firms operating in energy markets, measuring and detecting the manipulation of energy markets, and regulating the environmental impacts of energy production, delivery and consumption.

Prerequisites: (ECON 102 and MATH 230) or (EBF 200 and EBF 301); and (MATH 110 or MATH 140); and (EBF 472 OR STAT 200 OR STAT 301 OR STAT 401)

Changes Effective Spring 2021:
- Description
- Prerequisites

**ECON 454: Economics of Mergers (3 Credits)**
Old Listing Effective Through Fall 2020:

It is not uncommon for two separate and distinct corporate entities within an industry to merge and become one firm. This course includes topics that examine the economics of mergers as well as economic policy with regard to mergers. There often are both pro-competitive and anti-competitive effects of mergers. In the U.S. the Federal Trade Commission has primary responsibility for assessing the balance between effects. Along with the FTC, the antitrust division of the department of justice can analyze potential mergers using economic data and forecasts with
of their contribution to online and in-class discussions. The course logs, the analytic quality of their papers, and the frequency and quality settings. Students' grades will be based on the completeness of their presentation of relevant concepts of leadership and organizational theory. Studies in Popular Film aims at enhancing students' understanding and application of leadership in three primary ways. First, using the films as a starting point, students will be expected to write three short (3-4 pp.) essays and one more substantial final essay (10-12 pp.).

Rather than simple plot narratives, it is expected that these essays will thoughtfully analyze and synthesize actions and concepts from each film's plots and characters, the practical and theoretical problems portrayed in the films. Second, these challenges, decisions, and behaviors will serve to highlight and illustrate important leadership concepts and how they might be applied to authentic situations in schools and other organizational settings. Finally, the films will challenge and spark students' imagination and inspire them to consider new possibilities and problems. Students are expected to rigorously participate in whole class and on-line discussions about the meanings expressed in the films. These discussions will be coupled with and enhanced by the instructor's presentation of relevant concepts of leadership and organizational theory. Students are also expected to maintain a continuing reflective log of each film's plots and characters, the practical and theoretical problems presented, and their own reactions to and ideas about each film. Using these logs as a starting point, students will be expected to write three short (3-4 pp.) essays and one more substantial final essay (10-12 pp.).

Indeed, the course has benefited in the past from having students with diverse backgrounds and levels of professional experience. The course effectively complements and reinforces other EDLDR courses, such as Introduction to Educational Leadership (EDLDR 480), The Principalship (EDLDR 568), Leadership in Today's Schools (EDLDR 597), and Schools as Organizations (EDLDR 580).

Prerequisites: (EDTHP 115, junior standing, or permission or program)

Changes Effective Spring 2021:

• Prerequisites

EDLDR 409: Leadership Studies in Popular Film
Old Listing Effective Through Fall 2020:

In-depth analysis of leadership dynamics revealed in popular film. Focus on cinematic depictions of theory and practical application of leadership. EDLDR 409 Leadership Studies in Popular Film aims at enhancing students' understanding and application of leadership in three primary ways. First, using the films as case studies, students will critically analyze, evaluate, and discuss the moral, ethical, and administrative challenges, decisions, and behaviors portrayed in the films. Second, these challenges, decisions, and behaviors will serve to highlight and illustrate important leadership concepts and how they might be applied to authentic situations in schools and other organizational settings. Finally, the films will challenge and spark students' imagination and inspire them to consider new possibilities for practice and research. During the course, students will view 10-12 classic popular films, each revealing a set of key leadership concepts and problems. Students are expected to rigorously participate in whole class and on-line discussions about the meanings expressed in the films. These discussions will be coupled with and enhanced by the instructor's presentation of relevant concepts of leadership and organizational theory. Students are also expected to maintain a continuing reflective log of each film's plots and characters, the practical and theoretical problems presented, and their own reactions to and ideas about each film. Using these logs as a starting point, students will be expected to write three short (3-4 pp.) essays and one more substantial final essay (10-12 pp.).

Rather than simple plot narratives, it is expected that these essays will thoughtfully analyze and synthesize actions and concepts from the films, and attempt to apply them to school or other organizational settings. Students' grades will be based on the completeness of their logs, the analytic quality of their papers, and the frequency and quality of their contribution to on-line and in-class discussions. The course is intended for graduate, undergraduate, and certification students. Indeed, the course has benefited in the past from having students with diverse backgrounds and levels of professional experience. The course effectively complements and reinforces other EDLDR courses, such as Introduction to Educational Leadership (EDLDR 480), The Principalship (EDLDR 568), Leadership in Today's Schools (EDLDR 597), and Schools as Organizations (EDLDR 580).

Prerequisites: (EDTHP 115, junior standing, or permission or program)

Changes Effective Spring 2021:

• Prerequisites

EDLDR 476: The Teacher and the Law
Old Listing Effective Through Fall 2020:

An introduction to education law as it affects the teacher. EDLDR 476 The Teacher and The Law (3) This course will provide an overview of major issues in law related to teachers. The course will focus primarily on case law including U.S. Supreme Court decisions as well as relevant state and federal lower court opinions. State legislation and administrative laws will also be considered. Topics to be covered include an introduction to education law as it affects teachers, including teachers’ privacy rights, school safety, special education, sexual harassment, discrimination, student assessment, slander/libel, tenure and constitutional issues as related to education. The class will be a combination of lectures and discussions on particular legal topics related directly to the training of teachers and based on the text and selected handouts. From time to time, the class will break up into small groups to work on in-class dilemmas.

Prerequisites: 9 Credits in education or the social sciences

Changes Effective Spring 2021:

• Prerequisites

EDLDR 480: Introduction to Educational Leadership
Old Listing Effective Through Fall 2020:

Development of educational leadership. Relationships among local, state, and federal agencies. Introduction to current concepts and theories. EDLDR 480 Introduction to Educational Leadership (3) Through lectures, readings, case study, film, and discussion, this course examines basic topics in organizational theory, school administration, and educational policy. In addition, the course presents a historical perspective, suggesting how understandings about education have varied and changed throughout American history. The primary aim of the course is to help students begin to perceive, understand, and apply the important connections between educational theory, research, and practice in a critical and thoughtful fashion.

Prerequisites: 3 credits in social science, sociology, anthropology, community development, business administration or political science

Changes Effective Spring 2021:

• Prerequisites

EDMTH 301: Mathematics in Elementary Education I (3 Credits)
Old Listing Effective Through Fall 2020:

Survey of content, pedagogy, and psychology of mathematics instruction relating to numbers, operations, and algebraic thinking for pre-school through eighth grade. EDMTH 301 Mathematics in Elementary Education I (3) The course will provide candidates the opportunity to explore and develop research-based practices needed to teach elementary
mathematics in alignment with national and state content standards. This course will focus on the big ideas and learning trajectories associated with the mathematical content strands of numbers and operations and algebraic reasoning and functions across grades PK – 8. Course content will also focus on curriculum materials and considerations, planning effective lessons, pedagogical practices, and assessment of students' knowledge related to these mathematical content areas. The course will also emphasize the use of manipulatives and technology to represent the essential understandings needed to help students make sense of mathematical operations and make mathematical connections. Throughout the course, teacher candidates will engage in mathematical tasks and mathematical discussions, and observe videos of elementary mathematics classes to explore the focus, coherence, and rigor needed across PK – 8 grade levels relative to the content strands of numbers and operations and algebraic reasoning and functions. They will also learn about various formative and summative assessments strategies to identify students' misconceptions and learn various intervention strategies to clarify students' understanding. The course will also emphasize instructional approaches designed to help students develop the mathematical behaviors associated with the Common Core Mathematical Practices across grade levels.

Prerequisite: a previous course in college mathematics and formal admission into the Teacher Certification Program

Changes Effective Spring 2021:

- Description

**EDMTH 302: Mathematics in Elementary Education II (3 Credits)**

Old Listing Effective Through Fall 2020:

Survey of content, pedagogy, and psychology of mathematics instruction relating to geometry, measurement, statistics, and data for pre-school through eighth grade. EDMTH 302 Mathematics in Elementary Education II (3) The course will provide candidates the opportunity to explore and develop research-based practices needed to teach elementary mathematics in alignment with national and state content standards. This course will focus on the big ideas and learning trajectories associated with the mathematical content strands of geometry, measurement, data analysis, and probability across grades PK – 8. Course content will also focus on curriculum materials and considerations, planning effective lessons, pedagogical practices, and assessment of students' knowledge related to these mathematical content areas. The course will also emphasize the use of manipulatives and technology to represent the essential understandings needed to help students make sense of mathematical operations and make mathematical connections. Throughout the course, teacher candidates will engage in mathematical tasks and mathematical discussions, and observe videos of elementary mathematics classes to explore the focus, coherence, and rigor needed across PK – 8 grade levels relative to the content strands of geometry, measurement, data analysis, and probability. They will also learn about various formative and summative assessments strategies to identify students' misconceptions and learn various intervention strategies to clarify students' understanding. The course will also emphasize instructional approaches designed to help students develop the mathematical behaviors associated with the Common Core Mathematical Practices across grade levels.

Prerequisites: EDMTH 301

Changes Effective Spring 2021:

- Remove Prerequisite

**EDPSY 10: Individual Differences and Education (3 Credits) (GS) (BA)**

Old Listing Effective Through Fall 2020:

Relationships between learner differences and physical, cognitive, language, social, and cultural development; emphasis on ethnicity, gender, special needs; schooling implications. EDPSY 010 Individual Differences in Education (3) (GS)(BA) This course meets the Bachelor of Arts degree requirements. This course is an overview of the major theories and significant research on the development and explanation of individual differences and how those differences affect the education of school-age children. Specific topics include physical, cognitive, language, social-emotional, and cultural development in children and youth ages 3-20. By its very nature, the course will include a diversity focus, with special attention to ethnic, cultural, and gender issues as well as the needs of special populations. Within each topic area, the course will pay special attention to theoretical and empirical work on how and why variations occur, how they are to be interpreted and measured, and the implications those variations have for society, especially for schooling. Traditional and alternative practices in schools will be examined to see which approaches best meet the needs of an increasingly diverse American society. While the course will focus on individual differences in education it will not be exclusively oriented toward future teachers. The course will also help parents (or future parents) understand the nature of development and individual differences of students as they progress through the educational system.

Changes Effective Spring 2021:

- Recertification
- Description

**EDPSY 14: Learning and Instruction**

Old Listing Effective Through Fall 2020:

Psychology of human learning applied toward the achievement of educational goals; evaluation of learning outcomes.

Changes Effective Spring 2021:

- GS Attribute
- BA Attribute
- Abbreviated Title
- Description

**EDPSY 101: Analysis and Interpretation of Statistical Data in Education (3 Credits) (GQ) (BA)**

Old Listing Effective Through Fall 2020:

An introduction to quantitative methods in educational research emphasizing the interpretation of frequently encountered statistical procedures.

Changes Effective Spring 2021:

- Recertification
- Description

**EDPSY 406: Applied Statistical Inference for Behavioral Sciences**

Old Listing Effective Through Fall 2020:
Common techniques (parametric) covered through two-factor analysis of variance (independent samples); hypothesis testing, confidence interval, power, robustness; MINITAB frequently used.

Prerequisites: EDPSY 400 or STAT 200

Changes Effective Spring 2021:

- Description
- Prerequisites

EDPSY 408: Meeting Instructional Needs for English Language Learners with Special Needs
Old Listing Effective Through Fall 2020:

The course content and activities focus on instruction and assessment for English Language Learners with special needs. EDPSY (SPLED) 408 Meeting Instructional Needs of English Language Learners with Special Needs (3) The purpose of this course is to bring together two bodies of research to prepare future teachers of learners with special needs who are also English language learners to be effective teachers. The course has been developed to fulfill requirements of Pennsylvania Department of Education and in recognition of the growing number of English Language Learners (ELL) in the general population and thus in special education settings. The course presents (1) theory and research on the instructional needs of English Language Learners (ELLs) and (2) the knowledge base on effective instruction for students with special needs and assists students to integrate the two. Major topic areas include principles and issues in second language acquisition; ELL characteristics including linguistic and cultural factors that affect second language acquisition; techniques and methods of research-based instruction for English Language Learners with special needs; lesson planning and instructional modifications for ELLs with special needs; and appropriate assessment practices for ELLs with special needs. A major objective of this course is for students to be able to develop or modify instructional plans that reflect evidence based practices for adapting for the needs of ELL learners with special needs. Evaluation will be based on a combination of methods including, tests and quizzes, analyses of videos and case studies and reports of observations and interviews.

Prerequisites: EDPSY010, EDPSY014, Prerequisite or concurrent: SPLED395W, SPLED425

Changes Effective Spring 2021:

- Description
- Prerequisites

EDPSY 421: Learning Processes in Relation to Educational Practices (3 Credits)
Old Listing Effective Through Fall 2020:

An introduction to the empirical study of variables and conditions that influence school learning.

Prerequisite: EDPSY014 or PSYCH212

Changes Effective Spring 2021:

- Description
- Prerequisites

EDPSY 450: Principles of Measurement (3 Credits) (BA)
Old Listing Effective Through Fall 2020:

Scale transformation, norms, standardization, validation procedures, estimation of reliability.

Prerequisite: EDPSY 400, PSYCH 100, or PSYCH 200; STAT 200

Cross-Listed Courses: PSYCH 404

Changes Effective Spring 2021:

- Description
- Prerequisites

EDPSY 475: Introduction to Educational Research (3 Credits)
Old Listing Effective Through Fall 2020:

Scientific method; classes of variables in educational research; the measurement of classroom behavior; survey, predictive, and experimental studies.

Prerequisite: EDPSY 400

Changes Effective Spring 2021:

- Description
- Prerequisites

EDSCI 454: Modern Elementary Science Education (3 Credits)
Old Listing Effective Through Fall 2020:

Introduction of content, methods, and materials used in modern elementary science with emphasis upon modern elementary science programs.

Prerequisite: seventh-semester standing in Elementary Education Major

Changes Effective Spring 2021:

- Abbreviation to EDUC
- Description
- Prerequisite

EDSGN 100: Introduction to Engineering Design (3 Credits)
Old Listing Effective Through Fall 2020:

Introduction to engineering design processes, methods, and decision making using team design projects; design communication methods including graphical, verbal, and written.

Changes Effective Spring 2021:

- Credits Repeatable
- Title
- Abbreviated Title
- Description

EDTHP 115: Education in American Society
Old Listing Effective Through Fall 2020:

Introduction to the development of educational institutions, with emphasis on historical, philosophical, and sociological forces, and on problems of equity.

Changes Effective Spring 2021:
EDTHP 420: education and Public Policy
Old Listing Effective Through Fall 2020:

Focus on the development and analysis of education policy, and policy’s influence on schools. EDTHP 420 Education and Public Policy (3) This course examines the inherently political process in which educational policies are developed and implemented. It also considers how these formal policies interact with the practice of teaching and learning in U.S. schools. In this course, students will be expected to actively participate in classroom discussions and activities as we examine the development of policies and their implementation, with a focus on understanding pressing policy dilemmas in education today. Course evaluation includes quizzes, a midterm paper analyzing a policy issue, and a series of final exam essays.

Prerequisites: six credits in social/ behavioral sciences

Changes Effective Spring 2021:

• Prerequisites

EDTHP 427: Intelligence and Educational Policy
Old Listing Effective Through Fall 2020:

This course explores the concept of intelligence and its assessment from historical, psychological, educational and policy perspectives. EDTHP 427 Intelligence and Education Policy (3) In this course, we will focus on two main content areas. First, we'll explore the concept of intelligence and its assessment from historical, psychological, educational, and policy perspectives: What does intelligence look like in different cultures and at different points in history? What forces help to shape conceptions of intelligence? Second, we will consider the ways in which conceptions of intelligence influence students' opportunities to learn. For example, how are students assigned to higher-level or remedial classes and on what bases should admission to elite educational programs be allocated? What policies govern such decisions? The study of intelligence has been a controversial one. This course will touch on several controversies associated with the topic, including the "nature/nurture" debate and the "merit/affirmative action" debate. Readings and discussion will draw on opposing sides of these issues.

Prerequisites: EDTHP 115 or 6 credits in social/ behavioral sciences

Changes Effective Spring 2021:

• Prerequisites

EDUC 466: Foundations of Teaching English as a Second Language
Old Listing Effective Through Fall 2020:

Overview of various legal, historical, and socio-cultural implications of teaching and learning English as a Second Language. EDUC 466 Foundations of Teaching English as a Second Language (3) EDUC 466 is the first course in a four-course sequence designed to meet the Pennsylvania Department of Education’s (PDE) requirements for the ESL Program Specialist endorsement. EDUC 466 addresses the legal, historical, and socio-cultural issues related to non-native speakers of English, and the implications for ESL curriculum, instruction, and assessment within the K-12 school setting. The course is designed: (1) to encourage understanding and appreciation for language diversity and culture, and (2) to enhance the knowledge and skills of teachers working with culturally and linguistically diverse learners, their families, and their communities. The course specifically addresses two of the PDE competencies necessary for a teacher to acquire in order to be endorsed as an ESL Program Specialist: PDE Competency IV-Developing cultural awareness/sensitivity. The four areas of emphasis within EDUC 466 are:a) The legal, historical, and cultural implications of English as a Second Language, which explores the legal and historical bases of ESL and analyzes the differences among home and school cultures, especially as they relate to language; b) Fundamentals of developing English language skills, which provides an introduction to the structure of the English language, grammar, and pronunciation, including lexical, morphological, syntactical, and phonological components; c) An overview of second language acquisition, which introduces the topics of linguistic skill development, and first and second language acquisition; and d) Multicultural education, which focuses on helping teachers acquire knowledge, develop cultural sensitivity, and identify educational strategies that address the needs of multilingual and multicultural learners and their families.

Prerequisites: Permission of program

Changes Effective Spring 2021:

• Prerequisites

EE 480: Linear Systems: Time Domain and Transform Analysis (3 Credits)
Old Listing Effective Through Fall 2020:

Signals and systems representations, classifications, and analysis using: Difference and Differential equations, Laplace transform, z-transform, Fourier series, FT, FFT, DFT. EE 480 Linear Systems: Time Domain and Transform Analysis (3) Linear Systems: Time Domain and Transform Analysis, is a recommended graduate level course for the Master of Engineering in Electrical Engineering at Capital College, since it is a Prerequisite for most of the E E prefixed courses offered at this location. The major topics covered in this course include: Signals and Systems representations, classifications, and analysis using: Difference and Differential Equations, Laplace Transform, Z-transform, Fourier series, Fourier Transform, Fast Fourier Transform (FFT), Discrete-Time Fourier Transform (DTFT) and Discrete Fourier Transform (DFT). The objective of this course is to develop intuitive and practical understanding of the essentials in signals and systems. The stress is on fundamentals of representation, and analysis of signals and their applications to systems in both discrete and continuous time and frequency domains. This course is designed to prepare the graduate students for more advanced work in broad range areas including communications, control systems, power systems, computer engineering, signal processing and image processing. The quality of students’ performances and therefore their course grades are determined via their performance in a midterm exam, a comprehensive final exam, homework assignments, and a course project in accordance with the university’s grading policy.

Prerequisites: graduate standing

Changes Effective Spring 2021:

• Abbreviated Title
• Description
• Prerequisite
EGEE 101H: Energy and the Environment
Old Listing Effective Through Fall 2020:

Energy utilization and technological development, energy resources, conversion and consequences on the local and global environment, and future energy alternatives. EGEE 101H Energy and the Environment (3) (GN)Energy is the life-blood of any society. The information and principles learnt in this course will allow the students to make sound judgments in the area of personal energy choices; There is increasing concern about the influence of human activities, particularly energy use, on global climate change. This has an impact on global business aspects. Students in all walks of life need to be exposed to the basic concepts to appreciate the positions of policymakers, scientists, and industry over the interrelationship between greenhouse gas emissions and global climate change. The students will acquire knowledge, which will enable them to critically evaluate any energy-related concerns of the society. This is important for any college graduate for responsible citizenship and stewardship. The main objectives of this course are to: provide basic understanding and appreciation of energy and environmental concepts and interconnectedness; analyze energy consumption patterns; discuss various energy resources that power the modern society; examine the energy conversion processes; explore interrelationships between energy use and industrial progress and environmental consequences; discuss future energy alternatives.

Changes Effective Spring 2021:

• Recertification

EGEE 110: Safety Science for the Rest of Your Life
Old Listing Effective Through Fall 2020:

Survey of applications and technologies associated with safety in our every day life with associated review of scientific principles and economic, social and political impacts. EGEE 110 Safety Science for the Rest of Your Life (3) (GN) Safety is an applied field with many aspects. It has engineering, science, psychology and management components. For an understanding of how humans interact with their working and living environment, one has to understand the basic sciences of physics, biology, chemistry, mathematics and psychology as well as some of the traditional engineering disciplines. This general education course is intended to provide students with a basic understanding of how these science and engineering principles are applied in a safety context to every day life, products, hobbies, finances and human interaction. The material that will be discussed, presented, assigned, tested, etc. is the fundamental science and engineering principles behind each applied safety-related activity discussed. The history discussion will include bacteria exposure and ergonomic aspects (such as cumulative trauma, impact on the body of hot environments, long shifts, etc.) of meat packers, railroaders and miners. It will include discussion of air pollution associated with industry's early development and toxicological effects of exposure to methyl iso-cyanate associated with Union Carbide's 1984 incident in Bhopal, India. Ventilation, water influx and collapse hazards associated with the mining industry (e.g. Quecreek) are discussed. The science of finding the right drill shaft location for air and rescue at Quecreek will be discussed. Economic coverage will include the societal costs of inadequate safety measures. The hazards and control sections will cover structural and impact resistant aspects of sports equipment and the biomechanics of sports injuries. The inner workings of smoke detectors, how fires progress through a home, fire extinguishers, quenching, smothering, combustion reaction interruption mechanisms of fire suppression will also be covered. In fleet safety, applied physics concepts such as friction, acceleration, momentum and force will be presented. Electrical concepts such as static generation, grounding, current flow, etc. will be covered in a safety context (filling a gas can). Toxicology of chemical exposure, biomechanics and ergonomics of materials handling, moving, lifting, climbing, etc. will be dealt with through examples, discussions and presentations. Bacteria sanitization, disinfection, freezing, cooking, etc. and other food science concepts will be presented in a safety context. Emergency response issues from catastrophic incidents (natural or purposeful attack) will be addressed and practiced. This course will be offered in the spring and fall semesters. Performance assessment will be through on-line quizzes, a short individual and a longer group analytical and reflective paper and a group presentation of the results of an outside deductive analysis activity.

Changes Effective Spring 2021:

• GS Attribute
• Recertification
• Inter-Domain
• Course Number
• Title
• Abbreviated Title
• Description

EGEE 436: Modern Thermodynamics for Energy Systems
Old Listing Effective Through Fall 2020:

Thermodynamics of external fields, theory of stability and fluctuations, irreversible and non-linear thermodynamics, and bifurcation theory and their applications in energy and environmental processes are discussed. EGEE 436 Modern Thermodynamics for Energy Systems (3) This course will be an advanced thermodynamics class that will expose students to the thermodynamics of irreversible processes and the thermodynamic analysis of dynamic systems. Students will learn to analyze the thermodynamics of conductivity, diffusion, gravitation, electrochemical systems, stability, fluctuations and critical phenomena. Students are expected to be able to understand and apply their knowledge to analyze problems involving fuel cells, membrane potential in electrolysis systems for hydrogen production, and other energy and environmental processes. This is an elective course in the energy engineering major and will be offered once a year in the spring semester to about 40 students. Student performance will be evaluated based on homework, mid term exams, class participation, project, and final exams.

Prerequisites: EME 301 , EGEE 302 , MATH 231 , and MATH 251

Changes Effective Spring 2021:

• Description
• Prerequisites

EMCH 210: Statics and Strength of Materials
Old Listing Effective Through Fall 2020:

Equilibrium of particles, rigid bodies, frames, trusses, beams, columns; stress and strain analysis of rods, beams, pressure vessels. E MCH 210 E MCH 210 Statics and Strength of Materials (5) This course is a combination of E MCH 211 and E MCH 213. Students taking E MCH 210 may not take E MCH 211 or 213 for credit, or vice versa. Students will learn how forces and moments acting on rigid and deformable bodies affect reactions both inside and outside the bodies. Students will study the external reactions, and their inter-relationships; the discipline of statics (E MCH 211), as well as the associated internal forces and deformations, quantified by their corresponding stresses and strains;
the discipline of strength of materials (E MCH 213). The student will be able to analyze and design simple structural components based on deformation, strength, or stability. Students will be prepared to analyze and design simple structures and take upper division courses in mechanics of materials and structural analysis and design. Students will communicate their analysis through the use of free-body diagrams and logically arranged equations.

Prerequisites: Or concurrent MATH 141

Changes Effective Spring 2021:

• Prerequisites

EMCH 210H: Statics and Strength of Materials, Honors
Old Listing Effective Through Fall 2020:

Equilibrium of particles and rigid bodies, frames, trusses, beams, columns; stress and strain analysis of rods, beams, pressure vessels. E MCH 210H E MCH 210H Statics and Strength of Materials, Honors (5) This honors course is a combination of E MCH 211 and E MCH 213. Students taking E MCH 210H may not take E MCH 211 and 213 for credit, or vice versa. The same general topics are covered as in E MCH 210, but in a more advanced fashion and with more advanced applications. Students will learn how forces and moments acting on rigid and deformable bodies affect reactions both inside and outside the bodies. Students will study the external reactions, and their inter-relationships – the discipline of statics (E MCH 211), as well as the associated internal forces and deformations, quantified by their corresponding stresses and strains – the discipline of strength of materials (E MCH 213). The student will be able to analyze and design simple structural components based on deflection, strength, or stability. Students will be prepared to analyze and design simple structures and take upper division courses in mechanics of materials and structural analysis and design. Students will communicate their analysis through the use of free-body diagrams and logically arranged equations.

Prerequisites: Or Concurrent MATH 141

Changes Effective Spring 2021:

• Prerequisites

EMCH 211: Statics
Old Listing Effective Through Fall 2020:

Equilibrium of coplanar force systems; analysis of frames and trusses; noncoplanar force systems; friction; centroids and moments of inertia. E MCH 211 E MCH 211 Statics (3) Engineering Mechanics is the engineering science that relates forces and moments to the motion (displacement, velocity, acceleration) of bodies. The understanding of the concepts of force, moment, and motion is essential to design efficient engineering components ranging from a bridge to a wing strut to a robot arm to the mother board of a computer. Statics (E MCH 211) is the foundational course for both Dynamics (E MCH 212), which is the study of motion and the forces causing motion, and Strength of Materials (E MCH 213), which is the study of deformation and strength design of solids. Statics will provide students with the tools and guidance to master the use of equilibrium equations and Free Body Diagrams (FBD's) and to solve real engineering problems. Students should leave this class with the ability to logically approach a variety of static engineering problems, to translate a physical situation into an analytic model, and to use various mathematical tools to determine desired information. Course topics include: introduction and vectors, problem solving, force vectors, particle equilibrium, moments/couples, equivalent systems, distributed loads/FBDs, rigid body equilibrium, trusses, frames and machines, 3-D equilibrium, friction, centroids and center of gravity, and moments of inertia.

Prerequisites: or Concurrent MATH 141

Changes Effective Spring 2021:

• Prerequisites

EMCH 212: Dynamics (3 Credits)
Old Listing Effective Through Fall 2020:

Motion of a particle; relative motion; kinetics of translation, rotation, and plane motion; work-energy; impulse-momentum. E MCH 212 E MCH 212 Dynamics (3) Dynamics (E MCH 212) is the study of forces causing motion and, at least in engineering, its primary goal is the determination of loads on moving structures for the purpose of design. Dynamics will provide students with the tools and guidance to analytically model a wide variety of mechanical and structural systems. In Dynamics, this is done by drawing free-body diagrams of the relevant parts of the system and then applying the laws of Newton and Euler, laws governing material behavior, and equations describing the geometry of motion of points and bodies (kinematics) to those free-body diagrams to obtain the equations governing the motion of the system. Once a system has been modeled, Dynamics will also provide students with the tools to obtain desired information from those models by solving the equations governing the motion of the system. Topics covered in Dynamics include: kinematics of particles, application of Newton's laws to particles, energy and momentum methods for particles, kinematics of rigid bodies, application of the laws of Newton and Euler to rigid bodies, and energy and momentum methods for rigid bodies.

Prerequisite: E MCH 211 or E MCH 210; MATH 141

Changes Effective Spring 2021:

• Prerequisites

EMCH 212H: Dynamics (3 Credits) (H)
Old Listing Effective Through Fall 2020:

Motion of a particle; relative motion; kinetics of translation, rotation, and plane motion; work-energy; impulse-momentum. E MCH 212H E MCH 212H Dynamics (3) Dynamics (E MCH 212) is the study of forces causing motion and, at least in engineering, its primary goal is the determination of loads on moving structures for the purpose of design. Honors Dynamics (E MCH 212H) will provide students with the tools and guidance to analytically model a wide variety of mechanical and structural systems. In Dynamics, this is done by drawing free-body diagrams of the relevant parts of the system and then applying the laws of Newton and Euler, laws governing material behavior, and equations describing the geometry of motion of points and bodies (kinematics) to those free-body diagrams to obtain the equations governing the motion of the system. Once a system has been modeled, Honors Dynamics will also provide students with the tools to obtain desired information from those models by solving the equations governing the motion of the system. Topics covered in Honors Dynamics include: kinematics of particles, application of Newton's laws to particles, energy and momentum methods for particles, kinematics of rigid bodies, application of the laws of Newton and Euler to rigid bodies, and energy and momentum methods for rigid bodies. In addition to what is done in Dynamics (E MCH 212), students in Honors Dynamics will
typically do a project in which they design an experiment and use what they have learned to compare theory with experiment. They will also make use of modern mathematical software to solve the nonlinear differential equations obtained in their analysis of mechanical and structural systems to obtain further understanding of the behavior of these systems.

Prerequisite: E MCH 211, E MCH 210H, or E MCH 210; MATH 141

Changes Effective Spring 2021:

• Prerequisites

**EMCH 302H: Thermodynamics, Heat Conduction, and Principles of Modeling, Honors (4 Credits) (H)**

Old Listing Effective Through Fall 2020:

EMCH 302H is a required course for engineering science students. This course presents the fundamental principles of classical thermostatics, thermodynamics, and heat transfer with relevant engineering applications. The students are expected to develop skills necessary to apply these principles to common engineering problems involving properties of matter, energy, non-reacting mixtures, and energy transport. The classical thermostatics and thermodynamics instruction will typically take 9 weeks. Control volume analysis techniques are introduced for closed and open systems undergoing both quasi-static and dynamic processes. The techniques are applied to analyze common power and refrigeration cycles, including gas and vapor systems. Diffusion in fluid and solid mixtures will also be considered. Special attention will be devoted to the notions of Helmholtz and Gibbs free energies as well as enthalpy. Use and significance of these concepts constitutive theories of gas, fluid, and solid materials systems will be discussed. The heat transfer component of the course will typically take 4 weeks. Instruction on heat transfer will cover the three classical modes of heat transfer: conduction, convection, and radiation. Heat exchangers and heat transfer from extended surfaces are presented at a very basic level. Two weeks will be devoted to an introduction to statistical thermodynamic concepts in which a thermodynamic system is viewed as an ensemble whose state can be characterized in phase space. Enough background will be provided to compare and contrast the classical and statistical notions of entropy.

Prerequisites: CHEM 110, PHYS 211, MATH 230; OR MATH 231

Changes Effective Spring 2021:

• Prerequisites

**EMCH 316: Experimental Determination of Mechanical Response of Materials**

Old Listing Effective Through Fall 2020:

Experimental techniques for mechanical property measurement and structural testing. E MCH 316 E MCH 316 Experimental Determination of Mechanical Response of Materials (1) The objective of EM CH 316 is to introduce students to the relevant technology and methods used to determine the mechanical responses of engineering materials and structural components. Student teams will apply stress and strain measurement techniques; conduct tensile, torsion, creep, internal pressurization, and fatigue tests; then characterize mechanical behavior and explain the material parameters obtained. The laboratory assignments are designed to complement the lecture course E MCH 315, which must be taken as a prerequisite of concurrently.

Prerequisites: or Concurrent EMCH 315

Changes Effective Spring 2021:

• Prerequisites

**EMCH 407: Computer Methods in Engineering Design**

Old Listing Effective Through Fall 2020:

Computer methods in mechanical design: solid modeling, graphics, surface smoothing/interpolation and underlying numerics; simultaneous equations, quadrature, eigen problems, discrete models. E MCH 407 Computer Methods in Engineering Design (3) E MCH 407 teaches computer methods and the use of modeling tools for doing mechanical design and the underlying numerical methods necessary to design, design analysis and development of design-related computer tools. The programming tool used in the course is MATLAB. E MCH 407 provides preparation for study of finite element analysis and professional practice. It is well suited to students who expect to work in design, manufacturing and/or project engineering. E MCH 407 is not a typical numerical methods course; for example, it treats solution of differential equations using finite differences only as a minor application. Nonetheless the mathematics is at times rather abstract. Course Objectives (labels for ABET criterion are appended to each objective). Students will be able to: Apply methods prerequisite to finite element analysis to solve well-defined problems (a, e, f, g, i, k) Generate splines and curves for the smoothing of surfaces (a, b, e, f, g, h, i, j, k) Write computer code to do computer graphics and object manipulation (a, c) Do solid modeling, create rapid-prototypes, generate meshes using a commercial package (c, e, h, j, k) Calculate eigenvalues/eigenvectors and plot mode shapes (a, e, j, k) 2 Evaluation Methods include homework, mini-project submittals, midterm and final exams. 3 Special Facilities: E MCH 407 is taught in classrooms with computers. 4 Frequency of Offering/Enrollment: E MCH 407 is offered every spring semester. Enrollment is limited to the number of computers in the classroom.

Prerequisites: CMPSC201, CMPSC202, or E SC 261M; E MCH213, E MCH210H, or E MCH210

Changes Effective Spring 2021:

• Prerequisites

**EMCH 416: Failure and Failure Analysis of Solids (3 Credits) (H)**

Old Listing Effective Through Fall 2020:

Examination and analysis of the various modes of failure of solid materials.

Prerequisite: E MCH213, E MCH210, or E MCH210H

Changes Effective Spring 2021:

• Prerequisites

**EMCH 446: Mechanics of Viscoelastic Materials**

Old Listing Effective Through Fall 2020:

Nature of viscoelastic materials, constitutive relations, thermorheological materials, viscoelastic stress analysis, rubber elasticity, viscoelastic liquids, experimental techniques for material characterization.

Prerequisites: EMCH 315, EMCH 316

Changes Effective Spring 2021:
EMCH 470: Analysis and Design in Vibration Engineering
Old Listing Effective Through Fall 2020:

Application of Lagrange's equations to mechanical system modeling, multiple-degree-of-freedom systems, experimental and computer methods; some emphasis on design applications.

In this course, students will learn basic techniques for modeling and analyzing linear multidegree-of-freedom (MDOF) mechanical systems, and will learn how to use these techniques for mechanical design. Students will learn to obtain equations of motion using energy methods (Lagrange's equations), with emphasis on the efficient formulation and reduction to the linear case. The basic theory of MDOF systems will be presented, including: eigenvalue problems; natural frequencies and normal modes; superposition and modal analysis; and frequency response. Numerical methods for solving static, dynamic and eigenvalue problems will be presented. Introductions to the theory of linear continuous systems and experimental methods of vibrations will be presented. A substantial portion of the course will be spent discussing design applications of the basic theory, such as: finite element numerical analysis and experimental modal analysis of beams and plates; vehicle suspension design; and vibration isolation and absorption.

Prerequisites: EMCH 121 or EMCH 121H; ME 370 or ESC 407H

Changes Effective Spring 2021:

• Prerequisites

EMCH 471: Engineering Composite Materials
Old Listing Effective Through Fall 2020:

Properties, manufacture, forms of composites; micromechanics; orthotropic lamina properties; laminate analysis; theories; failure analysis; thermal, environmental effects.

Prerequisites: E MCH213 , E MCH210H , or E MCH210 ; E MCH315 , E SC 414M , or MATSE201

Changes Effective Spring 2021:

• Prerequisites

EMCH 480: Mechanism Design and Analysis
Old Listing Effective Through Fall 2020:

Design and analysis of mechanical linkages including kinematic synthesis and dynamic analysis. Linkages for a variety of applications are considered. M E 480 Mechanism Design and Analysis (3) The student who takes this course will develop a basic understanding of the analysis and synthesis of planar linkage mechanisms. Students will develop the ability to model real linkage mechanisms using kinematic diagrams, including identification of links and joints. They will also learn to use Gruebler's equation to calculate the mobility or number of degrees of freedom of linkages based on the kinematic diagram. Students will also become familiar with real mechanism applications in the context of mechanism synthesis, where they will learn to determine the required dimensions of a mechanism for a specific application. Students will apply these dimensional synthesis methods in a design project which includes building a simple linkage prototype. They will learn kinematic analysis methods, i.e., analysis of position, velocity, and acceleration of planar linkages. These methods consist of graphical, algebraic, and complex number approaches. Students will also learn to use commercial software packages, e.g. Working Model, to predict position, velocity, and acceleration of planar linkages, and will compare their predictions to those using analytical approaches. Finally, students will learn to do dynamic force analysis of planar linkages to predict joint forces and motor torques. They will use commercial software packages to predict joint forces and motor torques of planar linkages, and will compare their predictions to those using analytical approaches.

Prerequisites: E MCH212 . Prerequisite or Concurrent: CMPSC200

Changes Effective Spring 2021:

• Prerequisites

EME 444: Global Energy Enterprise
Old Listing Effective Through Fall 2020:

Industry perspective on the resources, technologies, engineering approaches and externalities involved in satisfying worldwide energy demand profitably and sustainably.

Prerequisites: ECON 004 or equivalent, EGEE 102 , EGEE 120

Changes Effective Spring 2021:

• Description

ENGL 1: Understanding Literature
Old Listing Effective Through Fall 2020:

In ENGL 1 students will study a wide variety of genres of literature – poetry, novel, short story, drama, perhaps even genres like the comic book – from different time periods and cultures to gain a better understanding of how literature explores human values and issues. Throughout the course, students might use the texts to ask such questions as: of what value is a play, a novel, a poem, or a short story? Is literature worthwhile for its ability to tell a good story or for its questions that do not lend themselves to easy answers? Can literature improve our lives, individually and collectively? The course may also take advantage of literary events occurring on campus each semester – such as poetry readings, dramatic performances, even films relating to the course – to enrich the experience both of literature and of campus life.

Changes Effective Spring 2021:

• Course Number

ENGL 15A: Rhetoric and Composition (3 Credits) (US) (GWS)
Old Listing Effective Through Fall 2020:

Instruction and practice in writing expository prose that shows sensitivity to audience and purpose.

Prerequisite: ENGL 4 or satisfactory performance on the English proficiency examination

Changes Effective Spring 2021:

• Recertification

• Description
ENGL 15S: Rhetoric and Composition (3 Credits) (GWS) (FYS)
Old Listing Effective Through Fall 2020:
Instruction and practice in writing expository prose that shows sensitivity to audience and purpose.
Prerequisite: ENGL 4 or satisfactory performance on the English proficiency examination
Changes Effective Spring 2021:
  • Recertification
  • Description

ENGL 30: Honors Freshman Composition (3 Credits) (HON) (GWS)
Old Listing Effective Through Fall 2020:
Writing practice for specially qualified and screened students. Students who have passed a special writing test will qualify for this course.
Changes Effective Spring 2021:
  • Recertification
  • Change Number to 30H
  • Abbreviated Title
  • Title
  • Description

ENGL 30T: Honors Freshman Composition (3 Credits) (HON) (GWS) (FYS)
Old Listing Effective Through Fall 2020:
Writing practice for specially qualified and screened students. Students who have passed a special writing test will qualify for this course.
Changes Effective Spring 2021:
  • Recertification
  • Abbreviated Title
  • Title
  • Description

ENGL 130: Reading Popular Texts (3 Credits) (BA) (GH)
Old Listing Effective Through Fall 2020:
Popular texts (printed, visual, and aural texts) and their social, political, and cultural significance in the contemporary world. ENGL 130 Reading Popular Texts explores a variety of popular texts with the goal of enabling students to sharpen their ability to interpret the social, political, and cultural significance of such texts in the contemporary world. For the purposes of this course, the term "texts" is defined broadly, to include printed texts (books, periodicals, and hypertext), visual texts (film, television, visual arts and graphics), and aural texts (music, sound, and spoken word). Since these texts are primarily examples of popular culture-pervasive, self-replicating, commercialized artifacts of the contemporary scene—they are familiar to the general student outside the classroom. Too often, however, students have not seen such texts subjected to the same kind of critical reading as more elite cultural forms (e.g., canonized literature, art, and music). As a result, the general student in particular benefits from learning that cultural phenomena to which she or he is exposed on a daily basis have layers of significance as yet unexplored or unrealized. The purpose of the course is fulfilled if such students come away from it with a sharpened awareness of the role that popular texts play in their daily lives and the means to discuss and explain their influence—in short, to read their culture more critically.
Prerequisite: ENGL 15 or ENGL 30H
Changes Effective Spring 2021:
  • Recertification
  • Abbreviated Title
  • Description
  • Remove Prerequisites

ENGL 135: Alternative Voices in American Literature (3 Credits) (GH) (US) (BA)
Old Listing Effective Through Fall 2020:
United States writers from diverse backgrounds offering varying responses to issues such as race, class, gender, and ethnicity.
Cross Listing: AMST 135
Changes Effective Spring 2021:
  • Recertification
  • Description

ENGL 194H: Women Writers (3 Credits) (H) (US) (IL) (BA) (GH)
Old Listing Effective Through Fall 2020:
SHORT STORIES, NOVELS, POETRY, DRAMA, AND ESSAYS BY ENGLISH, AMERICAN, AND OTHER ENGLISH-SPEAKING WOMEN WRITERS.
Changes Effective Spring 2021:
  • Recertification
  • Abbreviated Title
  • Title
  • Description

ENGL 200: Introduction to Critical Reading (3 Credits) (BA)
Old Listing Effective Through Fall 2020:
Responses to a variety of literary texts written in English that evoke different approaches.
Prerequisite: ENGL 015 or ENGL 030
Changes Effective Spring 2021:
  • Remove Prerequisites

ENGL 200H: Introduction to Critical Reading (3 Credits) (H)
Old Listing Effective Through Fall 2020:
Responses to a variety of literary texts written in English that evoke different approaches.
Prerequisite: ENGL 015 or ENGL 030
Changes Effective Spring 2021:
  • Remove Prerequisites

ENGL 200W: Introduction to Critical Reading (3 Credits) (WF) (BA)
Old Listing Effective Through Fall 2020:
ENGL 201H: What is Literature (3 Credits) (H) (BA)

ENGL 201H will familiarize students with theories and practices that are foundational for thinking about literature, and for understanding literature's relation to life. It will teach students close analytic practices of reading, both those that have shaped the discipline of English studies and those emerging currently. As an honors course, ENGL 201H will introduce students to how conventions of literary genres operate, how they generate meaning, and how they require and manipulate readers' responses. English 201H will also encourage students to explore whether or not literary discourse, as instanced in particular genres, can be distinguished from other written or spoken discourses. While asking such questions, the course will acquaint students with technical vocabularies used by literary scholars and literary historians, and will provide students with sample scholarly rationales for hypothesizing the singularity of literary discourse, for constructing literary history, and for understanding literature's relation to life. It will teach students close analytic practices of reading, both those that have shaped the discipline of English studies and those emerging currently. Students can expect to take a highly engaged role in seminar-style discussion, including prepared presentations intended to provide a basis for that session's discussion, and which may both draw on, and emerge from, written work for the course.

Prerequisites: ENGL 15; ENGL 30 OR ( ENGL 137H, ENGL 138T )

Changes Effective Spring 2021:

• Remove Prerequisites

ENGL 202A: Effective Writing: Writing in the Social Sciences

ENGL 202A introduces students to the types of writing that social scientists typically do in the workplace, including research proposals, proper citation practices, literature reviews, and research reports. In discussing writing and writing activities, this class will focus on some of the more common forms of social science research - among them, experiments, interviews, observations, and surveys. Students will learn to formulate ideas and create coherent pieces of writing from the research they have conducted and read about. In short, this course will introduce students to a variety of writing and research strategies from which they can begin to develop their own identity as a social scientist.

(A student may take only one course for credit from ENGL 202A, 202B, 202C, and 202D.)

Prerequisites: ENGL 15; ESL 15; ENGL 30 OR ( ENGL 137H, ENGL 138T ) AND 4th Semester standing

Changes Effective Spring 2021:

• Prerequisites

ENGL 202B: Effective Writing: Writing in the Humanities

Instruction in writing persuasive arguments about significant issues in the humanities. (A student may take only one course for credit from ENGL 202A, 202B, 202C, and 202D.) ENGL 202B
Advanced Writing in the Humanities encourages students to develop professional writing skills most likely required in humanities careers. These writing modes include professional materials and then a wider range of writing projects that may include a professional narrative, analysis of a controversy, argumentation, persuasion, and synthesis. Students may analyze a wide-variety of texts - both verbal, digital, and visual - to learn skillful argumentation with advanced writing techniques.

Prerequisites: ENGL 15; ESL 15; ENGL 30 OR ( ENGL 137H, ENGL 138T ) AND 4th Semester standing

Changes Effective Spring 2021:

ENGL 202C: Effective Writing: Technical Writing
Old Listing Effective Through Fall 2020:

Writing for students in scientific and technical disciplines. (A student may take only one course for credit from ENGL 202A, 202B, 202C, and 202D.)

ENGL 202C is an advanced writing course designed to help students in science and engineering develop the writing strategies that they will need to communicate successfully on the job and to help them understand why those strategies are appropriate and effective. A key emphasis will be on the rhetorical principles of effective communication, including context analysis and defining clear, actionable purposes. Students will gain experience with a wide range of technical writing genres, including reports, descriptions, definitions, procedures, job application documents, emails, memos, and web applications. Students will also learn about the importance of document and graphic design, including how best to design communications to maximize their potential for success.

Prerequisites: ENGL 15; ESL 15; ENGL 30 OR ( ENGL 137H, ENGL 138T ) AND 4th Semester standing

Changes Effective Spring 2021:

• Prerequisites

ENGL 202D: Effective Writing: Business Writing
Old Listing Effective Through Fall 2020:

Writing reports and other common forms of business communication. (A student may take only one course for credit from ENGL 202A, 202B, 202C, and 202D.)

ENGL 202D is an advanced writing course designed to help students develop the writing strategies that they will need to write successfully on the job and to help them understand why those strategies are appropriate and effective. A key emphasis will be on rhetorical principles of effective communication, including audience analysis and defining clear, actionable purpose. Students will gain experience with a wide range of business writing genres, including reports, letters, job application documents, emails, memos and web applications like business blogs, online articles, social media profiles and personal branding. Students will also learn about the importance of document design, including how best to utilize headings, page layout, graphics and other visuals to maximize the potential for communication success.

Prerequisites: ENGL 15; ESL 15; ENGL 30 OR ( ENGL 137H, ENGL 138T ) AND 4th Semester standing

Changes Effective Spring 2021:
this class, students explore the multifaceted nature of writing. As the list of major topics indicates above, students study a broad range of contemporary theories and issues, from the socially-constituted self in the act of writing, to plagiarism as it is variably defined in professional settings, to the role of the writer in social change. The course is designed for both breadth and depth. Breadth is achieved through the many topics described above. The exams are designed to encourage students to make connections from one topic to another, to see how each builds on and intertwines with others. For example, early semester study on a writer’s individual agency is later complicated by issues of power determined by race, class, and gender. Writers’ ethical choices are made more challenging when confronted with questions of ideology and social justice. Depth is achieved through the written essays. Each essay requires that students examine a narrow topic in depth, building on an assigned reading with limited and manageable primary and secondary research. For example, students may study their own writing as intertextual, drawing conclusions about originality and creativity in the process. Throughout the course, students are encouraged to apply issues and theories to real-world situations, in such realms as professional settings, politics, media, and social justice. Several speakers come to class throughout the semester to expose students to the many kinds of writing professional writers do, the expectations and standards required of professional writers, and the avenues to success as professional writers.

Prerequisites: ENGL 15; ENGL 30 or (ENGL 137H, ENGL 138T)

Changes Effective Spring 2021:

- Remove Prerequisites

**ENGL 212: Introduction to Fiction Writing (3 Credits) (BA)**
Old Listing Effective Through Fall 2020:

Written exercises and short readings in the elements of fiction writing; the writing of at least one short story.

Prerequisite: ENGL 15 or ENGL 30

Changes Effective Spring 2021:

- Add GA Attribute
- Description
- Remove Prerequisite

**ENGL 213: Introduction to Poetry Writing (3 Credits) (BA)**
Old Listing Effective Through Fall 2020:

Written exercises in the components and techniques of poetry writing in conjunction with selected readings.

Prerequisites: ENGL 15 or ENGL 30

Changes Effective Spring 2021:

- Remove Prerequisites

**ENGL 215: Introduction to Article Writing (3 Credits) (BA)**
Old Listing Effective Through Fall 2020:

Written exercises in, and a study of, the principles of article writing; practice in the writing of specific articles.

Prerequisite: ENGL 015 or ENGL 030

Changes Effective Spring 2021:

- Remove Prerequisites

**ENGL 221: British Literature to 1798 (3 Credits) (GH) (BA)**
Old Listing Effective Through Fall 2020:

Focusing on major writers and their cultural contexts, English 221 surveys British literature to 1798. A remarkable amount of important work was produced over this period. Students will read major texts like Beowulf, Romeo and Juliet, and Tom Jones; learn about renowned authors such as Chaucer, Shakespeare, and Fielding; and be introduced to influential literary forms, such as the epic, the revenge tragedy, and the picaresque novel. The tradition of British literature evolved over periods of significant upheaval and change. Students will also learn about the shifting historical and ethical orientations that energized this tradition, from the Heroic Ethos to Christian Humanism to Neoclassicism. As an introductory survey of British literature, English 221 welcomes non majors: no previous course in literature is required. By reading and discussing some of the best-known works in British literature, students will sharpen their skills of interpretation while surveying an important literary tradition.

Prerequisites: ENGL 15; ENGL 30 OR (ENGL 137H, ENGL 138T)

Changes Effective Spring 2021:

- Remove Prerequisites

**ENGL 221W: British Literature to 1798 (3 Credits) (WF) (BA)**
Old Listing Effective Through Fall 2020:

Focusing on major writers and their cultural contexts, English 221 W surveys British literature to 1798. A remarkable amount of important work was produced over this period. Students will read major texts like Beowulf, Romeo and Juliet, and Tom Jones; learn about renowned authors such as Chaucer, Shakespeare, and Fielding; and be introduced to influential literary forms, such as the epic, the revenge tragedy, and the picaresque novel. The tradition of British literature evolved over periods of significant upheaval and change. Students will also learn about the shifting historical and ethical orientations that energized this tradition, from the Heroic Ethos to Christian Humanism to Neoclassicism. As an introductory survey of British literature, English 221 W welcomes non majors: no previous course in literature is required. By reading and discussing some of the best-known works in British literature, students will sharpen their skills of interpretation while surveying an important literary tradition.

Prerequisites: ENGL 15; ENGL 30 OR (ENGL 137H, ENGL 138T)

Changes Effective Spring 2021:

- Remove Prerequisites

**ENGL 222: British Literature from 1798 (3 Credits) (IL) (BA)**
Old Listing Effective Through Fall 2020:

Focusing on major writers and their cultural contexts, English 222 surveys British literature from 1798 to the present. A remarkable amount of important literature was produced during this period. Students will read major texts like Pride and Prejudice, Hard Times, and Jane Eyre; learn about renowned authors such as William Blake, Charles Dickens, and Virginia Woolf; and be introduced to influential literary forms, such as the dramatic monologue, the gothic novel, and stream-of-consciousness narrative. The tradition of British literature since 1798 evolved over
ways marginalization, shame, and criminalization have been transformed and to fantasy, imagination, and utopianism. We will also explore the concepts that relate bodies and environments to history and memory, and themselves shape, the production of and resistance to sexual norms.

Prerequisites: ENGL 15; ENGL 30 OR ENGL 137, OR ENGL 138

Changes Effective Spring 2021:

• Remove Prerequisites

ENGL 222W: British Literature from 1798 (3 Credits) (WF) (IL) (BA)
Old Listing Effective Through Fall 2020:

Focusing on major writers and their cultural contexts, ENGL 222W surveys British literature from 1798 to the present. A remarkable amount of important literature was produced during this period. Students will read major texts like Pride and Prejudice, Hard Times, and Jane Eyre; learn about renowned authors such as William Blake, Charles Dickens, and Virginia Woolf, and be introduced to influential literary forms, such as the dramatic monologue, the gothic novel, and stream-of-consciousness narrative. The tradition of British literature since 1798 evolved over periods of significant political and cultural upheaval and change. Thus students will also learn about the shifting historical and ethical orientations that energized this tradition, from rising industrialization and changing class and gender relations as manifested in Romanticism, Modernism, and Postmodernism. As an introductory survey of British literature, ENGL 222W welcomes non majors; no previous course in literature is required. By reading and discussing some of the best-known works in British literature, students will sharpen their skills of interpretation while surveying important literary traditions and gaining crucial critical insight into an international culture that literally influenced-through its imperial reach-countries around the world. This is a WAC course

Prerequisites: ENGL 15; ENGL 30 OR (ENGL 137, ENGL 138)

Changes Effective Spring 2021:

• Remove Prerequisites

ENGL 227: Introduction to Queer Theory
Old Listing Effective Through Fall 2020:

ENGL 227 Introduction to Sexuality Studies (3) (GH;US) This course focuses on the body of critical writings known as queer theory in order to analyze issues of sexuality and gender since 1969. The course interrogates sexual norms and their deviations, with a particular focus on the relationships between sexuality, imagination, and ethics in the making of sexual communities and fostering activism around sexuality and gender. We will study how class, race, and gender have been shaped, and themselves shape, the production of and resistance to sexual norms. Queer Theory engages issues "queer space" and "queer time," related concepts that relate bodies and environments to history and memory, and to fantasy, imagination, and utopianism. We will also explore the ways marginalization, shame, and criminalization have been transformed into visionary acts of "world-making" that have changed contemporary understandings of bodies, identities, social formations, literature and visual culture. Throughout, our focus will be on the relationships between sexuality and ethics, and how both shape the history of queer culture and activism.

Prerequisites: ENGL 15; ENGL 30 OR ENGL 137H

Cross-Listed Courses: WMNST 227

Changes Effective Spring 2021:

• Remove Prerequisites

ENGL 231: American Literature to 1865 (3 Credits) (US) (BA)
Old Listing Effective Through Fall 2020:

This course offers students a broad introduction to key moments and authors in the literary traditions that shaped US literature up to 1865. While individual authors and works discussed in class will vary, the course addresses the overall development of literatures in the United States by time periods and genres that may range from pre-Columbian oral traditions to American fiction and poetry published until the end of the Civil War. The class may feature the study of representative examples of both oral traditions and written works. In addition to highlighting enduring literary voices, the class may also highlight the development of specific genres (such as slave narratives), literary movements (such as Transcendentalism), periods of literary production (such as the American Renaissance) or other groupings of authors (such as the Fireside Poets) over the course of US literary history. Likewise, the class may include works both by authors who were popular at the time when they published their works (and thus able to impact American literature and culture during their lifetime) and those whose contributions to literary history were recognized only later. While it should be expected that no version of this course will be able to cover all authors whose works emerged before 1865, selected authors and works might include the following: examples of Native American, African American, and other oral traditions; excerpts from works by authors such as Anne Bradstreet, Edward Taylor, Cotton Mather, Phillis Wheatley, Samson Occom, Benjamin Franklin, Washington Irving, James Fenimore Cooper, Harriet Beecher Stowe, William Cullen Bryant, Henry Wadsworth Longfellow, John Greenleaf Whittier, James Russell Lowell, Oliver Wendel Holmes, Frederick Douglass, Harriet Jacobs, Edgar Allan Poe, Nathaniel Hawthorne, Henry David Thoreau, Ralph Waldo Emerson, Margaret Fuller, Herman Melville, Walt Whitman, or Emily Dickinson.

Prerequisites: ENGL 15; ENGL 30 OR (ENGL 137H, ENGL 138T)

Changes Effective Spring 2021:

• Remove Prerequisites

ENGL 231Y: American Literature to 1865 (3 Credits) (US) (BA)
Old Listing Effective Through Fall 2020:

This course offers students a broad introduction to key moments and authors in the literary traditions that shaped US literature up to 1865. While individual authors and works discussed in class will vary, the course addresses the overall development of literatures in the United States by time periods and genres that may range from pre-Columbian oral traditions to American fiction and poetry published until the end of the Civil War. The class may feature the study of representative examples of both oral traditions and written works. In addition to highlighting enduring literary voices, the class may also highlight the development of specific genres (such as slave narratives), literary movements (such as Transcendentalism), periods of literary production (such as the American Renaissance) or other groupings of authors (such as the Fireside Poets) over the course of US literary history. Likewise, the class may include works both by authors who were popular at the time when they published their works (and thus able to impact American literature and culture during their lifetime) and those whose contributions to literary history were recognized only later. While it should be expected that no version of this course will be able to cover all authors whose works emerged before 1865, selected authors and works might include the following: examples of Native American, African American, and other oral traditions; excerpts from works by authors such as Anne Bradstreet, Edward Taylor, Cotton Mather, Phillis Wheatley, Samson Occom, Benjamin Franklin, Washington Irving, James Fenimore Cooper, Harriet Beecher Stowe, William Cullen Bryant, Henry Wadsworth Longfellow, John Greenleaf Whittier, James Russell Lowell, Oliver Wendel Holmes, Frederick Douglass, Harriet Jacobs, Edgar Allan Poe, Nathaniel Hawthorne, Henry David Thoreau, Ralph Waldo Emerson, Margaret Fuller, Herman Melville, Walt Whitman, or Emily Dickinson.

Prerequisites: ENGL 15; ENGL 30 OR (ENGL 137H, ENGL 138T)

Changes Effective Spring 2021:

• Remove Prerequisites

ENGL 231: American Literature to 1865 (3 Credits) (US) (BA)
Old Listing Effective Through Fall 2020:

This course offers students a broad introduction to key moments and authors in the literary traditions that shaped US literature up to 1865. While individual authors and works discussed in class will vary, the course addresses the overall development of literatures in the United States by time periods and genres that may range from pre-Columbian oral traditions to American fiction and poetry published until the end of the Civil War. The class may feature the study of representative examples of both oral traditions and written works. In addition to highlighting enduring literary voices, the class may also highlight the development of specific genres (such as slave narratives), literary movements (such as Transcendentalism), periods of literary production (such as the American Renaissance) or other groupings of authors (such as the Fireside Poets) over the course of US literary history. Likewise, the class may include works both by authors who were popular at the time when they published their works (and thus able to impact American literature and culture during their lifetime) and those whose contributions to literary history were recognized only later. While it should be expected that no version of this course will be able to cover all authors whose works emerged before 1865, selected authors and works might include the following: examples of Native American, African American, and other oral traditions; excerpts from works by authors such as Anne Bradstreet, Edward Taylor, Cotton Mather, Phillis Wheatley, Samson Occom, Benjamin Franklin, Washington Irving, James Fenimore Cooper, Harriet Beecher Stowe, William Cullen Bryant, Henry Wadsworth Longfellow, John Greenleaf Whittier, James Russell Lowell, Oliver Wendel Holmes, Frederick Douglass, Harriet Jacobs, Edgar Allan Poe, Nathaniel Hawthorne, Henry David Thoreau, Ralph Waldo Emerson, Margaret Fuller, Herman Melville, Walt Whitman, or Emily Dickinson.

Prerequisites: ENGL 15; ENGL 30 OR (ENGL 137H, ENGL 138T)
Renaissance) or other groupings of authors (such as the Fireside Poets) over the course of US literary history. Likewise, the class may include works both by authors who were popular at the time when they published their works (and thus able to impact American literature and culture during their lifetime) and those whose contributions to literary history were recognized only later. While it should be expected that no version of this course will be able to cover all authors whose works emerged before 1865, selected authors and works might include the following: examples of Native American, African American, and other oral traditions; excerpts from works by authors such as Anne Bradstreet, Edward Taylor, Cotton Mather, Phillis Wheatley, Samson Occom, Benjamin Franklin, Washington Irving, James Fenimore Cooper, Harriet Beecher Stowe, William Cullen Bryant, Henry Wadsworth Longfellow, John Greenleaf Whittier, James Russell Lowell, Oliver Wendel Holmes, Frederick Douglass, Harriet Jacobs, Edgar Allan Poe, Nathaniel Hawthorne, Henry David Thoreau, Ralph Waldo Emerson, Margaret Fuller, Herman Melville, Walt Whitman, or Emily Dickinson.

Prerequisites: ENGL 15; ENGL 30 OR ( ENGL 137H, ENGL 138T )

Changes Effective Spring 2021:

• Remove Prerequisites

ENGL 232: American Literature from 1865 (3 Credits) (US) (BA)
Old Listing Effective Through Fall 2020:

Focusing on major writers and their cultural contexts, English 232 surveys American literature from 1865 to the present. A remarkable amount of important literature was produced during this period. Students will read major texts like The Great Gatsby, The Grapes of Wrath, and Beloved; learn about renowned authors such as Ernest Hemingway, Flannery O’Connor, and James Baldwin; and be introduced to influential literary forms, such as the imagist poem, the modernist novel, and New Journalism. The tradition of American literature since 1865 evolved over periods of significant upheaval and change. Students will also learn about the shifting historical and ethical orientations that energized this tradition, from Naturalism to Modernism and Postmodernism. As an introductory survey of American literature, ENGL 232 welcomes non majors: no previous course in literature is required. By reading and discussing some of the most important works in American literature, students will sharpen their skills of interpretation while surveying an important literary tradition.

Prerequisites: ENGL 15; ENGL 30 OR ( ENGL 137H, ENGL 138T )

Changes Effective Spring 2021:

• Remove Prerequisites

ENGL 232Y: American Literature from 1865 (3 Credits) (WF) (US) (BA)
Old Listing Effective Through Fall 2020:

Focusing on major writers and their cultural contexts, ENGL 232Y surveys American literature from 1865 to the present. A remarkable amount of important literature was produced during this period. Students will read major texts like The Great Gatsby, The Grapes of Wrath, and Beloved; learn about renowned authors such as Ernest Hemingway, Flannery O’Connor, and James Baldwin; and be introduced to influential literary forms, such as the imagist poem, the modernist novel, and New Journalism. The tradition of American literature since 1865 evolved over periods of significant upheaval and change. Students will also learn about the shifting historical and ethical orientations that energized this tradition, from Naturalism to Modernism and Postmodernism. As an introductory survey of American literature, ENGL 232Y welcomes non majors: no previous course in literature is required. By reading and discussing some of the most important works in American literature, students will sharpen their skills of interpretation while surveying an important literary tradition.

Prerequisites: ENGL 15 or ENGL 30

Cross-Listed Courses: AFAM 235

Changes Effective Spring 2021:

• Remove Prerequisites

ENGL 235: From Folk Shouts and Songs to Hip Hop Poetry
Old Listing Effective Through Fall 2020:

The origins, forms, and function of the oral folk tradition of African Americans.

ENGL 235 / AFAM 235 From Folk Shouts and Songs to Hip Hop Poetry (3) (US)(BA) This course meets the Bachelor of Arts degree requirements. This course contemplates connections between African oral traditions and contemporary trends in Black poetry including hip-hop and spoken word poetry. The central objective of the course is to examine the degree to which the most contemporary forms of African American poetry continue to function as folk expression; it provides an opportunity for students to examine the oral roots of African American literature in general and contemporary hip-hop and spoken word poetry, in particular. Music, particularly the Blues and Jazz, will be a prominent feature of this class as we try to discover the peculiarities of Black poetry. Students will begin by comparing African and African American folk forms such as proverbs and epic poetry, continue with early African American poets such as Phyllis Wheatley, George Moses Horton, Frances Ellen Watkins Harper, and Paul Laurence Dunbar, and continue through the 20th century with the poetry of the Harlem Renaissance and Black Arts Movement to contemporary Hip-Hop and Spoken Word, including Def Poetry Jam recordings. Background readings will include important essays (such as James Weldon Johnson’s "Preface to the Book of Negro Poetry" and Langston Hughes’s "The Negro Artist and the Racial Mountain") that reveal the kinds of aesthetic issues African American artists faced in crafting their art in the face of a dominant culture that consistently questioned their capacity for artistic production. Students will listen as Margaret Walker reads her famous poem, "For My People," and they will consider the importance of the Black Arts Movement, its poets and critics to the development of contemporary hip-hop and spoken word poetry. Other course materials will include videotaped interviews and poetry readings. Readings would come from an appropriate anthology and/or a combination of other appropriate texts selected by the instructor.

Prerequisites: ENGL 15 or ENGL 30
Prerequisite: ENGL 015 or ENGL 030

Changes Effective Spring 2021:

• Remove Prerequisites

ENGL 250: Peer Tutoring in Writing
Old Listing Effective Through Fall 2020:

Introduction to skills and attitudes required for successful peer tutoring in writing. Provides internship experience in a writing center.

Prerequisites: ENGL 20A, ENGL 20B, ENGL 20C, or ENGL 20D; approval of department

Changes Effective Spring 2021:

• Description
• Prerequisites

ENGL 261: Exploring Literary Forms (3 Credits: Maximum of 6 Credits) (BA)
Old Listing Effective Through Fall 2020:

The examination of specific genres in English-language texts and an inquiry into the question of genre itself. (Section subtitles may appear in the Schedule of Courses.)

Prerequisite: ENGL 015 or ENGL 030

Changes Effective Spring 2021:

• Remove Prerequisites

ENGL 262: Reading Fiction (3 Credits) (BA)
Old Listing Effective Through Fall 2020:

ENGL 262 examines the critical, theoretical, and practical issues that readers face when reading fiction. Students will examine critical concepts ranging from fundamental analytical concerns such as plot structure, characterization, and themes, to broader ethical, philosophical, social, and political questions raised by fiction. As a genre, ENGL 262 will pay special attention to the critical issues and problems raised by reading fiction, as opposed to reading poetry, drama, or non-fiction. Authors might include the following: Defoe, Richardson, Fielding, Walpole, Burney, Sterne, Smollett, C.B. Brown, Austen, J.F. Cooper, Hawthorne, Melville, Child, Chopin, Shelley, the Brontes, G. Elliot, Dickens, Hardy, Thackeray, James, Joyce, Woolf, Bellamy, Faulkner, Hemingway, Morrison, Delillo, Reed, Barthe, Coover, Ellison, Nabokov, Wright, Welch, Erdrich, and others.

Prerequisites: ENGL 15; ENGL 30 OR ( ENGL 137H, ENGL 138T )

Changes Effective Spring 2021:

• Remove Prerequisites

ENGL 265: Reading Nonfiction (3 Credits) (BA)
Old Listing Effective Through Fall 2020:

Reading Nonfiction will provide students with a historical context and the reading skills necessary for this “fourth genre” of creative writing, with an emphasis on memoirs and the essays that have defined the genre across different eras. Biographies, autobiographies, travel narratives, science writing, and political writing could be included along with hybrid nonfiction such as graphic memoir and the video essay. As a reading (not writing) class, content will focus on the implicit contract of truth between the writer and the reader, with discussions to focus on the impact of a ¿true story¿ told creatively. What must the writer accomplish on the page in order for a reader to become engaged with this genre? The course will bring to the table questions of ethics and morals when applied to our latest understanding of the fallibility or reliability of memory and how authors use their memories to write nonfiction. Later weeks in the course will examine publishing trends in nonfiction and identify career paths for students wishing to further explore the scholarship of nonfiction.

Prerequisites: ENGL 15; ENGL 30; OR ( ENGL 137H, ENGL 138T )

Changes Effective Spring 2021:

• Remove Prerequisites

ENGL 266: Reading Drama (3 Credits) (BA)
Old Listing Effective Through Fall 2020:

Reading Drama is a course that will cover elements of drama including plot, character, dialogue, staging, and dramatic forms in primarily British, American, and other English-language traditions. Students will explore different techniques for reading drama through a literary lense, including the overlap of reading for history, reading for theory, reading for pleasure, and reading as a preparation for the eventual staging of drama. Students can expect to encounter a range of drama presented in such a way that learning outcomes explore historical trends, artistic movements, critical reception, and drama’s effect on culture, society, politics, and art. Students will by the end of the course have a solid foundation in comparing and contrasting styles of drama and will also be able to engage in the scholarly dialogue of analyzing dramatic literature to a depth that goes beyond appreciating the entertainment value of a good play.

Prerequisites: ENGL 15; ENGL 30; OR ( ENGL 137H, ENGL 138T )
Changes Effective Spring 2021:

- Remove Prerequisites

**ENGL 281: Television Script Writing (3 Credits) (BA)**

Old Listing Effective Through Fall 2020:

An introduction to the writing of scripts for television production.

Prerequisite: ENGL 015 or ENGL 030

Changes Effective Spring 2021:

- Remove Prerequisites

**ENGL 282: TV Script Writing 2 (3 Credits)**

Old Listing Effective Through Fall 2020:

This creative writing course will further explore the specialized techniques and requirements of television script writing. Students will complete a first draft of a pilot episode (begun in ENGL281) and then revise the draft, focusing especially on the main character's story arc, plot structure, adding multiple narrative lines, scene and dialogue revision, and developing larger narrative lines for future episodes. Through script readings, discussions, writing exercises, and workshopping, students will come to understand the revision process and develop skills that can be applied to future scriptwriting.

Changes Effective Spring 2021:

- Remove Prerequisites

**ENGL 312: Globality and Literature (3 Credits) (BA)**

Old Listing Effective Through Fall 2020:

Examines relationships between literature and culture, through the study of major texts in English by writers of various cultures.

Prerequisite: ENGL 015 or ENGL 030H

Changes Effective Spring 2021:

- Prerequisites

**ENGL 395: Internship**

Old Listing Effective Through Fall 2020:

Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

Prerequisites: prior approval of proposed assignment by instructor

Changes Effective Spring 2021:

- No Changes Proposed

**ENGL 400: Authors, Texts, Contexts (3 Credits: Maximum of 6 Credits) (BA)**

Old Listing Effective Through Fall 2020:

Styles, cultural milieus, critical perspectives toward particular English-language authors and/or movements they represent, and the idea of authorship. (Section subtitles may appear in the Schedule of Courses.)

Prerequisite: ENGL 015 or ENGL 030

Changes Effective Spring 2021:

- Prerequisites

**ENGL 401: Studies in Genre (3 Credits: Maximum of 6 Credits) (BA)**

Old Listing Effective Through Fall 2020:

English-language texts exemplifying particular genres, with attention to critical theories, historical development, rhetorical strategies, and social, cultural, and aesthetic values. (Section subtitles may appear in the Schedule of Courses.)

Prerequisites: ENGL 15 or ENGL 30

Changes Effective Spring 2021:

- Prerequisite

**ENGL 401W: Creative Writing Theory**

Old Listing Effective Through Fall 2020:

Theories of art and creativity which inform the making of literary works.

Prerequisites: ENGL 200; ELISH 201, ELISH 209, ENGL 212, or ENGL 213

Changes Effective Spring 2021:

- Abbreviated Title
- Prerequisites

**ENGL 402: Literature and Society (3 Credits: Maximum of 6 Credits) (BA)**

Old Listing Effective Through Fall 2020:

Texts confronting social, political, technological, or other issues in the English-speaking world. (Section subtitles may appear in the Schedule of Courses.) ENGL 402 Literature and Society (3)(BA) This course meets the Bachelor of Arts degree requirements. One variation will focus on Literature and Censorship by first considering general arguments for and against censorship and then by examining texts by writers who sought publication in their own country but whose books were censored or banned. The course will consider such questions as, Are there ever legitimate grounds for censorship? How do standards of censorship differ between countries? What is the relation between censorship on political and on moral grounds? What does artistic merit have to do with concern about moral or political subversion? Works from England, South Africa and the United States will be read and discussed, and where available, excerpts from trial transcripts will be read in order to examine arguments for and against publication. Readings will include works by Milton, D. H. Lawrence, Alan Paton, Nadine Gordimer, Athol Fugard, Eugene O’Neill, Henry Miller, and Alan Ginsberg. Another variation will focus on war and gender in 20th century American literature by examining the ways male and female authors write about war. Texts will vary from battlefield experiences to repercussions of war to the symbolic implications of war. Questions will be raised about literary authority: Does one need to be combatant to write about war? If not, how does one find the authority to speak, particularly as a woman? How does race and/or ethnicity complicate one’s perceptions of American participation in war? Readings will include works by Ernest Hemingway, William Faulkner, Joseph Heller, Cynthia Ozick, Leslie Marmon Silko, Norman Mailer, Bobbie Mason, Tim O’Brien, and Toni Morrison. Another variation will focus specifically on the writings which emerged from the postwar African-American struggle for civil rights. The course will include not only fiction and poetry but also those speeches, sermons, editorials, and other forms of discourse to have emerged from the era. The emphasis will be both traditional literary concerns as well as on the various rhetorical strategies involved in each work. Ideally, the course would make visible to students the
ENGL 403: Literature and Culture (3 Credits: Maximum of 6 Credits) (BA)
Old Listing Effective Through Fall 2020:

Historical, theoretical, and practical issues within cultural studies in relation to English-speaking texts. (Section subtitles may appear in the Schedule of Courses.) ENGL 403 Literature and Cultural Studies (3) (BA) This course meets the Bachelor of Arts degree requirements. Topics covered in this course will vary from semester to semester, but a broad framework will be to introduce students to literary and other texts read in relation to cultural studies. Individual instructors may take up different historical periods, while other versions may suggest ways cultural studies draws on different theoretical discourses such as rhetoric, deconstruction, feminism, or the New Historicism for its problems. All Reading Culture courses should serve as an introduction to cultural studies, moving from theoretical to practical readings of literature and culture. In any case, a common goal would involve examining cultural studies as constituted by plural theories and ends.

Prerequisites: ENGL 15 or ENGL 30
Changes Effective Spring 2021:

ENGL 404: Mapping Identity, Difference, and Place (3 Credits: Maximum of 6 Credits) (BA)
Old Listing Effective Through Fall 2020:

Ethnicity, gender, class, race with reference to theoretical inquiry into identity, difference, and place in English-language literatures. (Section subtitles may appear in the Schedule of Courses.)

Prerequisite: ENGL 015 or ENGL 030
Changes Effective Spring 2021:

ENGL 405: Taking Shakespeare From Page to Stage (3 Credits) (BA)
Old Listing Effective Through Fall 2020:

Students experience a Shakespeare play as a text to be explicated and as a script to be performed.

Prerequisite: permission of program
Changes Effective Spring 2021:

ENGL 406M: Honors Course in English: General Topic in Recent Literature (3-12 Credits: Maximum of 12 Credits) (H) (WF) (BA)
Old Listing Effective Through Fall 2020:

This advanced Honors Seminar in literature, rhetoric, and cultural studies allows students to explore and research a topic related to recent literary culture. Topics will vary depending on the course instructor but may include the study novels, poetry, drama, theory, film, nonfiction, or rhetoric. Recent topics have included Alfred Hitchcock, contemporary novels, prison narratives, authors and artists, and apocalyptic fiction. Assignments will include extensive primary and secondary reading, participation in class discussion, and a substantial paper or final project.

Prerequisites: Approval of the departmental Honors Committee AND ENGL 15; OR ENGL 30; OR (ENGL 137, AND ENGL 138)
Changes Effective Spring 2021:

ENGL 407: History of the English Language (3 Credits) (IL) (BA)
Old Listing Effective Through Fall 2020:

This course provides an accessible overview of the English language from its earliest beginnings as an insular language to its current place as a global language. One central issue will be the ways in which the external history (culture, political power, geography) of the language has impacted its internal history (spelling, pronunciation, dialect) over time. In the process, we will examine several representative English texts which illustrate significant moments in this long process of language change. Other topics will include the traces of early English vocabulary and structures in modern English, sound changes and pronunciation, English's heavy lexical borrowing from other languages, the politics of language and language use, longstanding debates over what constitutes standard English, the impact of prescriptive language guides, varieties of spoken and written English, the English language and colonialism, English as a global language, and the influence of technologies.

Prerequisite: ENGL 100; ENGL 202A, ENGL 202B, ENGL 202C, or ENGL 202D
Changes Effective Spring 2021:

ENGL 408M: Honors Seminar in English: General Topic in Post-1800 Literature (3-12 Credits: Maximum of 12 Credits) (H) (WF) (BA)
Old Listing Effective Through Fall 2020:

This advanced Honors Seminar in literature and literary and cultural history allows students to explore and research a topic related to post-18th century literary culture. Topics will vary depending on the course instructor but may include the study 19th- or 20th-century novels, poetry, drama, theory, film, nonfiction, or rhetoric. Recent topics have included critical medical humanities, historical novels, Victorian underground literature, spiritual biography, and the 1890s.

Prerequisites: Approval of the departmental Honors Committee AND ENGL 15; OR ENGL 30; OR (ENGL 137, AND ENGL 138)
Changes Effective Spring 2021:
ENGL 409: Composition Theory and Practice for Teachers (3 Credits) (BA)
Old Listing Effective Through Fall 2020:

An overview of the theory and practice of writing for teachers, with emphasis on the writing process. ENGL 409 Composition Theory and Practice for Teachers (3)(BA) This course meets the Bachelor of Arts degree requirements. ENGL 409 is intended to help teachers improve their writing instruction by immersing them in composition theory and providing them with the opportunity to learn the writing process through personal experience. On completion of the course, participants will be able to: Articulate and test composition theory in written works. Work through each phase of the writing process in assigned essays. Develop strategies for writing effectively in various genres and styles, including journal writing. Produce written works which demonstrate an awareness of audience. Implement recommendations for effective revisions. Provide responsive feedback to peers' written work. Develop a precis for a model lesson. Evaluation: Students will be evaluated on their knowledge and understanding of instructional objectives, demonstrated in written assignments, class discussions and other projects.

Prerequisite: permission of the program

Concurrent: EDUC 452

Changes Effective Spring 2021:

- Prerequisites

ENGL 411M: Honors Seminar in English: Creative Writing
Old Listing Effective Through Fall 2020:

Advanced Seminars in Creative Writing focus on a particular genre and/or topic. Genres include poetry, fiction, graphic novel, memoir, creative non-fiction, essay, or drama. Topics vary. Students work as apprentice writers, reading the work of published and expert authors, experimenting within the genre, engaging in structured peer review and group workshops, and preparing texts for publication and contest submission. Students discuss a number of issues relevant to the practice of creative writing and the production of literature, such as innovation and circulation, and numerous techniques, including the establishment of voice, creation of character plot development, pacing, and principles of prosody. Students may also consider the responsibilities of literary citizenship and the ethics of artistic representation. The courses offer an intense investigation of creative writing craft. Students develop skills in close, critical reading through the examination of exemplary works of contemporary literature and craft analysis, often reading an entire book per week. They also learn to read analytically and practically in workshop critiques of peer writing. In workshop discussion, students engage in a range of critical and editing tasks from close reading to broad conceptualization; they develop the ability to communicate ideas clearly and extemporaneously, and to negotiate meaning with others. Students experiment with and hone various writing techniques by executing focused exercises and drafting and developing pieces for final submission. They apply critical and analytical reading skills to revise and strengthen their own writing. The final project may include drafts and polished versions of two to three stories or essays, and up to a dozen poems.

Prerequisites: (ENGL 15 or ENGL 30) OR (ENGL 137 or ENGL 138)

Changes Effective Spring 2021:

- Prerequisites

ENGL 412: Advanced Fiction Writing (3 Credits: Maximum of 12 Credits) (BA)
Old Listing Effective Through Fall 2020:

Advanced study of the techniques of fiction writing; regular practice in writing the short story; group discussion of student work.

Prerequisite: ENGL 212

Changes Effective Spring 2021:

- Prerequisites

ENGL 413: Advanced Poetry Writing (3 Credits: Maximum of 12 Credits) (BA)
Old Listing Effective Through Fall 2020:

Advanced study of the techniques of poetic composition; regular practice in writing poetry; group discussion of student work. ENGL 413 Advanced Poetry Writing (3 per semester/maximum of 6)(BA) This course meets the Bachelor of Arts degree requirements. Students enrolled in the Advanced Poetry Workshop will have successfully completed ENGL 213, Introduction to Poetry Writing. In the advanced course, they continue their study of prosody through the close reading of published poems, including entire volumes of poetry by a single author. Students will also study articles and books that discuss various elements of craft. They can expect to prepare written reading responses and formal classroom presentations on the assigned readings. They will also draft approximately one new poem or revision each week, in addition to completing various writing exercises in or outside of class. All students will prepare for and engage in the workshop critiques; participation in these conversations is essential and subject to assessment. The writing, revision, and workshop process prepare the student to compile a portfolio of 8-10 poems, which they will submit as a final project for the course.

Prerequisite: ENGL 213

Changes Effective Spring 2021:

- Prerequisites

ENGL 414: Biographical Writing (3 Credits) (BA)
Old Listing Effective Through Fall 2020:

Writing of biography and autobiography, character sketches, “profiles,” and literary portraits; analysis and interpretations of source materials.

Prerequisite: ENGL 200, ENGL 202B, ENGL 210, ENGL 212, or ENGL 215

Changes Effective Spring 2021:

- Prerequisites

ENGL 415: Advanced Nonfiction Writing (3 Credits: Maximum of 12 Credits) (BA)
Old Listing Effective Through Fall 2020:

Advanced study of the principles of nonfiction; substantial practice in writing and submitting magazine articles for publication.

Prerequisite: ENGL 212 or ENGL 215

Changes Effective Spring 2021:

- Prerequisites
ENGL 416: Science Writing (3 Credits: Maximum of 6 Credits) (BA)  
Old Listing Effective Through Fall 2020:
Prepares scientists and writers to gather, interpret, and present scientific information to the layman with clarity and accuracy.
Prerequisite: COMM 260W, ENGL 202C, ENGL 210, ENGL 215, or ENGL 421
Changes Effective Spring 2021:
• Prerequisites

ENGL 417: The Editorial Process (3 Credits) (BA)  
Old Listing Effective Through Fall 2020:
The process of editing from typescript through final proof.
Prerequisite: ENGL 202A, ENGL 202B, ENGL 202C, ENGL 202D, ENGL 210, ENGL 215
Changes Effective Spring 2021:
• Prerequisites

ENGL 418: Advanced Technical Writing and Editing (3 Credits: Maximum of 6 Credits) (BA)  
Old Listing Effective Through Fall 2020:
Preparing and editing professional papers for subject specialists and for others interested in careers as writers or editors.
Prerequisite: ENGL 202A, ENGL 202B, ENGL 202C, ENGL 202D, or ENGL 215
Changes Effective Spring 2021:
• Prerequisites

ENGL 419: Advanced Business Writing (3 Credits) (BA)  
Old Listing Effective Through Fall 2020:
Preparing and editing reports and presentations common to business, industry, and government.
Prerequisite: ENGL 202A, ENGL 202B, ENGL 202C, or ENGL 202D
Changes Effective Spring 2021:
• Prerequisites

ENGL 420: Writing for the Web (3 Credits) (BA)  
Old Listing Effective Through Fall 2020:
Analysis and composition of informative, persuasive, and "creative" Web texts, based on rhetorical principles; no prior Web writing experience required. ENGL 420 Writing for the Web (3)(BA) This course meets the Bachelor of Arts degree requirements. This course, designed for writers and potential writers, will explore the unique opportunities and constraints of writing for the Web. As a writing course, it should appeal to students in the Humanities; however, because of the growing importance of Web texts in fields such as business and the social sciences and given the opportunity to compose/construct a variety of fictional and non-fictional "creative" and informative/persuasive Web texts, this course should be of value to students across the college. In this course, students will survey a wide variety of Web texts—webs, electronic journals and books, learning to analyze these as to their efficacy in light of each text's rhetorical situation. As students learn to compose and construct such texts themselves, rhetorically based principles of audience awareness and persuasive appeal will be emphasized. Rather than focusing on writing html codes and java scripts, this course will build on the rhetorical principles taught in first-year writing courses, teaching students how to apply those principles to more sophisticated, multi-sensory, multimedia hyper textual writing. The course will be taught primarily in a hands-on workshop environment—in a PC computer lab or laptop-equipped classroom. Although no prior Web writing experience is required, some experience with Web navigation and computer word processing will be helpful. Students will be evaluated on the basis of their participation/attendance in the course's workshop environment, written web analyses, and constructed web texts.
Prerequisite: ENGL 015 or ENGL 030
Changes Effective Spring 2021:
• Prerequisites

ENGL 421: Advanced Expository Writing (3 Credits) (BA)  
Old Listing Effective Through Fall 2020:
Develops skill in writing expository essays, with particular attention to style. Intended for liberal arts majors.
Prerequisite: ENGL 202A, ENGL 202B, ENGL 202C, or ENGL 202D
Changes Effective Spring 2021:
• Prerequisites

ENGL 422: Fiction Workshop (3 Credits: Maximum of 6 Credits) (BA)  
Old Listing Effective Through Fall 2020:
Practice and criticism in the composition of the short story and the novel.
Prerequisites: ENGL 412
Changes Effective Spring 2021:
• Prerequisites

ENGL 423: Poetry Writing Workshop (3 Credits: Maximum 6 Credits) (BA)  
Old Listing Effective Through Fall 2020:
Extensive practice in writing poetry; consideration of contemporary poetic forms; selected readings.
Prerequisite: ENGL 413
Changes Effective Spring 2021:
• Prerequisites

ENGL 424: Creative Writing and the Natural World  
Old Listing Effective Through Fall 2020:
Creative writing workshop focused on the environment and related issues. ENGL (ENVST) 424 Creative Writing and the Natural World (3) American literature includes a long and rich tradition of writing that focuses on the natural world. From the oral stories of indigenous people to the journals of the first European settlers, many have looked for a way to understand their own place in the world based upon their relationship to the earth and its creatures. While Puritans often discerned the
ENGL 426: Chicana and Chicano Cultural Production: Literature, Film, Music (3 Credits: Maximum of 3 Credits) (US) (BA)
Old Listing Effective Through Fall 2020:

An in-depth study of Chicana/Chicano literature, film, and music from the inception of the Chicano Movement (1965-1975) to the present. ENGL 426 Chicana and Chicano Cultural Production: Literature, Film, and Music (3) (US)(BA) This course meets the Bachelor of Arts degree requirements. ENGL 426 will constitute an in-depth study of Chicano/a literature, film, and music from the inception of the Chicano movement (1965-1975) to the present. In addition to primary aesthetic texts, students will read historical, political, and theoretical essays designed to situate the Chicano/a cultural texts in historical and political context. The aim of the course is to give students a better understanding of Chicano/a cultural production by situating these works of art against other U. S. artistic traditions and within wider historical and political movements. Authors and artists under consideration in this class will vary, but will likely include Luis Valdez, Tomas Rivera, Estella Portillo Trambley, Oscar Zeta Acosta, Corky Gonzales, Gloria Anzaldúa, Norma Alarcon, Cherrie Moraga, Richard Rodriguez, Dagoberto Gilb, Rolando Hinojosa, Alfredo Vea, Charlie Trujillo, Diego Vasquez Jr., Joe Rodriguez, Tomas Almaguer, Jose Esteban Munoz, Manuel Ramos, Lucha Corpi, Rudolfo Anaya, Michael Nave. This class will prepare students for advanced courses in Latin/a literatures as well as other academic courses that engage in the verbal and written analysis of complex texts. Students will be evaluated by means of essays written in and out of class, essay exams, group projects, term-long journals, and class participation. Students should expect to complete a minimum of three written assignments in the course of the term. The course may be used as ENGL major elective credit or as credit towards the ENGL minor and will be offered once a year with 40 seats per offering.

Prerequisite: 3 credits in English

Changes Effective Spring 2021:

• Prerequisites

ENGL 427: Topics in Jewish American Literature (3 Credits: Maximum of 9 Credits)
Old Listing Effective Through Fall 2020:

An in-depth examination of important themes, writers, and/or historical developments in Jewish Literature of the United States. ENGL (J ST) 427 Topics in Jewish American Literature (3) This course will provide sustained examination of major themes, texts, and figures in the Jewish American literary tradition. The course will focus on depth rather than breadth in its analysis of the defining aspects of the literature and on what the literature reveals about Jewish American culture and identity. The United States has absorbed large numbers of Jewish immigrants from many parts of the world, holding many different ideas about Jewish practice, and affiliating themselves with many different political, social, and cultural traditions, and moreover Jews have settled and made homes in a wide variety of American communities. Close analysis of literature will therefore provide an opportunity to consider the constitution, origin, and development of Jewish America’s wider cultural, political, and social contexts. Materials will consist predominantly of primary texts, including prose fiction and nonfiction, poetry, drama, and film, and the methodology will emphasize the close reading of these texts. The course complements offerings in Jewish Studies, English, and Comparative Literature. Most obviously, the course will offer students of Jewish literature, world literature, and American literature an opportunity for contextualization. It enables students in Jewish Studies to study the rich literature of American Jews, and it adds to courses covering Jewish American history, religion, and culture. The course offers students in English and Comparative Literature a valuable, sustained introduction to an important U.S. and world sub-culture and -literature.

Prerequisite: ENGL 015 or ENGL 030

Changes Effective Spring 2021:

• Prerequisites

ENGL 430: The American Renaissance
Old Listing Effective Through Fall 2020:

Studies in the works and the interrelationships of writers such as Emerson, Hawthorne, Poe, Thoreau, Whitman, Melville, and Dickinson. The course will cover Transcendentalism and the authors who contributed to this movement, many of whom lived in Concord, MA. Though the class will feature the works of Emerson, Hawthorne, and Thoreau, it can also branch out to address other authors such as Margaret Fuller, Jones Very, and Elizabeth Peabody. Departing from Concord, the course will explore Walt Whitman and Emily Dickinson, both of whom read and were inspired by Emerson. Finally, the course will include works by Herman Melville, who formed a friendship with Hawthorne prior to writing Moby-Dick. Though literature constitutes the center piece of this course, iterations of the course may bring in other parts of the cultural, social, and political landscape: slavery, abolitionism, Jacksonian Democracy, western settlement, art, science, and technology.

Changes Effective Spring 2021:

• Prerequisites
ENGL 431: Black American Writers (3 Credits: Maximum of 6 Credits) (BA)
Old Listing Effective Through Fall 2020:
A particular genre or historical period in the development of Black American literature. ENGL 431 / AMST 475 Black American Writers (3) (US) A study of a particular genre or historical period in the development of Black American literature. This course will allow faculty and students to focus a semester's study on a particular genre, theme, or problem in African-American literature. The flexibility of the course will allow faculty a forum in which to share current scholarship or to relate issues in African-American literature to larger school-wide themes in a classroom environment. Because of the potential variety of topics and faculty members, specific evaluation methods will be determined by the instructor and specified in the syllabus. The course will be offered once every two years with an expected enrollment of 25 students. The course satisfies the “area” requirement in culture for American Studies majors.
Prerequisite: ENGL 015 or ENGL 030
Changes Effective Spring 2021:
• Prerequisites

ENGL 432: The American Novel to 1900 (3 Credits) (BA)
Old Listing Effective Through Fall 2020:
Such writers as Hawthorne, Melville, Stowe, Mark Twain, James, Crane, Chopin, and others.
Prerequisite: ENGL 015 or ENGL 030
Changes Effective Spring 2021:
• Prerequisites

ENGL 433: The American Novel: 1900-1945 (3 Credits) (BA)
Old Listing Effective Through Fall 2020:
Such writers as Wharton, Dreiser, Cather, Fitzgerald, Faulkner, Hemingway, Hurston, Wright, and others.
Prerequisite: ENGL 015 or ENGL 030
Changes Effective Spring 2021:
• Prerequisites

ENGL 434: Topics in American Literature (3 Credits: Maximum of 99 Credits) (BA)
Old Listing Effective Through Fall 2020:
Focused study of a particular genre, theme, or problem in American literature. (May be repeated for credit.) ENGL 434 / AMST 472 Topics in American Literature (3) This course will allow faculty and students to focus a semester's study on a particular genre, theme, or problem in American literature. The flexibility of a topics course will allow faculty a forum in which to share current scholarship or to relate issues in American literature to larger school-wide themes in a classroom environment. Because of the potential variety of topics and faculty members, specific evaluation methods will be determined by the instructor and specified in the syllabus. The course will be offered once every two years with an expected enrollment of 25 students. The course satisfies the “area” requirement in culture for American Studies majors.
Prerequisite: 6 credits of ENGL, ENLSH, or LIT
Changes Effective Spring 2021:
• Prerequisites

ENGL 435: The American Short Story (3 Credits) (BA)
Old Listing Effective Through Fall 2020:
Development of the short story as a recognized art form, with emphasis on major writers.
Prerequisite: ENGL 015 or ENGL 030
Changes Effective Spring 2021:
• Prerequisites

ENGL 436: American Fiction Since 1945
Old Listing Effective Through Fall 2020:
Representative fiction by such writers as Barth, Bellow, Ellison, Heller, Mailer, Morrison, Nabokov, Oates, O'Connor, Pynchon, Updike, Walker.
Prerequisites: ENGL 15 OR ENGL 30
Changes Effective Spring 2021:
• Description

ENGL 437: The Poet in America (3 Credits) (BA)
Old Listing Effective Through Fall 2020:
American poets such as Bradstreet, Taylor, Poe, Emerson, Whitman, Dickinson, Frost, Eliot, Stevens, Hughes, Brooks, Moore, Williams, Plath, Rich, Lowell.
Prerequisite: ENGL 015 or ENGL 030
Changes Effective Spring 2021:
• Prerequisites

ENGL 438: American Drama (3 Credits) (BA)
Old Listing Effective Through Fall 2020:
Development from the colonial period to playwrights such as O'Neill, Wilder, Hellman, Miller, Williams, Albee, Shepard, Norman, Wilson, and others.
Prerequisite: ENGL 015 or ENGL 030
Changes Effective Spring 2021:
• Prerequisites

ENGL 439: American Nonfiction Prose (3 Credits) (BA)
Old Listing Effective Through Fall 2020:
Major prose writers such as Franklin, Emerson, Thoreau, Fuller, Henry Adams, Mailer, Baldwin, McCarthy, Dillard, Didion, Angelou, and others.
Prerequisite: ENGL 015 or ENGL 030
Changes Effective Spring 2021:
• Prerequisites

ENGL 440: Studies in Shakespeare
Old Listing Effective Through Fall 2020:
Intensive study of a single genre, topic, or critical approach to selected plays.

Prerequisites: ENGL 15 OR ENGL 30

Changes Effective Spring 2021:

• Description
• Prerequisites

ENGL 441: Chaucer
Old Listing Effective Through Fall 2020:

This course surveys the literary career of Geoffrey Chaucer, perhaps the most celebrated English-language poet of the medieval ear. The course primarily examines Chaucer’s own writings, with consideration of the several international authors and traditions that informed his own literary productions. Selections may vary, but students will read texts from across Chaucer’s career, including from major works like Troilus and Criseyde and The Canterbury Tales. Readings from Chaucer’s sources and models may include translated selections from Boethius’s Consolation of Philosophy or from Guillaume de Lorris and Jean de Meun’s Romance of the Rose, and/or examples from relevant literary genres such as romance, fabliaux, beast fable, sermon, tragedy, and exemplum. Accordingly, students will develop a knowledge and appreciation of how Chaucer shaped (and was shaped by) his continental influences and the ways in which he developed a poetic tradition in English that proved deeply influential for many centuries.

Prerequisites: (ENGL 15 OR ENGL 30) OR (ENGL 137, ENGL 138)

Changes Effective Spring 2021:

• Prerequisites

ENGL 442: Medieval English Literature
Old Listing Effective Through Fall 2020:

Study of major works and genres of medieval English literature, exclusive of Chaucer.

Prerequisites: ENGL 15 or ENGL 30

Changes Effective Spring 2021:

• Prerequisites

ENGL 443: The English Renaissance
Old Listing Effective Through Fall 2020:

Such writers as More, Sidney, Spenser, Shakespeare, Donne, Jonson, Bacon, and Marvell.

Prerequisites: ENGL 15 OR ENGL 30

Changes Effective Spring 2021:

• Description
• Prerequisites

ENGL 444: Shakespeare
Old Listing Effective Through Fall 2020:

Selected tragedies, comedies, and histories.

Prerequisites: ENGL 15 or ENGL 30

Changes Effective Spring 2021:

• Prerequisites

ENGL 444: Shakespeare's Contemporaries
Old Listing Effective Through Fall 2020:

Selected plays by Shakespeare’s major predecessors and contemporaries: Kyd, Marlowe, Jonson, Webster, Marston, Middleton, and others.

Prerequisites: ENGL 15 or ENGL 30

Changes Effective Spring 2021:

• Prerequisites

ENGL 446: Milton
Old Listing Effective Through Fall 2020:

Analysis of principal poems and their background.

Prerequisites: ENGL 15 or ENGL 30

Changes Effective Spring 2021:

• Prerequisites

ENGL 447: The Restoration and the Eighteenth Century
Old Listing Effective Through Fall 2020:

The neoclassical age (1660-1776). Such writers as Dryden, Congreve, Swift, Pope, Fielding, Goldsmith, Sheridan, Boswell, Johnson.

Prerequisites: ENGL 15 OR ENGL 30

Changes Effective Spring 2021:

• Description
• Prerequisites

ENGL 448: The English Novel to Jane Austen
Old Listing Effective Through Fall 2020:

Novelist such as Defoe, Richardson, Fielding, Smollett, Sterne, and Austen.

Prerequisites: ENGL 15 OR ENGL 30

Changes Effective Spring 2021:

• Description
• Prerequisites

ENGL 449M: Honors Seminar in English: Pre-1800s literature
Old Listing Effective Through Fall 2020:

This course offers honors students the opportunity to explore in depth a period of early English literature before 1800. Topics will vary from year to year, but may include Beowulf and Anglo-Saxon literature and culture, late medieval authors such as Chaucer, Gower, and Langland, sixteenth-century lyric poets, Shakespeare, Shakespeare and film, Elizabethan dramatists, authorship and book history, early women authors, seventeenth-century writers such as Donne, Herrick, Wroth, and Bacon, writers of the English Revolution, Milton, and eighteenth-century writers such as Pope, Dryden, and Swift. Assignments will
include extensive primary and secondary reading, participation in class discussion, and a substantial paper or final project.

Prerequisites: (ENGL 15 OR ENGL 30) OR (ENGL 137, ENGL 138)

Changes Effective Spring 2021:

- Description
- Prerequisites

**ENGL 450: The Romantics (3 Credits) (IL) (BA)**
Old Listing Effective Through Fall 2020:

Writers of the British Romantic period (roughly 1790 to 1832) often made sweeping claims for the power of poetry and imagination. Percy Bysshe Shelley contended that “poets are the unacknowledged legislators of the world,” while John Keats declared that “beauty is truth, truth beauty. Against the background of political revolution in France, the rise of industrialization and empire, and increasing social instability, Romantic writers turned to nature as a source of the self and looked back to childhood as a site of both innocence and ambivalence. Others turned their efforts to the supernatural and the gothic, hoping to inspire what Samuel Taylor Coleridge called “that willing suspension of disbelief for the moment which constitutes poetic faith.” This course is designed to provide an introduction to the richness and diversity of Romantic-era literature. It is not intended to be an exhaustive overview of the entire period, but rather an introduction to the best known Romantic ideas, many of which still influence the way we think about art and literature in the present day, as well as an invitation to further study and engagement. In that spirit, we will not work from a predetermined definition of “Romanticism,” but instead will build a collective, working understanding of the concept.

Prerequisite: ENGL 137, ENGL 138

Changes Effective Spring 2021:

- Prerequisites

**ENGL 451: Literary Modernism in English**
Old Listing Effective Through Fall 2020:

Survey of literary modernism in English and English translation in a variety of genres, including poetry, fiction, and drama.

Prerequisites: ENGL 15 or ENGL 30 or ENGL 137 or CAS 137 and ENGL 138T or CAS 138T

Changes Effective Spring 2021:

- Prerequisites

**ENGL 452: The Victorians**
Old Listing Effective Through Fall 2020:

Poets such as Tennyson, Browning, Arnold, and Hopkins; also prose by writers such as Carlyle, Mill, Ruskin, and Arnold.

Prerequisites: ENGL 15 or ENGL 30

Changes Effective Spring 2021:

- Prerequisites

**ENGL 453: Victorian Novel**
Old Listing Effective Through Fall 2020:

Novelists such as the Brontes, Thackeray, Dickens, George Eliot, Meredith, and Hardy.

Prerequisites: ENGL 15 OR ENGL 30

Changes Effective Spring 2021:

- Prerequisites

**ENGL 454: Modern British and Irish Drama**
Old Listing Effective Through Fall 2020:

From Wilde and Shaw to the present season. ENGL 454 Modern British and Irish Drama (3)(BA) This course meets the Bachelor of Arts degree requirements. ENGL 454 will introduce students to some of the most exciting playwrights and important trends in modern British and Irish drama from the late nineteenth century to the present. The course will examine a number of plays, exploring not only how they work formally, but also how changing cultural and historical contexts helped to shape the plays and British and Irish drama more generally. Authors under consideration will vary from class to class, but may include writers such as Oscar Wilde, George Bernard Shaw, John Synge, Lady Gregory, William Butler Yeats, Sean O’Casey, Samuel Beckett, Denis Johnston, Brendan Behan, Brian Friel, Tom Murphy, Martin McDonagh, Noel Coward, John Osborne, T. S. Eliot, Robert Bolt, Harold Pinter, Caryl Churchill, and Tom Stoppard. The course will explore such topics as the role of drama in the Irish Revival, nationalism, and the revolution, the use of myth and folklore in drama, the emergence of realism, the function of Wilde and Shaw’s humor in their plays, drama’s response to the decline of the British empire, the modernist verse drama, post-modernism in drama, issues of stagecraft and performance, and the political function of such theaters as the Abbey Theatre or the Field Day Company. Students will write at least two papers on particular plays, and can expect to take a mid-term exam and a final exam. The course may be used as English Major elective credit or as credit towards the English minor, and will be offered once a year with 40 seats per offering.

Prerequisites: ENGL 15 or ENGL 30

Changes Effective Spring 2021:

- Prerequisites

**ENGL 455: Topics in British Literature**
Old Listing Effective Through Fall 2020:

Focused study of a particular genre, theme, or problem in British literature. (May be repeated for credit.) ENGL 455 Topics in British Literature (3)(BA) This course meets the Bachelor of Arts degree requirements. This course will allow faculty and students to focus a semester’s study on a particular genre, theme, or problem in British literature. The flexibility of a topics course will allow faculty a forum in which to share current scholarship or to relate issues in British literature to larger School-wide themes in a classroom environment. Offering such focused studies under a British literature umbrella will allow majors to apply these offerings to their upper-level British literature requirement. Because of the potential variety of topics and faculty members, specific evaluation methods will be determined by the instructor and specified in the syllabus. This course will be offered once every two years, with an expected enrollment of 20-25 students.

Prerequisites: 6 credits of ENGL, ENLSH, or LIT
changes effective spring 2021:

• prerequisites

ENGL 456: British Fiction, 1900-1945
Old Listing Effective Through Fall 2020:

Major writers such as Conrad, Lawrence, Mansfield, Forster, Joyce, Woolf, Waugh, Greene, Bowen, Beckett, and others.

Prerequisites: ENGL 15 OR ENGL 30

Changes Effective Spring 2021:

• description
• prerequisites

ENGL 457: British Fiction Since 1945
Old Listing Effective Through Fall 2020:

Readings in British fiction since World War II.

Prerequisites: ENGL 15 or ENGL 30

Changes Effective Spring 2021:

• description
• prerequisites

ENGL 458: Twentieth-Century Poetry
Old Listing Effective Through Fall 2020:

Poets writing in English such as Yeats, Pound, Eliot, Frost, Auden, Stevens, Plath, Bishop, Brooks, H.D., and others.

Prerequisites: ENGL 15 OR ENGL 30

Changes Effective Spring 2021:

• description
• prerequisites

ENGL 460: Business and Literature
Old Listing Effective Through Fall 2020:

An investigation into how writers and the cultures in which they write have represented business and those engaged in it. For many people, literature and business could not have less to do with each other. According to this view, literature escapes from reality to the imaginative, while nothing could be more focused on the real than business and its buying and selling of commodities and services. The problem is that no one told literary writers of this mutual incompatibility. For centuries, writers have peered into the world of business and brought back stories intended to document, inspire, and warn. True, writers have often, and sometimes unthinkingly, condemned business and those who follow it, but they have just as often had genuine insights into its workings. In this course, we will follow the relationship between literature and business over the course of modern history. Although one version of the course would begin with literature that dates back to the invention of capitalism in (more or less) the sixteenth century, our course will begin at the turn of the nineteenth century with the Industrial Revolution in England and the United States and follow the literature of business up to the present. Our aim in reading is not just to understand how writers have represented business and those who pursue it, which, it has to be admitted, has often been with contempt. But, rather, in reading more sympathetic works, to understand the drama of business, why those who pursue it find it so invigorating. Money, of course, is one answer to that question, but it is neither the only nor the most important one.

Texts may vary, but they are almost certain to include Charles Dickens’s Dombey and Son (1847); Herman Melville’s “Bartleby the Scrivener” (1853); the “Economy” chapter of Henry David Thoreau’s Walden (1854); Anthony Trollope’s The Way We Live Now (1875); Thorstein Veblen’s Theory of the Leisure Class (1899); George Bernard Shaw’s Major Barbara (1905), Theodore Dreiser’s The Financier (1912); Sinclair Lewis’s Babbitt (1922); Edwin LeFèvre’s Reminiscences of a Stock Operator (1922); James M. Cain’s hardboiled masterpiece Mildred Pierce (1941); F. Scott Fitzgerald’s unfinished novel The Love of the Last Tycoon (1941); Arthur Miller’s Death of a Salesman (1949); Sloan Wilson’s The Man in the Gray Flannel Suit (1955); Ayn Rand’s Atlas Shrugged (1957); Ken Kesey’s Sometimes a Great Notion (1962); Joseph Heller’s Something Happened (1974); William Gaddis’s J R (1975); David Mamet’s Glengarry Glen Ross (1984); Michael Lewis’s Liars Poker (1987); and Richard Powers’ Gain (1998).

Prerequisites: ENGL 15; or ENGL 15A; or ENGL 15S; or ENGL 30; or ENGL 30S; or ENGL 137H, and ENGL 138T

Changes Effective Spring 2021:

• description
• prerequisites

ENGL 464M: Honors Seminar in English: Multicultural
Old Listing Effective Through Fall 2020:

This advanced Honors Seminar in multicultural literature, rhetoric, and cultural studies allows students to explore and research a topic related to race, gender, ethnicity, sexuality, queer theory, post-colonialism, disability, minority literature, women’s literature, world rhetorics, or other literatures reflecting the diversity of cultures and perspectives important to the English major. Topics will vary depending on the course instructor. Recent topics have included disability and literature, post-racial America, revolutionary writing, cognitive disability in literature, and early modern women authors.

Prerequisites: Approval of the departmental Honors Committee AND ENGL 15; OR ENGL 15A; OR ENGL 15S; OR ENGL 30; OR ENGL 137, AND ENGL 138

Changes Effective Spring 2021:

• description
• prerequisites

ENGL 466: African American Novel I
Old Listing Effective Through Fall 2020:

This course examines the origins of the African American novel and follows the genre’s evolution into the early twentieth century, outlining the relationships among the texts that form the body of African American narrative as well as the relationships of those texts to the constantly shifting cultural and political realities surrounding their writing. From the earliest novels, written during the period of slavery, through the Reconstruction era, the nadir of Black Codes and Jim Crow Supreme Court decisions, and into the Renaissance heralded by Alain Locke and others, course readings encompass a broad range of styles and genres, from early proto-documentary modes, through the realism and naturalism of a later time. The course takes up Robert S. Levine’s claim that “the history of the early African American novel is not fixed or stable” by mapping the genre’s early history and by developing an understanding of the novel as genre according to both early African American authors and later scholars. It addresses the fact that this history continues
to be updated and that some texts whether in part or in whole remain lost. Authors covered in the course might include William Wells Brown, Frederick Douglass, Frank J. Webb, Julia C. Collins, Hannah Crafts, Martin Delany, Frances Ellen Watkins Harper, Charles Chesnutt, Pauline Hopkins, Paul Laurence Dunbar, Sutton Griggs, James Weldon Johnson, Oscar Micheaux, Nella Larsen, Jesse Fauset, and others. Scholarly readings accompany primary texts in order to give students a sense of the critical work that has gone into and continues to go on in the study of African American literature. Course topics may include the issue of firsts; the challenges of publication and the attendant realities of early African American print cultures; questions of tradition and influence; and the political, social, religious, and philosophical aims of early African American novels. Readings and discussions also attend to questions of form, specifically regarding intertextuality and generic blurring and hybridity. The study of early African American novels necessarily includes attention to issues of race, identity, nation, diaspora, and the question of authenticity, and each is taken up in turn. Course assignments and discussions engage students in critical work that demands careful attention to both content and context in order that all students might strengthen their close reading capabilities and engage with course figures and materials within their historical milieus.

Cross-Listed Courses: AFAM 466
Prerequisites: ENGL 15 OR ENGL 30

Changes Effective Spring 2021:
• Prerequisites

ENGL 467: African American Novel II
Old Listing Effective Through Fall 2020:

This course examines the African American novel, its forms, and its traditions starting during the Harlem Renaissance. It follows the genre's evolution into the twenty-first century, outlining the relationships among the texts that form the body of African American narrative as well as the relationships of those texts to the constantly shifting cultural and political realities surrounding their writing. From the Renaissance heralded by Alain Locke, through the Civil Rights and Black Power Movements and their attendant Black Arts Movement and into the era of the Movement for Black Lives, course readings encompass a broad range of styles and genres, from realism, naturalism, and naturalist primitivism, through the experimental forms, magical realism, and "postrace aesthetics" of later times. The course invites students to think critically about the African American novel as a socially and politically engaged form, and to identify and analyze the long tradition of resistance that variously informs its development. Authors covered in the course might include major figures such as Claude McKay, Zora Neale Hurston, Nella Larsen, Wallace Thurman, Richard Wright, Ralph Ellison, Ann Petry, James Baldwin, Ishmael Reed, Earnest Gaines, Alice Walker, Toni Morrison, Toni Cade Bambara, Octavia Butler, Gayle Jones, Samuel Delany, Charles Johnson, John Edgar Wideman, Colson Whitehead, and others. Still, the course gives due attention to lesser known/studied materials from the period, including graphic novels, satire, speculative fiction, performance novels, and various other experimental forms. Course readings and instruction give particular attention to how African American novels of the twentieth and twenty-first centuries variously engage social identity categories, like race, gender, class, and sexuality, and how they engage and resist various literary conventions associated with naturalism, modernism, and postmodernism. The course also traces the development of new thematic and aesthetic interests in a generation of writers whose fiction has been influenced by the explosion of interest in the graphic novel, the popularity of cultural forms such as hip hop, and the ascendency of the digital age. Scholarly readings accompany primary texts to give students a sense of the critical work that has gone into and continues to go on in the study of African American literature.

In this course, students learn how to analyze literature, do close and careful readings of texts, conduct related research, and write persuasively about literary works. Assignments and discussions are designed such that students may engage with course figures and materials within their historical milieus.

Cross-Listed Courses: AFAM 467
Prerequisites: ENGL 15 OR ENGL 30

Changes Effective Spring 2021:
• Prerequisites

ENGL 468: African American Poetry
Old Listing Effective Through Fall 2020:

Meta duEwa Jones argues, “We cannot afford to continue to treat black poetry and poetics as loose change among the more highly valued paper currency of fiction and nonfiction prose. . . . The myriad aesthetic forms and concomitant political functions of black poetry and poetics should be seriously considered as grounds for broader and more nuanced theoretical and sociocultural claims.” This course takes as its subject matter these aesthetic forms and political functions of the poetry of black America. It surveys the broad history of African American poetry and poetics, tracing the evolution of formal structures and aesthetics, but also taking a critical view of the reception of African American verse. Whether reading Phillis Wheatley or the contemporary poet Ed Roberson, all the poets included in this course have contended within the writing itself with the racially striated nature of the literary spaces they occupy. Course readings may come from poets including Wheatley, Frances Ellen Watkins Harper, Paul Laurence Dunbar, Alice Dunbar Nelson, Claude McKay, Langston Hughes, Robert Hayden, Melvin Tolson, Gwendolyn Brooks, Amiri Baraka, John Coltrane, Ishmael Reed, Nathaniel Mackey, Rita Dove, Maya Angelou, Audre Lorde, Natasha Trethewey, Sonia Sanchez, Nikki Giovanni, Nikky Finney, Roberson, Claudia Rankine, and others. The course addresses works by many of the key figures of this American literary tradition so that students may develop an understanding of the various contributions and legacies formal, musical, cultural, critical, political of African American poetry from the eighteenth century to today. Scholarly readings accompany primary texts to give students a sense of the critical work that has gone into and continues to go on in the study of African American poetry and poetics. The course surveys early African American poetry through works from the Harlem Renaissance and the Black Arts Movement, and through contemporary movements and formations. Topics will cover a range of thematic and formal issues relevant to individual poets, to major movements and periods, to regions, and to various smaller organizations and collectives. Course assignments, lectures, and discussions engage students in critical work that requires careful attention to form, content, and context such that all students might strengthen their explicatory skills and approach course figures and texts from an informed, analytical perspective.

Cross-Listed Courses: AFAM 468
Prerequisites: ENGL 15 OR ENGL 30 OR (ENGL 137 AND ENGL 138)

Changes Effective Spring 2021:
At the same time, individuals with an East Asian linguistic and cultural background are making a strong presence in the United States. The urgency to understand East Asian peoples—their cultures, their languages, and their ways of reasoning—is being felt by a majority of Americans. This class will focus on the rhetorical traditions that have grown out of classical Greece and China. We will not only read ancient and modern texts but also watch movies produced in China and the United States to understand their philosophies, literatures, and communication arts. All readings are in English.

Prerequisite: ENGL 137 and ENGL 138

Changes Effective Spring 2021:

- Prerequisites

ENGL 469: Slavery and the Literary Imagination
Old Listing Effective Through Fall 2020:

The impact of slavery on the petitions, poetry, slave narratives, autobiographies, and novels of African Americans. ENGL 469 / AFAM 469 Slavery and the Literary Imagination (3) (US)(BA) This course meets the Bachelor of Arts degree requirements. ENGL 469 / AFAM 469 provides an opportunity for undergraduate students to examine African American petitions, poetry, slave narratives, autobiographies, and novels as literary reconstructions of the economics, politics, ethics, and poetics of slavery. Authors under consideration will vary from class to class, but may include writers such as Paul Laurence Dunbar, Phillis Wheatley, F. Harper, James Weldon Johnson, Langston Hughes, Claude McKay, Sterling Brown, Booker T. Washington, Harriet Jacobs, W. W. Brown, Harriet Wilson, Margaret Walker, Arna Bontemps, D. Bradley, S. A. Williams, Toni Morrison, Ishmael Reed, and Charles Johnson. The course will focus on the complex relationship of slavery to the literary imagination of Americans of African descent as they increasingly discovered the limitations and possibilities of reading and writing themselves into freedom, literacy, and wholeness as human beings and American citizens. Topics covered will vary, but will include issues of the legacy of slavery in the west; the political aims and rhetorical conventions of African-American autobiography; the myths and realities of slavery; economic, political, ethical, and aesthetic issues of the representation of slavery; understandings of black consciousness and black culture on the road from slavery to freedom; the rise of African American realism as a response to the legacy of slavery; Black Feminism and issues of slavery; the role of history and memory in the construction of slavery; post-modern configurations of slavery; and the like. This class will prepare students for advanced courses in African American literature, as well as other academic courses that engage in the verbal and written analysis of complex written forms.

Cross-Listed Courses: AFAM 469

Prerequisites: ENGL 15 OR ENGL 30

Changes Effective Spring 2021:

- Prerequisites

ENGL 470: Rhetorical Theory and Practice
Old Listing Effective Through Fall 2020:

Application of certain rhetorical principles to problems in composition. Writing exercise. Designed as preparation for the teaching of composition.

Prerequisites: ENGL 15 or ENGL 30

Changes Effective Spring 2021:

- Prerequisites

ENGL 471: Rhetorical Traditions (3 Credits: Maximum of 6 Credits) (IL) (BA)
Old Listing Effective Through Fall 2020:

(Course content may vary by instructor). This class will introduce you to communication theories developed in classical Greece and China. Economic globalization and the increased world travel have brought Americans into direct contact with East Asian peoples and their cultures. At the same time, individuals with an East Asian linguistic and cultural background are making a strong presence in the United States. The urgency to understand East Asian peoples—their cultures, their languages, and their ways of reasoning—is being felt by a majority of Americans. This class will focus on the rhetorical traditions that have grown out of classical Greece and China. We will not only read ancient and modern texts but also watch movies produced in China and the United States to understand their philosophies, literatures, and communication arts. All readings are in English.

Prerequisite: ENGL 137 and ENGL 138

Changes Effective Spring 2021:

- Prerequisites

ENGL 472: Current Theories of Writing and Reading
Old Listing Effective Through Fall 2020:

Investigates models of textual production and reception current within English studies. (Section subtitles may appear in the Schedule of Courses.)

Prerequisites: ENGL 15 or ENGL 30

Changes Effective Spring 2021:

- Prerequisites

ENGL 473: Rhetorical Approaches to Discourse
Old Listing Effective Through Fall 2020:

Practices the criticism of written texts from selected rhetorical perspectives. (Section subtitles may appear in the Schedule of Courses.)

Prerequisites: ENGL 15 or ENGL 30

Changes Effective Spring 2021:

- Prerequisites

ENGL 474: Issues in Rhetoric and Composition
Old Listing Effective Through Fall 2020:

Examines selected topics in the field of rhetoric and composition. (Section subtitles may appear in the Schedule of Courses.)

Prerequisites: ENGL 15 or ENGL 30

Changes Effective Spring 2021:

- Prerequisites

ENGL 477: Teaching Children's Literature
Old Listing Effective Through Fall 2020:

Teaching Children's Literature in light of recent literary pedagogy, the history of childhood, and critical approaches to Children's Literature. ENGL 477 Teaching Children's Literature (3) This course explores the teaching of Children's Literature. Beginning with students' own interpretations of the children's books we read, we develop critical concepts through which to understand and teach children's literature. The course presumes that books written for children have an intrinsic importance as literary and cultural artifacts and so demand serious consideration. Because this course is offered as an English course, we will concentrate on such things as the formal characteristics of the works we study, the kinds of audiences they seem to solicit, their implied authors, their ideologies, and so forth. The emphasis of the course is
on teaching Children’s Literature as literature; the course assumes that teaching literature is teaching reading and writing. Students are evaluated according to their participation in class discussion and three required papers—one on the teaching of a particular work of Children’s Literature, one on some aspect of the history of childhood, and one that analyzes a children’s book.

Prerequisites: ENGL 202

Changes Effective Spring 2021:

ENGL 481: Literary Theory: Historical Perspectives
Old Listing Effective Through Fall 2020:

Selected topics in the history of literary criticism and theory within the English-language tradition.

Prerequisites: ENGL 15 or ENGL 30

Changes Effective Spring 2021:

ENGL 482: Contemporary Literary Theory and Practice
Old Listing Effective Through Fall 2020:

Contemporary literary theories and their implication for critical practice as applied to British, American, and other English-language literary works.

Prerequisites: ENGL 15 or ENGL 30

Changes Effective Spring 2021:

ENGL 483: Problems in Critical Theory and Practice
Old Listing Effective Through Fall 2020:

Intensive study of one or more recent theoretical approaches as applied to British, American, and other English-language literary works.

Prerequisite: ENGL 15 or ENGL 30

Changes Effective Spring 2021:

ENGL 484: James Joyce
Old Listing Effective Through Fall 2020:

Analysis of principal works and their background.

Prerequisites: ENGL 2; ENGL 15 or ENGL 30

Changes Effective Spring 2021:

ENGL 485: Australian and New Zealand Literature and Culture
Old Listing Effective Through Fall 2020:

Questions of nationality, identity, gender, race, class, colonialism, and postcolonialism in these literatures.

Prerequisites: ENGL 15 or ENGL 30

Changes Effective Spring 2021:

ENGL 486: The World Novel in English
Old Listing Effective Through Fall 2020:

Studies in the novel, written in English, by writers outside of the United States and Great Britain. ENGL 486 The World Novel in English (3) (IL) This course examines the nature of the novel as written in English by writers outside of the United States and Great Britain. Such a study necessarily involves both an aesthetic and a political perspective, in that the tradition of the novel in these landscapes so often involves the aesthetic and political suppression of native literary forms and voices. Thus, this course looks at the novel as written both by the colonizer and by the colonized. It considers the politics of the aboriginal author writing in an adopted language, and the ways in which such an adoption bears upon related ethnic and gender matters; it also considers the sorts of artistic and political tensions that emerge in the work of writers who write in what might be called the dominant English tradition. This course also studies the work of what might be called the multi-cultural writer, or the writer perforce extracted from a native, non-English-speaking culture and placed within a larger, colonial, English-speaking culture. Matters of novelistic form, as they are related to ethnic and cultural identity, are also discussed. One intent of the course is to reveal the cultural, racial, and gender diversity that naturally adheres to these particular literary traditions.

Prerequisites: ENGL 2; ENGL 15 or ENGL 30

Changes Effective Spring 2021:

ENGL 489: British Women Writers
Old Listing Effective Through Fall 2020:

A study of selected British women writers. ENGL (WMNST) 489 British Women Writers (3) This course provides the opportunity to study writing by British Women from a historical perspective and to explore the views these women have of themselves as artists. The course will concentrate on a careful reading of works by a variety of authors. It will address the question of the role gender plays in the selection of literary forms and the development of character, theme, symbols, and rhetorical strategies. It will also explore what particular dimensions British women writers have brought to the British literary tradition. Students will be active learners through keeping reading journals, presenting background reports on the history of women in England, participating in small-group discussions about the texts, and writing 2 shorter essays and one longer research essay for the class. This course focuses on an area of British literature, which more traditionally structured courses tend to obscure. The course will be attractive to students from a variety of programs, including English majors, Women's Studies minors, and Interdisciplinary Humanities students. The course will be offered once every two years. Estimated class size 20.

Cross-Listed Courses: WMNST 489

Prerequisites: 6 credits of ENGL

Changes Effective Spring 2021:
ENGL 494: Senior Thesis in English
Old Listing Effective Through Fall 2020:
Senior English (ELISH) majors write a thesis arranged with in-charge person and submit it to a faculty committee for appraisal.
Prerequisites: seventh semester standing
Changes Effective Spring 2021:
• Description
• Prerequisites

ENGL 494H: Senior Thesis in English
Old Listing Effective Through Fall 2020:
Senior English (ELISH) majors write a thesis arranged with in-charge person and submit it to a faculty committee for appraisal.
Prerequisites: seventh semester standing
Changes Effective Spring 2021:
• Description
• Prerequisites

ENGR 320Y: Design for Global Society (3 Credits) (IL) (US) (GS) (WAC)
Old Listing Effective Through Fall 2020:
An interdisciplinary study of the engineering design process and the influence of society and culture on design.
Prerequisite: ENGL 202
Changes Effective Spring 2021:
• Recertification
• Description

ENT 222: Honey Bees and Humans
Old Listing Effective Through Fall 2020:
Among more than 1,000,000 known insect species, honey bees are truly unique. No other insect has been harnessed so effectively to benefit humankind: honey bees provide critical pollination services for agricultural crops, and the wax and honey they produce are valuable commodities. Furthermore, their fascinating social life-style has intrigued individuals from hobby beekeepers to scientists studying complex questions about the evolution of sociality. More recently, documented declines in populations of honey bees and wild bees have stimulated interest in many communities, including policymakers, in improving health outcomes for bees. This course will provide students with a strong understanding of (1) honey bee behavior (particularly their complex and sophisticated social systems), biology, and health, (2) the important contributions honey bees and their pollination services make to maintaining natural ecosystems and increasing productivity of many of our key agricultural crops; and (3) the global history of human interactions with honey bees, including how people from many cultures have managed bees to provide honey, wax, and pollination services (4) the social and political context of addressing bee health issues. The course material will be presented in a series of interactive lectures, videos, and discussions, and also include a field trip to the Pollinator Gardens at the Arboretum at Penn State, a field trip to one of the Penn State apiaries, tracking individual honey bees in an observation hive, and dissections of samples in a laboratory exercise.
Changes Effective Spring 2021:
• GS Attribute
• Inter-Domain

ENT 313: Introduction to Entomology (2 Credits)
Old Listing Effective Through Fall 2020:
Introduction to basic entomology, covering insect diversity, identification, structure and function, and principles of management. ENT 313 Introduction to Entomology (3)This course is an introduction to entomology addressing issues of insect diversity,morphology and physiology, and identification of the most common groups of adult and immature insects. This course will highlight the beneficial and detrimental roles insects in human society along with responsible methods of pest management. Other topics such as insects as vectors of disease and the ecological and agricultural impact of exotic insect species introduction and climate change will be discussed.
PREREQUISITE: 3 credits of natural science
Changes Effective Spring 2021:
• Abbreviated Title
• Make Credits Repeatable
• Description
• Prerequisites

ENT 317: Turfgrass Insect Pest Management
Old Listing Effective Through Fall 2020:
This course will introduce students to a thorough understanding of insects and their relatives, IPM, and control strategies. The course will provide the students the opportunity to review EPA registered turfgrass insecticides and respective Material Safety Data Sheets, the effects of turfgrass insecticides on nontarget organisms, and the Food Quality Protection Act and how this legislation has altered public perception of insecticides. Students will be provided with a fundamental understanding of the ecology, ethology, life history and development of IPM plans for the key surface and subsurface pests of cool- and warm-season turfgrass. Students will be introduced to a wide array of commercial, educational and government web sites to strengthen their understanding of turfgrass entomology. Students also will be encouraged to develop a web based notebook which they can utilize upon completion of the course. Students will be invited to share their experiences with pest problems and methods they deployed to manage turfgrass insect species in the turfgrass environment. Students will be evaluated by the use of class assignments, quizzes, two hour exams and a final exam, refereed journal reading assignment, and an IPM class project.
Concurrent: TURF 235
Changes Effective Spring 2021:
• Abbreviated Title
• Description
• Concurrent

ENVSE 457: Industrial Hygiene Measurements
Old Listing Effective Through Fall 2020:
Industrial hygiene is the discipline devoted to the anticipation, recognition, evaluation, and control hazards in the workplace. Course provides an overview of the common industrial hygiene measurement techniques used to evaluate exposure chemical, physical, and biological agents in the workplace. Will include coverage of basic definitions, exposure standards, and guidelines, and an introduction to the different sampling equipment and analytical methods used often in the evaluation of airborne exposure, vapors, and aerosols. Interpretation of quantitative sample will be an area emphasis and will become familiar with different exposure, appropriate sampling strategies, and different statistical available for making decisions in occupational exposure.

Prerequisites: Enforced prerequisite at enrollment: CHEM 110

Changes Effective Spring 2021:
- Enforced Prerequisites

ENVSE 480: Environmental Systems Engineering Process Design (3 Credits)
Old Listing Effective Through Fall 2020:
An integrated problem-based learning experience that utilizes fundamental concepts covered in the curriculum to design a geoenvironmental system.

Prerequisites: Enforced prerequisite at enrollment: ENVSE 427 and seventh semester standing or higher in Environmental Systems Engineering (ENVSE_BS) major

Changes Effective Spring 2021:
- Description
- Prerequisites

ERM 300: Basic Principles and Calculations in Environmental Analysis
Old Listing Effective Through Fall 2020:
This course will teach basic problem solving skills while using examples taken from environmental media—air, water, and soil. ERM 300 Basic Principles and Calculations in Environmental Analysis (3) Students will be provided a contextual link between chemical, biological, and physical principles learned in their basic science courses and the advanced environmental concepts presented in later required Environmental Resource Management (ERM) courses. This course will demonstrate the dependence of environmental science on biology, chemistry, and physics. Students will integrate knowledge from each of these disciplines into an interdisciplinary framework. This course will teach Environmental Resource Management students basic problem solving skills while using examples taken from environmental media—air, water, and soil. Students will have many opportunities to examine, manipulate, and solve quantitative problems related to the environment. This is a required course for Environmental Resource Management majors.

Prerequisites: 3 credits in BIOL; CHEM 111; MATH 110 or MATH 140; PHYS 250 or PHYS 211

Changes Effective Spring 2021:
- Travel Component
- Abbreviated Title
- Description
- Prerequisites

ERM 309: Measurement & Monitoring of Hydrologic Systems (3 Credits)
Old Listing Effective Through Fall 2020:
Introduction to measurement and monitoring equipment/techniques commonly used in analyses and design of hydrologic systems. ASM 309 / ERM 309 Measurement & Monitoring of Hydrologic Systems (3) This course will provide students the opportunity to learn and apply basic measurement techniques that serve as critical tools in professional practice in water resources. Mapping development and use serves as a critical aspect of water resources engineering and planning, and a major portion of this course will focus on the fundamentals of surveying and translation of surveyed data into useful maps and engineering drawings.

Students will learn the theory that underpins basic surveying and then apply this theory in actual survey practice. Autocad serves as a primary software tool used in engineering design and water resources planning, and students will be afforded opportunities to use Autocad to present and process various watershed- and survey-based data. Geographic information system (GIS) techniques will also be investigated as a tool to process, record, analyze, and display various spatial data commonly used in water resources planning and engineering design. Students will learn the basic techniques and processes used to transfer data between GIS and Autocad, both of which are commonly used in practice. The course will also investigate the instrumentation, techniques, and theory involved in common water resources measurements including weather conditions (which serve as the principle driving conditions in water resources), flow monitoring, basic soil properties, water movement in soils, and water quality sampling and analyses. Students will conduct hands-on exercises that will focus on the use of various instruments and techniques commonly employed to conduct such measurements. Data collected will be processed and analyzed within the context of professional practice case studies. The various aspects of the course will coalesce around the concept of the watershed being the basic unit of water resources analyses and design, and students will experience how various measurement techniques and approaches are necessary tools for practicing professionals. This course will be useful to any undergraduates seeking degrees in a major related to water resources planning, engineering, or technology.

PREREQUISITE: PHYS 211 or PHYS 250, CHEM 110
CROSS LISTING: ASM 309

Changes Effective Spring 2021:
- Abbreviated Title
- Description
- Prerequisites
- Add Concurrent

ERM 413: Case Studies in Ecosystem Management (3 Credits)
(WAC)
Old Listing Effective Through Fall 2020:
Application of biological, physical, and social science principles to ecosystem management problems; introduction to environmental impact analysis and review.

PREREQUISITE: BIOL 220W, SOILS 101. Prerequisite or Concurrent: ERM 412

Changes Effective Spring 2021:
ESC 211: Material, Safety and Equipment Overview for Nanotechnology (3 Credits)
Old Listing Effective Through Fall 2020:

Nanotechnology processing equipment and materials handling procedures with a focus on safety, environment, and health issues. E SC 211 Material, Safety, and Equipment Overview for Nanotechnology (3) This course overviews basic material properties as well as environmental, health, and safety (EHS) issues in equipment operation and materials handling in “top down” and “bottom up” nanofabrication. The chemical and physical materials properties underlying nanotechnology are surveyed. EHS topics arising from the processing and disposal of these materials are addressed including: cleanroom operation, OSHA lab standard safety training, health issues, biosafety levels (BSL) guidelines, and environmental concerns. Specific safety issues dealing with nanofabrication equipment, materials, and processing will also be discussed including those pertinent to wet benches, thermal processing tools, vacuum systems and pumps, gas delivery systems and toxic substance handling and detection.

Prerequisite: CHEM 101, MATH 081, PHYS 150 or PHYS 250

Changes Effective Spring 2021:
- Prerequisites

ESC 313: Introduction to Principles, Fabrication Methods, and Applications of Nanotechnology
Old Listing Effective Through Fall 2020:

Principles, fabrication methods and applications of nanoscale. E SC 313 Introduction to Principles, Fabrication Methods, and Applications of Nanotechnology (3) This course covers the unique opportunities provided by the nano-scale and focuses on the engineering issues of fabricating and applying structures designed to take advantage of these opportunities. The course begins with defining nanotechnology and nanofabrication. It then moves to the unique features available in nanoscale structures such as large surface-to-volume ratios, quantum size effects, unique chemical bonding opportunities, dominance of physical optics, surface control of reactions and transport, and the creation of structures on the same size scale as basic features in living cells. With this understanding of the uniqueness of the nano-scale, the course progresses into the fabrication methods used in nanotechnology and then into nanostructure applications. The various nanofabrication approaches found in top-down, bottom-up, and hybrid fabrication approaches are explained and discussed in the lecture format. The principles behind the application of structures fabricated at the nanoscale are then addressed in more depth. This section of the course includes an introduction to nano-scale electronic devices, an introduction to nano-scale sensing devices, an introduction to nano-scale optics and optical devices, an introduction to material property modification at the nanoscale, and an introduction to the biology/nano-scale interface. Specific applications of the structures made using various combinations of top-down and bottom-up fabrication techniques are overviewed in various applications including sensors, nanoelectronics, molecular electronics, photonics, nano-optics, information storage and computing, materials, nano-mechanics, and nanobiotechnology and medicine. The course concludes with an introduction to the manufacturing issues encountered when fabricating, assembling, and interfacing nanoscale structures as well as with an overview of health, environmental, and societal issues The objective of this course is to give a broad technical picture of nanotechnology to engineering students from various engineering disciplines. In so doing, the course will develop a sound background for making informed judgments concerning the potential of nanotechnology for various technical applications and a sound background for assessing the societal and health issues as well as environmental impact of nanotechnology. The course objectives are to have students be able to consider nanotechnology solutions to technical problems, be able to fabricate these nanotechnology solutions in a manufacturable manner, be able to determine if there are any potential health or environmental issues involved in their solutions, and be able to assess the societal impact of their solutions. The course will require a college-level chemistry and physics background. Evaluation methods to be used in this course will be two in-class examinations and one final period examination.

Prerequisites: CHEM 110, CHEM 111, PHYS 212, PHYS 214

ESC 400: Electromagnetic Fields (3 Credits) (H)
Old Listing Effective Through Fall 2020:

Irrotational and solenoidal fields, potentials, vector and scalar field and wave equations, harmonic and wave functions in various coordinates, radiation. E SC 400H Electromagnetic Fields (3) E SC 400H is a required senior-level course for students pursuing a bachelor’s of Engineering Science. At the conclusion of this course, students will be able to: 1. Apply the basic principles of electrostatics, such as Coulomb’s Law, electric field intensity, electric flux density, Gauss’s Law, the concepts of divergence and gradient, and potential functions to solve basic and applied problems. 2. To compute resistance and capacitance for a variety of geometric configurations. 3. They will apply the basic principles of steady magnetic fields, such as the Biot-Savart Law, Amper6s Circuital Law, magnetic flux and flux density, Stoke’s Theorem and the concept of the curl and Maxwell’s equations for static electric and steady magnetic fields to solve basic and applied problems. 4. Compute self and mutual inductance for a variety of geometric configurations. 5. Understand the necessary modifications of Maxwell’s equations for time varying fields including Faraday’s Law and the concept of displacement current and apply these to solve basic and applied problems. 6. Understand the solutions of the reduced wave equation, for time-harmonic excitations, for plane wave propagation in both perfect and lossy dielectrics, the concepts of skip depth and wave polarization, plane wave reflection at planar boundaries, Snell’s Law, Brewster’s angle, and the concept of standing wave ratio and apply these to solve basic and applied problems. 7. Understand the basic principles of waves on transmission lines and apply these to solve basic and applied problems. Topics include: Vector Analysis; Coulomb’s Law and Electric Field Intensity; Electric Flux Density, Gauss’s Law, and Divergence; Energy and Potential; Conductors, Dielectrics, and Capacitance; Poisson’s and Laplace’s Equations; the Steady Magnetic Field; Magnetic Forces, Materials, and Inductance; time-Varying Fields and Maxwell’s Equations; the Uniform Plane Wave; Waves at Boundaries and in Dispersive Media. A typical course assessment includes homework assignments, mid-semester examinations and a final examination. The course is offered, in a lecture format, each spring at the University Park Campus. A typical enrollment is 25-30 students. This course is not a prerequisite for other courses.

Prerequisites: EE 210, MATH 250
Changes Effective Spring 2021:

• Prerequisites

ESC 406: Analysis in Engineering Science II, Honors (3 Credits) (H)
Old Listing Effective Through Fall 2020:

Application of complex variable theory, integral equations, and the calculus of variations to engineering problems.
Prerequisite: ESC 404H

Changes Effective Spring 2021:

• Prerequisites

ESC 407: Computer Methods in Engineering Science, Honors
Old Listing Effective Through Fall 2020:

Numerical solution of differential equations including fundamentals: roots of single nonlinear and simultaneous (Matrix) equations, least squares fitting and statistical goodness, interpolation, finite differences, differentiation, integration, eigensolutions. ESC 407H Computer Methods in Engineering Science, Honors (3) The overall objective of this course is the creation of mathematical continuum models in the form of differential equations and the application of numerical methods to solve them. To reach this goal, fundamental methods dealing with numerical approximation, specifically starting with Taylor's series, are covered: differentiation, integration, and root search of single nonlinear equations. Mathematical models are transformed into discrete models using the finite difference method, hence the solution of simultaneous algebraic equations in matrix and iterative forms is also covered. In addition, eigenvalue problems are also covered in order to characterize models, both continuous and discrete. The concept of vector-variable and vector-valued functions are used to form algorithms, cast them into computer code, in a language of student choice, usually Mathematica or MATLAB because graphical output is required in doing assignments. This course relates to programs of study in most engineering disciplines based upon the physics of solids and fluids. Evaluation methods include assessment of written reports, at least one midterm examination and either a final examination or a final report.

Prerequisites: ESC 433H, ESC 414M

Changes Effective Spring 2021:

• Prerequisites

ESC 410: Senior Research and Design Project I, Honors (3 Credits) (H)
Old Listing Effective Through Fall 2020:

Design and synthesis in the context of a specific design project undertaken during the senior year. ESC 410 Senior Design Project, Honors (3) is the second of a three-part series of courses that constitute the Engineering Science honors capstone research and design project. Engineering Science students participate in projects in all engineering disciplines and employ design principles before, during, and after analysis, experimentation and/or simulation. The resulting designs of systems, components or processes are tested and refined by changing material, geometric, stochastic or other parameters, as required. ESC 410 is the continuation of ESC 409 and constitutes the core effort in the honors senior research and design project for Engineering Science majors. It is followed by ESC 411. All three courses are required of Engineering Science majors and together they comprise the capstone research and design project, which integrates the scientific principles of research, design, and analysis and applies them to a particular field of engineering. In-class lectures and discussions on a wide range of topics such as design, engineering ethics, international relations, engineering management, safety, government and public policy, environmental issues, workforce preparation and graduate school occur in tandem with the students’ development of their individual topics.

Prerequisite: ESC 409H

Changes Effective Spring 2021:

• Course Number to 410H

• Prerequisites

ESC 411: Senior Research and Design Project II, Honors (2 Credits) (H)
Old Listing Effective Through Fall 2020:

Design and synthesis in the context of a specific design project undertaken during the senior year. ESC 411 Senior Research and Design
Project II, Honors (3) is the third of a three-part series of courses that constitute the Engineering Science honors capstone research and design project. Engineering Science students participate in projects in all engineering disciplines and employ design principles before, during, and after analysis, experimentation and/or simulation. The resulting designs of systems, components or processes are then tested and refined by changing material, geometric, stochastic or other parameters, as required. ESC 411 is the continuation of ESC 409 and ESC 410. All three courses are required of Engineering Science majors and together they comprise the capstone research and design project, which integrates the scientific principles of research, design, and analysis and applies them to a particular field of engineering. In-class lectures and discussions on a wide range of topics such as design, engineering ethics, international relations, engineering management, safety, government and public policy, environmental issues, workforce preparation and graduate school occur in tandem with the students' development of their individual topics.

Changes Effective Spring 2021:

- Add Prerequisites

ESC 433: Engineering Science Research Laboratory Experience
Old Listing Effective Through Fall 2020:

Hands-on lab experience and exposure to campus-wide interdisciplinary experimental research. Experimental probability and statistics. Applications across all Engineering Science disciplines. E SC 433H Engineering Science Research Laboratory Experience (1) This course provides an introduction to experimental research, including hands-on laboratory experience. In addition, students take part in campus-wide laboratory tours that illustrate the variety of experimental practice, as well as the strongly interdisciplinary nature of contemporary experimental research in Engineer Science. Lab tours involve laboratories in a variety of disciplines, both within the Department of Engineering Science and Mechanics, and in other departments with related interdisciplinary activities. The classroom content focuses on the fundamentals of experimental probability and statistics, including: the experimental process; probability distributions and error; statistical estimators; least squares; and confidence limits and hypothesis testing. Applications of the statistical analysis of experimental data are drawn from across all Engineering Science disciplines and illustrated in the labs and lab tours. There will be three hands-on laboratories. Each lab will include additional introductory lecture material, specific handouts, and readings. A report will be required for each lab that represents a significant writing component to the class, and includes both descriptive and analytical components. Assessment for the course is based on the laboratory reports, which include analytical and descriptive components, as well as exercises involving the material discussed in lectures.

Prerequisites: MATH 251

Changes Effective Spring 2021:

- Prerequisites

ESC 450: Synthesis and Processing of Electronic and Photonic Materials (3 Credits)
Old Listing Effective Through Fall 2020:

The materials science of applying thin film coatings, etching, and bulk crystal growth; includes materials transport, accumulation, epitaxy, and defects.

Cross-Listed Courses: MATSE 450

Prerequisite: MATSE 201 or E SC 414H, sixth semester standing

Changes Effective Spring 2021:

- Prerequisites

ESC 455: Electrochemical Methods Engineering and Corrosion Science
Old Listing Effective Through Fall 2020:

The objective of the course is to give students hands-on experience in assessing environmental degradation of engineering materials. E SC 455 E SC 455 Electrochemical Methods in Corrosion Science and Engineering (3) The objective of the course is to give students hands-on experience in assessing environmental degradation of engineering materials. Students will be introduced to a variety of experimental electrochemical methods and will use their training to evaluate corrosion of steel, stainless steel, and aluminum. Techniques that will be used in this laboratory-intensive course include potentiodynamic and potentiostatic polarization, galvanic corrosion measurements, localized corrosion measurements (scratch, critical pitting temperature, and metastable pitting experiments), evaluation of sensitization (double-loop electrochemical potentiokinetic reactivation), cyclic voltammetry, and electrochemical impedance spectroscopy of painted and unpainted specimens.

Prerequisites: MATSE259 or E SC 414M or EGEE 441

Changes Effective Spring 2021:

- Prerequisites

ESC 460M: Multidisciplinary Design Project
Old Listing Effective Through Fall 2020:

This course will provide students with the opportunity to learn the design process in the context of an industry- or governmentsponsored or service-based design project that demands delivering a working solution. The design projects in this course will be structured for students from two or more different engineering majors, as defined by the project sponsors in collaboration with the instructor and departmental project coordinators. While the projects may be supplied/supported/initiated by industry, topics may be related to the cutting-edge multidisciplinary research areas represented by the strengths and diversity of the Engineering Science faculty, such as nanotechnology, biomaterials, and other areas requiring cross-discipline collaboration. The project sponsor will provide the technical expertise for the project, a clear definition of all project deliverables, and the financial support to cover needed materials and supplies and travel costs. Project sponsors will be invited to attend two key events each semester: Project Kickoff in week 1 of the semester to define the project and answer questions from the students as well as the Design Showcase in week 15 of the semester, when teams present their project results to sponsors, faculty, other students, and the public. The College of Engineering will provide the facilities where the design teams will work together to develop the design concept and prototype solutions. Faculty members in the Department of Engineering Science and Mechanics will administer the course, including reading, evaluating, and grading the final project report, provide lectures on topics including on project management, design, product manufacturing, intellectual property, engineering ethics, societal/global/contemporary/professional issues, and related technical topics, and organize invited technical lectures related to industry projects. In accordance with standard procedures, specific multidisciplinary projects will be selected for this course to provide challenging design experiences for all students. The selection of these projects will be done by the course instructor prior to
the start of each semester of the course offering. Multidisciplinary teams are be formed based on specific technical elements of the project and project scope.

Prerequisites: Senior standing in the students major or junior standing in Engineering Science Honors Curriculum or Schreyer Honors College. CHEM 110 MATH 140 MATH 141 MATH 250; OR MATH 251 PHYS 211; OR PHYS 212

Changes Effective Spring 2021:

• Prerequisites

ESC 460W: Multidisciplinary Design Project
Old Listing Effective Through Fall 2020:

This course will provide students with the opportunity to learn the design process in the context of an industry- or government-sponsored or service-based design project that demands delivering a working solution. The design projects in this course will be structured for students from two or more different engineering majors, as defined by the project sponsors in collaboration with the instructor and departmental project coordinators. While the projects may be supplied/supported/initiated by industry, topics may be related to the cutting-edge multidisciplinary research areas represented by the strengths and diversity of the Engineering Science faculty, such as nanotechnology, biomaterials, and other areas requiring cross-discipline collaboration. The project sponsor will provide the technical expertise for the project, a clear definition of all project deliverables, and the financial support to cover needed materials and travel costs. Project sponsors will be invited to attend two key events each semester. Project Kickoff in week 1 of the semester to define the project and answer questions from the students as well as the Design Showcase in week 15 of the semester, when teams present their project results to sponsors, faculty, other students, and the public. The College of Engineering will provide the facilities where the design teams will work together to develop the design concept and prototype solutions. Faculty members in the Department of Engineering Science and Mechanics will administer the course, including reading, evaluating, and grading the final project report, provide lecturers on topics including on project management, design, product manufacturing, intellectual property, engineering ethics, societal/global/contemporary/professional issues, and related technical topics, and organize invited technical lectures related to industry projects. In accordance with standard procedures, specific multidisciplinary projects will be selected for this course to provide challenging design experiences for all students. The selection of these projects will be done by the course instructor prior to the start of each semester of the course offering. Multidisciplinary teams are formed based on specific technical elements of the project and project scope.

Prerequisites: CHEM 110, MATH 140, MATH 141, MATH 250; OR MATH 251, PHYS 211; OR PHYS 212

Changes Effective Spring 2021:

• Prerequisites

ESCO 482: Micro-Optoelectromechanical Systems (MOEMS) and Nanophotonics
Old Listing Effective Through Fall 2020:

(3) ESC 482 provides the engineering student with a unifying and multifaceted description of MOEMS and nanophotonics. Students will learn the fundamental principles behind many novel micro- and nanophotonic devices and systems and their practical applications in the fields of communication, sensor and image technology. The course starts with an overview of the fundamental physics of semiconductors with focuses on silicon, III-V and II-V compound semiconductors due to their important applications in MOEMS and active nanooptoelectronic devices. Semiconductor nanostructures, such as epitaxial grown quantum wells and quantum dots, and chemically synthesized nanowires and colloidal nanocrystals will be introduced through discussions on their unique electronic structures carrier transport and excitonic dynamics. In addition to inorganic materials, the structures and critical characteristics of electro-optic and light emitting polymers will also be reviewed for their fastgrowing applications in display technology, sensory and information processing systems. The general principles for the design and operation of MOEMS and nanooptoelectronic devices will be discussed in the frame of geometrical optics, electromagnetic theory, and semiconductor physics. The reflection of light at dielectric interfaces will be reviewed to reveal the critical features of optical waveguide structures and to introduce the concept of surface plasma waves. In-depth descriptions will be given for the interband-and intraband-electron transition and exciton emission process in semiconductor quantum structures. Important instances of applying the “quantum confinement” in nanostructures to tailor their optical and optoelectronic properties will be underscored during the mechanism-analysis of laser diodes, detectors and modulators. The new concept of “photonic crystals” will be introduced through the analysis of parallelism between electron transport in semiconductor lattices and light propagation in periodic dielectric media. Following a brief survey of the state-of-the-art technologies for the fabrication of MOEMS and nanophotonic devices, the course topics will move to their application examples in the fields of communication, sensor and image technology. For each application example, analysis will be carried out on the design, fabrication, and characterization issues of the involved systems/devices. Their merit-of-performance will be linked to the application practice to illustrate how the introduction of MOEMS/nanophotonic devices advances the technology in each specific field. Important topics to be covered in this part include micromachined lightwave systems, microwowlight emitting devices, fiber based biological nanosensors, nanoparticle enhanced surface plasma resonance sensors, microspectrometers, and digital micromirror device (DMD)-based projection display engine.

Prerequisites: PHYS 212, PHYS 214

Changes Effective Spring 2021:

• Prerequisites

FOR 200: The Profession of Forestry
Old Listing Effective Through Fall 2020:

Introduction to the profession of forestry and related career opportunities.

Concurrent: FOR 203

Changes Effective Spring 2021:

• Abbreviated Title
• Travel
• Remove Concurrent
FOR 204: Dendrology
Old Listing Effective Through Fall 2020:

Taxonomic and silvical characteristics, ranges, genetic relationships, and uses of important forest tree species.

Prerequisites: FOR 203

Changes Effective Spring 2021:

- Abbreviated Title
- Description
- Prerequisites
- Remove Prerequisites

FOR 225: GPS and GIS Applications for Natural Resources Professionals
Old Listing Effective Through Fall 2020:

Using Global Positioning Systems (GPS) and Geographic Information Systems (GIS) for mapping and analysis of natural resources data. FOR 255 GPS and GIS Applications for Natural Resources Professionals (3) FOR 255, GPS and GIS Applications for Natural Resources Professionals, teaches students to apply Global Positioning Systems (GPS) and Geographical Information Systems (GIS) in the management of natural resources. Students learn how GPS works and how to use GPS to find locations in the field and to capture spatial data and transfer it to a GIS system. Students learn how GIS data are structured and how to find, use and edit existing GIS databases and to create new ones. They learn to use various software applications to work with and analyze GIS databases, including both spatial and non-spatial data, to address a variety of natural resources management questions and issues. Finally, they learn to present spatial information in a map that effectively communicates information relevant to a variety of natural resources situations.

Prerequisites: MATH 22 and MATH 26; OR MATH 40; OR MATH 41; OR MATH 110; OR MATH 140

Changes Effective Spring 2021:

- Abbreviated Title
- Description
- Travel
- Remove Prerequisites

FOR 228: Chainsaw Safety, Maintenance, and Operation in Forest Management (1 Credit)
Old Listing Effective Through Fall 2020:

Safety, maintenance, skills, and techniques for effective chainsaw operation in forest management. FOR 228 Chainsaw Safety, Maintenance, and Operation in Forest Management (1) This course covers the detailed use of the modern chainsaw. The course begins with safety and personal protective equipment (PPE), Occupational Safety and Health Agency (OSHA) regulations, saw selection, and an introduction into safe saw handling skills and techniques. The course then transitions to saw maintenance and proper care of the chainsaw, and then to a hazard recognition, mitigation, and avoidance component that addresses both the work site and the resource being harvested and processed. Once these objectives have been understood, the remaining two-thirds of the course focus on the practice of chainsaw handling skills and techniques that are necessary for safe operation. This course has an extensive hands-on, experiential learning component in actual tree-felling and processing in the forest, including on-site discussion of harvesting as a forest management tool. The course concludes with training in proper log manufacturing, including scaling and grading of the harvested resource.

Efficient recovery of the timber resource that minimizes damage on the residual stand is emphasized.

PREREQUISITE: FOR 203 and WP 203

FOR 266: Forest Resources Measurements (4 Credits)
Old Listing Effective Through Fall 2020:

Measurement systems used in forest and wildlife management and urban forestry.

Prerequisite: FOR 203; FOR 255; MATH 22 and MATH 26, or MATH 40, or MATH 41, or MATH 110, or MATH 140; STAT 200, STAT 240, or STAT 250

Changes Effective Spring 2021:

- Abbreviated Title
- Description
- Prerequisite
- Concurrent

FOR 303: Herbaceous Forest Plant Identification and Ecology
Old Listing Effective Through Fall 2020:

Survey of common herbaceous plant taxa occurring within forested habitats in Pennsylvania and eastern North America. Botanical characteristics, ecological interrelations, commercial importance, and field specimen collection methods are covered.

Prerequisites: 3 credits in plant or biological sciences

FOR 308: Forest Ecology
Old Listing Effective Through Fall 2020:

Effects of environment, spacing, and age on trees; forest influences; origin and development of forest communities.

FOR 308 FOR 308 Forest Ecology (3)This class will provide the basic concepts of forest ecology and silvics. The class will emphasize (a) community concepts such as sampling, succession, productivity, disturbance, and animal factors, (b) ecosystem concepts such as nutrient and energy cycles and plant-soil relationships, and (c) environmental factors such as light, temperature, moisture, and pollution, and their effects on individual tree species and community structure and function. Other special topics of interest (allelopathy, seed behavior, tropical forests, etc.) will be included as time permits. The class will also include a field component that allows students to observe the effects of various conditions or treatments on forest community structure and growth, and to practice field methods commonly used to measure site factors and environmental processes in forest communities.
Prerequisite: or concurrent FOR 203

Changes Effective Spring 2021:

- Description
- Add Concurrent
- Travel

FOR 320: Forest Fire Management  
Old Listing Effective Through Fall 2020:

Principles and concepts involved in managing the forest ecosystem in regard to fire.

FOR 320 Forest Fire Management (2) This course will cover the principles and concepts involved in managing forest ecosystems in regard to fire. It will enable students to think analytically and operationally about fire in forested landscapes, taking into account a complex of physical/biological factors, management objectives, and public interest. Wildland fire processes, fuels, and behavior, fire weather, fire ecology, the sociology of fire, fire presuppression, fire containment/suppression, post-fire rehabilitation, prescribed fire, and fire management planning will be covered. Evaluation will be based on exams, individual assignments, and group assignments.

Prerequisites: FOR 308

Changes Effective Spring 2021:

- Abbreviated Title
- Description
- Prerequisites

FOR 403: Invasive Forest Plants: Identification, Ecology, and Management  
Old Listing Effective Through Fall 2020:

Survey of common nonnative (“exotic”) herbs, forbs, shrubs, trees, and vines that invade forested habitats in Pennsylvania and the region. Field identification, life history traits, ecosystem-related challenges and problems, and management options and considerations are reviewed.

Prerequisites: 6 credits in plant or biological sciences

Changes Effective Spring 2021:

- Abbreviated Title
- Description
- Prerequisites
- Travel

FOR 410: Elements of Forest Ecosystem Management (3 Credits)  
Old Listing Effective Through Fall 2020:

Fundamentals of forest ecosystem management for goods and services.

Prerequisite: 3 credits in both ecology and biology

Changes Effective Spring 2021:

- Abbreviated Title
- Description
- Prerequisite

FOR 421: Silviculture (3 Credits)  
Old Listing Effective Through Fall 2020:

The application of the principles of forest ecology to control of establishment, composition, and growth of forest stands.

Prerequisites: FOR 308, FOR 266

Changes Effective Spring 2021:

- Abbreviated Title
- Description
- Travel Component
- Prerequisites

FOR 439: Timber Sale Administration  
Old Listing Effective Through Fall 2020:

Practical aspects of the logistical, environmental, managerial, and regulatory oversight of active and retired timber sales.

FOR 439 Timber Sale Administration (3) This course provides hands-on experience with all of the activities associated with overseeing a timber sale, including the legal aspects of arranging a sale, marking timber and calculating volume, road and sale layout, best management practices, inspections, harvesting equipment, working with contractors and loggers, and liability issues. The objectives of the course are to 1) obtain and translate a property deed onto the ground and create a professional map of the timber sale area; 2) design a timber sale, including cutting boundaries, skid trails, haul roads, and landings such that site impact is minimized, harvesting efficiency and safety is maximized and productivity is maintained; 3) collect sufficient information for a professional timber sale prospectus, including which harvesting systems would be best suited to the situation; 4) complete a erosion and sedimentation plan, a stream crossing permit, and local harvesting ordinance requirements; 5) develop a timber sale contract and a landowner-consultant contract to protect all parties and address all possible legal scenarios; 6) work with, inspect, supervise and provide meaningful feedback to harvesting, road building and landscape contractors; 7) retire a timber sale area to prevent erosion, create habitat variety and/or recreational opportunities, and maintain aesthetic qualities. This course is offered every fall, and class size is restricted.

Prerequisites: FOR 203 and FOR 266; and prerequisites or concurrent: FOR 421

Changes Effective Spring 2021:

- Abbreviated Title
- Description
- Travel
- Prerequisites and Concurrent

FOR 440: Forest and Conservation Economics (3 Credits)  
Old Listing Effective Through Fall 2020:

The role and application of economics and finance to forest resource conservation and management. FOR 440 economic and financial concepts and tools used in managing forests and natural resources. Specifically, they will: a) use financial tools including cost-benefit analysis to analyze forest investments, b) recognize forest-related business operations and management issues, c) apply economic principles to forest and natural resource management decisions including environmental and nonmarket valuation methods, and d) discuss current issues in forest management and economics such as climate change,
bioenergy and tropical deforestation. Students will carry out a case study of a forest-related business.

Prerequisites: ECON 102 or ECON 104

Changes Effective Spring 2021:

• Description
• Prerequisite

FOR 455: Remote Sensing and Spatial Data Handling (3 Credits)
Old Listing Effective Through Fall 2020:

Remote sensing systems, with emphasis on application to forest ecosystem analysis. Includes introduction to computer systems for spatial data handling. FOR 455. Remote Sensing and spatial Data Handling imparts a basic understanding of remote sensing and related spatial data technologies such as geographic information systems (GIS) and digital elevations models (DEM) in a natural resources context. Lectures cover the nature of electromagnetic radiation, electronic remote sensing systems, air photo systems, photo grammetry, and GIS fundamentals. Laboratory work includes stereo viewing, basic photo grammetry, introductory photo interpretation, air photo mission planning, digital image analysis, topographic analysis and landforms, GIS mapping, and some basic GIS analysis. Emphasis is on learning by doing, with one lecture and two 2-hour labs each week.

Prerequisites: MATH 110, 3 credits in computer science, 6 credits in ecological and/or geological sciences

Changes Effective Spring 2021:

• Abbreviated Title
• Description
• Prerequisites

FOR 466: Forest Management and Planning
Old Listing Effective Through Fall 2020:

Rationale, process, and tools for forest management decision-making and planning. Developing and communicating forest plans for forested properties. FOR 466W Forest Management and Planning (3) Students learn the rationale, processes, and tools for forest management decision-making and planning. They learn to identify and obtain information needed for management decision-making and planning. They learn to develop management alternatives and to use appropriate data and tools to evaluate those alternatives. Students learn to apply financial analysis to evaluate the financial viability of stand-level forest management activities. Students develop and write forest management plans for small (≤ 250 acres) and large (≥ 250 acres) forested properties. Students identify how alternative forest management objectives are balanced in developing management plans. Students evaluate and critique public agency forest management plans.

Prerequisites: FOR 255, FOR 421, and FOR 440

Changes Effective Spring 2021:

• Abbreviated Title
• Description
• Prerequisites

FR 137: Paris: Anatomy of a City (3 Credits) (IL) (GH) (BA)
Old Listing Effective Through Fall 2020:

Survey of the cultural, artistic, literary, and social life of the city of Paris from Gallo-Roman times to the present. FR 137 Paris: Anatomy of a City (3) (GH;IL)(BA) This course meets the Bachelor of Arts degree requirements. FR 137, taught in English, is an introductory survey of the cultural, artistic, literary, and social life of the city of Paris. We will explore painting, sculpture, architecture, music, dance, theatre, literature, as well as the history and geography of this great city through the ages. Beginning with Gallo-Roman Paris and ending with the Paris of today, the course will explore the continuities as well as the changes in more than 2000 years of Parisian history. Students will read representative texts from every period and be exposed to the artistic movements through slides, films, and virtual tours. There will be extensive use of technology (CDs, DVDs, internet). In discussion sections, students will get a chance to discuss readings and fine-tune their analytical skills. In addition to the three examinations (short answer and essay), there will be short writing assignments and group research projects. This course will complement the Departments of Art History, Architecture, Comparative Literature, Geography, Music History, History. It will require a room equipped for technology and will be offered every semester.

Changes Effective Spring 2021:

• Recertification
• Abbreviated Title
• Title
• Description

FSC 431: The Chemistry of Fuels (3 Credits)
Old Listing Effective Through Fall 2020:

Nature and properties of fossil and other fuels, including aerospace, in relation to use; preparation of fuels; by-products; fuel analysis. FSC 431 The Chemistry of Fuels (3) The course deals with the formation, composition and properties of the principal naturally occurring fossil hydrocarbons (coal, petroleum, natural gas), and their refining, upgrading, and conversion chemistry. The objectives of this course are to equip students with a fundamental knowledge of the chemistry for the fossil hydrocarbon resources and their energy use for transportation and stationary fuels as well as their use as chemical feedstocks. It also helps to prepare students for the challenges, opportunities, and changes in the world of energy and resource-related enterprises. The primary emphasis is on petroleum, natural gas, coal, and liquid transportation fuels. This is a required course for the Energy Engineering Major.

Prerequisites: CHEM 202 or CHEM 210 or EGEE 302 or equivalent

Changes Effective Spring 2021:

• Description
• Prerequisite

FSC 432: Petroleum Processing (3 Credits)
Old Listing Effective Through Fall 2020:

A study of physical and chemical processes to convert crude oil into desired products with an outlook from present to future.

Prerequisites: CHEM 210

Cross-Listed Courses: CHE 432

Changes Effective Spring 2021:
Students will learn to approach problems in design by developing skills in creative thinking, applying those skills in defining problems, and working in creative teams to solve problems through the generation of new ideas that can be practically applied. Grading is based on participation (20%), studio project one (40%), and studio project two (40%). GD 102 is only available to students enrolled in AADES or by permission of instructor and carries the prerequisite of GD 001S and GD 101.

Prerequisite: GD 1S and GD 101

Changes Effective Spring 2021:

- Abbreviated Title
- Title
- Description
- Prerequisite

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**GD 201: Typography (3 Credits)**

Old Listing Effective Through Fall 2020:

A consideration of the word in relation to visual organization and its application to communication. GD 201 GD 201 Typography (3) GD 201 is intended to provide the students with practical, formal, and communicative typographic skills. Instruction focuses on the understanding the practical and analytical application of typography in graphic design and its critical evaluation. Emphasis is on developing strong typographic skills in students. Instruction focuses on problem solving and technical training while, at the same time, nurturing intuition and creativity. The course will help students to: 1. Develop a well-rounded understanding of typography and its relationship to graphic design. 2. Develop skills and techniques applicable to typography. 3. Become familiar with appropriate hardware and software. 4. Continue to refine their conceptual skills. 5. Foster an appreciation of good typography. 6. Develop the work habits and attitudes of design professionals. Grading: 1. Work will be evaluated on the relevance of the typography to the design idea, the suitability of the design approach and choice of typography, the effectiveness of the design, and all pertinent functional parameters. 2. Professional attitude and the development of professional work habits will be evaluated. Students are expected to think for themselves, budget their time, meet deadlines, and adhere to production schedules. 3. Attendance is required. In the case of illness or an emergency, students are required to contact the professor just as they would contact an employer. Three unexcused absences will result in the final semester grade being lowered one full letter grade. 4. Neatness, craft and attention to detail will be considered in the final grade. 5. Participation in critiques and quality of the presentation of critical evaluations will part of the evaluation. 6. Visual, verbal and written communication skills will be a part of the evaluation. The prerequisite for GD 201 is GD 200. GD 201 will be offered spring semester.

Prerequisite: GD 200

Changes Effective Spring 2021:

- Add BA Attribute
- Abbreviated Title
- Title
- Description
- Remove Prerequisite
- Add Concurrent
Students will continue to develop core professional competencies in their technology, virtual interactions and sequential time-based media. In digital form this content may also address or entertain in public settings. Visual communication in their printed experience-based installations use visible language to navigate, explain text and image. Environmental applications such as way finding and to develop solutions for narrative structure with large quantities of alphanumeric character set. Voluminous publications require students social, culture, linguistic, and semiotic systems to form a useable as screens, devices, and open source programming. Also determine efficacy of emerging technologies in visual culture such as clay tablets to 21st century digital tablets. Special emphasis is given to periods of innovation and inspiration, including the late Roman period, the Renaissance, the Industrial Era, the rise of Modernism in Europe and America, and the digital revolution. Graphic design is a discipline which embraces its production and delivery technology; therefore, attention is also focused on the evolution of that technology—from the letterpress and metal typography, through the camera and photomechanical reproduction era, to current computer and digital production processes. Prerequisite: GD 1S, GD 100, GD 101; Concurrent: GD 102

Changes Effective Spring 2021:

• Remove Prerequisite and Concurrent

GD 203: Advanced Typography (3 Credits)
Old Listing Effective Through Fall 2020:

Continues students’ knowledge of foundational typographic systems and investigates the communicative potential of emerging methodologies on language systems in visual culture. Advanced Typography satisfies institutional and professional demand for future design practitioners to be versed in a robust knowledge of typography, the skillful techniques of organizing visible language. Building upon foundational knowledge gained from Typography GD201, this course excels student syntactic and semantic proficiencies and applies them towards crafting distinctive visual communications for print and digital platforms. Primarily, students will organize complex message systems of text, icons and image matter in the design of artifacts that address contemporary communication paradigms. They will explore the changing notion of the published form and create innovative content delivery solutions, which anticipate unique reader interpretation. Through investigation and analysis students will also determine efficacy of emerging technologies in visual culture such as screens, devices, and open source programming. Coursework manifests in several forms. Typeface design converges social, culture, linguistic, and semiotic systems to form a useable alphanumerical character set. Voluminous publications require students to develop solutions for narrative structure with large quantities of text and image. Environmental applications such as way finding and experience-based installations use visible language to navigate, explain or entertain in public settings. Visual communication in their printed form is the arrangement of poetic and visual content addressing material and physical variables. In digital form this content may also address technology, virtual interactions and sequential time-based media. Students will continue to develop core professional competencies in their mastery of industry tools and techniques for actual and virtual domains. Students should also expect introduction to newly available tools.

Prerequisite: GD 201

Changes Effective Spring 2021:

• Description
• Enforced Prerequisite

GD 300: Design Photography (4 Credits) (BA)
Old Listing Effective Through Fall 2020:

An investigation of graphic photography processes and how print technology affects the final appearance of a photograph. GD 300 GD 300 Design Photography (4) GD 300 is an intermediate design and photography course that explores the visual and conceptual relationship between typography and photography as it relates to the communication of information. This course is designed to help students: 1. Use photographic images and typography as they relate to visual communication. 2. Become proficient in the organization and graphic interpretation of information. 3. Learn the role and responsibility of the designer as a communicator. 4. Explore the relationship between the subject matter, designer, client, and design audience. 5. Experiment in graphic design problem solving. 6. Develop the work habits and attitudes of professional designers. Grading: 1. Work will be evaluated based on the relevance and originality of the idea and the appropriateness of the design approach to the idea, the intended audience, and all pertinent functional parameters. 2. Professional attitude and the development of professional work habits will be evaluated. Students are expected to think for themselves, budget their time, meet deadlines, and adhere to production schedules. 3. Attendance is required. In the case of illness or an emergency, students are required to contact the professor just as they would contact an employer. Three unexcused absences will result in the final semester grade being lowered one full letter grade. 4. Neatness, craft and attention to detail will be considered in the final grade. There will be a review at the end of the semester, which will include all work from the class. Each piece will be evaluated for quality and presentation. 6. Visual, verbal and written communication skills will be a part of the evaluation. GD 201 and successful portfolio review are Prerequisites to GD 300 GD 300 will be offered fall semesters.

Prerequisite: GD 201 and successful portfolio review

Changes Effective Spring 2021:

• Description
• Enforced Prerequisite

GD 301: Experience Design Process + Methods (4 Credits)
Old Listing Effective Through Fall 2020:

Experience design process and methods for graphic design majors. GD 301 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 programing 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.

The course will help students to:
1. Gain proficiency in appropriate hardware, software and programing languages.
2. Apply the students’ existing digital knowledge to design methodology for interfaces, user behavior and experiences.
3. Develop an understanding of the graphic designer as a digital communicator.
4. Refine their digital craft.
5. Develop the work habits and attitudes of professional designers.

Prerequisite: GD 201

**Changes Effective Spring 2021:**
- Description
- Remove Prerequisite

**GD 303: Applied Experience Design (4 Credits)**

**Old Listing Effective Through Fall 2020:**

Interaction design and user experience for graphic design. This class introduces the concepts, technologies, and languages used to design and build modern interactive experiences. GD303 will explore the visual aspects and structural flow of interface design. Through projects, lectures, and workshops students will explore design strategies for web and mobile devices. Students will design screen-based experiences through research and empathy to achieve their user's end-goals and objectives. Core concepts might include content strategy, personas, sitemaps, user flows, wireframes, information architecture, and usability principles.

The objectives for this course are to give graphic design students experience in the complexities of digital visual communication in emerging mediums and to provide students with the opportunity to work with software packages that facilitate digital communication. Students will receive instruction regarding the graphic designer's role in complex, collaborative digital communications.

**Changes Effective Spring 2021:**
- Abbreviated Title
- Description
- Enforced Prerequisite

**GD 304: Practical Communications (3 Credits) (BA)**

**Old Listing Effective Through Fall 2020:**

Practical design experience for students through design/publicity problems from the University and community non-profit organizations. GD 304 GD 304 Practical Communications (3) GD 304 is an advanced course that is intended to offer practical design experiences to graphic design students through assignments for various University and not-for-profit community clients. The course explores the essential relationship of the verbal and visual aspects of design to the communication of a message to a specific audience. Each student will meet with clients to develop strategies and advance individual projects from initial client contact to finished work. Students will conduct research, present rough ideas to the client, prepare presentations, and carry the work to production resulting in a finished piece. When necessary, members of the class will work with writers, photographers, and printers as they would in an actual professional setting. The course seeks to simulate as close as possible, the atmosphere of a professional design office. The course explores the essential relationship of the verbal and visual aspects of design to the communication of a message to a specific audience. Each student will meet with clients to develop strategies and advance individual projects from initial client contact to finished work. Students will conduct research, present rough ideas to the client, prepare presentations, and carry the work to production resulting in a finished piece. When necessary, members of the class will work with writers, photographers, and printers as they would in an actual professional setting. The course is intended to: 1. Prepare the students for the real working environment they will confront in the professional arena after graduation. The course seeks to simulate as close as possible, the atmosphere of a professional design office. 2. Thoroughly examine the design process and learn to define the problem clearly, and logically work toward an appropriate solution. 3. Help students to develop the work habits and attitudes of professional designers. 4. Practice positive behavior, and conflict avoidance/conflict resolution in the workplace. 5. Foster an appreciation for the appropriate integration of typography into design. 6. Develop the ability to work as a member of a team. 7. Gain a deeper understanding of graphic design aesthetically, critically, and technically. Grading: 1. Professional attitude and the development of professional work habits will be evaluated. Students are expected to think for themselves, budget their time, meet deadlines, and adhere to production schedules. 2. Attendance is required. In the case of illness or an emergency, students are required to contact the professor just as they would contact an employer. Three unexcused absences will result in the final semester grade being lowered one full letter grade. 4. Neatness, craft and attention to detail will be considered in the final grade. 5. There will be a review at the end of the semester, which will include all work from the class. Each piece will be evaluated for quality and presentation. 6. Visual, verbal and written communication skills will be a part of the evaluation. GD 300 and 301 or concurrent with GD 300 and 301 are Prerequisites to GD 304. GD 304 will be offered fall and/or spring semesters.

Prerequisite or Concurrent: GD 300, GD 301

**Changes Effective Spring 2021:**
- Abbreviated Title
- Description
- Enforced Prerequisite

**GD 310: Studio Apprenticeship (3-6 Credits: Maximum of 6 Credits) (BA)**

**Old Listing Effective Through Fall 2020:**

Direct involvement in the creative process of the artist-teacher in the studio environment. GD 310 GD 310 Studio Apprenticeship (3 per semester/maximum of 6) GD 310 is an advanced course that will offer pragmatic design experiences to graphic design students through direct involvement in the creative process of the designer-teacher in the studio environment. The course is intended to: 1. Prepare the students for the real working environment they will confront in the professional arena after graduation. The course seeks to simulate as close as possible, the atmosphere of a professional design office. 2. Thoroughly examine the design process and learn to clearly define each problem, and logically work toward an appropriate solution. 3. Help students develop the work habits and attitudes of professional designers. 4. Practice positive behavior, and conflict avoidance/conflict resolution in the workplace. 5. Develop the ability to work as a member of a team. 6. Gain a deeper understanding of graphic design aesthetically, critically, and technically. Grading: 1. Professional attitude and the development of professional work habits will be evaluated. Students are expected to think for themselves, budget their time, meet deadlines, and adhere to production schedules. 2. Attendance is required. In the case of illness or an emergency, students are required to contact the professor just as they would contact an employer. Three unexcused absences will result in the final semester grade being lowered one full letter grade. 3. There will be a review at the end of the semester, which will include all work from the class. 4. Visual and verbal communication skills will be a part of the evaluation. The Prerequisite for GD 310 is junior or senior standing in Graphic Design and the prior approval of the proposed project by instructor. GD 310 will be offered fall and spring semesters.
Prerequisite: GD 400, GD 401

Changes Effective Spring 2021:

- Description
- Remove Prerequisite

GD 402: Senior Problems (4 Credits) (BA)
Old Listing Effective Through Fall 2020:

Development of visual replies to graphic design problems. GD 402 GD 402 Senior Problems (4)(BA) This course meets the Bachelor of Arts degree requirements. This course is an in-depth course that explores the essential relation of the verbal and visual elements of design to advanced graphic design problems. The class is divided into two parts: 1) Each student submits a written proposal for a hypothetical magazine. In the proposal he or she describes the publication’s subject, content and editorial point-of-view, along with the intended audience, must be described in the proposal. Additionally, the functional parameters surrounding editorial design and a discussion of similar publications in the marketplace should be touched upon in the paper. The proposal drives the design of the publication. Each student is required to develop an appropriate title for their magazine, design a masthead, two covers, a table of contents, and a minimum of three articles. The minimum length for each article is two spreads (four pages). All sections of the magazine will be bound together with one of the covers for final presentation. Additionally, each student must apply his or her masthead design to letterhead, envelope and business card. 2) Each student prepares for graduation and the beginning of his or her career by putting together their final portfolios, resumes, letters and job search strategies. The course will help students to: 1. Perform as editorial designers. 2. Prepare for the real working environment they will confront in the professional arena after graduation. 3. Thoroughly examine the design process and learn to clearly define the problem, in order to work logically towards an appropriate solution. 4. Develop the work habits and attitudes of professional designers. 5. Polish visual, verbal and written presentation skills. 6. Practice positive behavior, and conflict avoidance/resolution in the workplace. 7. Prepare designers for realistic working environment expectations. 8. Foster an appreciation of good typography. Grading: 1. Work will be evaluated based on the relevance and originality of the idea and the appropriateness of the design approach to the idea, intended audience, and all pertinent functional parameters. 2. Professional attitude and the development of professional work habits will be evaluated. Students are expected to think for themselves, budget their time, meet deadlines, and adhere to production schedules. 3. Attendance is required. In the case of illness or an emergency, students are required to contact the professor just as they would contact an employer. Three unexcused absences will result in the final semester grade being lowered one full letter grade. 4. Neatness, craft and attention to detail will be considered in the final grade. 5. There will be a review at the end of the semester, which will include all work from the class. Each piece will be evaluated for quality and presentation. 6. Visual, verbal and written communication skills will be a part of the evaluation. GD 400 and 401 are Prerequisites to GD 402. GD 402 will be offered spring semesters.

Prerequisite: GD 400, GD 401

Changes Effective Spring 2021:

- Description
- Enforced Prerequisite

GEOG 115: Landforms of the World (3 Credits) (GN)
Old Listing Effective Through Fall 2020:

Distribution of the world’s landform features and mineral resources; their characteristics, causes, and significance. Practicum includes correlated field trips and laboratory studies. GEOG 115 GEOG 115 Landforms of the World (3:3:0) (GN)(BA) This course meets the Bachelor of Arts degree requirements. The subject of Geography 115 GN is landforms, the shape of the earth’s surface. Throughout the course, three questions are asked. The first question is: what is the surface of the earth like? What is it made of? What does it look like? And where do certain kinds of landforms occur geographically? The answers to these questions are complicated, but not as complicated as one might think. In fact, certain types of landforms tend to occur again and again, and they are found in predictable places. Mountains, for example, are not just high places, but their arrangement and internal geography are interesting and surprisingly orderly. By the same token, plains are not just flat flat places on the earth’s surface. They vary greatly, and those variations are extremely interesting. The second question deals with the origin of landforms. Is it the basic question which all sciences ask: Why? Why are the landforms of the earth shaped the way they are? Why are they made of certain kinds of rock materials? Why do they differ from place to place? In short, we want to know how landforms are made, and the forces that made them. Again, the answers to these questions are less complicated than one might guess, because certain causes tend to repeat themselves, and when they do, similar landforms result. The third question deals with the effect of landforms in human terms. How have people adapted themselves to various kinds of landforms? How have landforms helped or hindered people in their daily lives, both now and in the past? The answers, of course, are not surprising: landforms make a huge difference in the way we live. And the answers are especially interesting when we look at them in some detail, with examples from all parts of the world. Thus, Geography 115 GN is designed to examine: - Geomorphic processes at work; - The effect of these processes as they work on certain geologic structures; - How the combinations produce certain kinds of landforms; - How human beings have been affected by these elementary facts-of-life, with examples from all over the world, but especially the United States, and adjacent parts of Canada.

Changes Effective Spring 2021:

- Recertification
- Add BA Attribute
- Description

GEOG 126: Economic Geography
Old Listing Effective Through Fall 2020:

The geographic location and organization of economic activities and outcomes at global, national, regional, and local scales. GEOG 126 - Economic Geography (3) (GS;US;IL)(BA) This course meets the Bachelor of Arts degree requirements. This course is an introductory course on economic geography and serves as background for any course on international economics, economic development, international political economy, and international business management. It will provide a balanced view of contemporary globalization processes across the world through a geographical lens, focusing on a wide range of topics including the history of globalization, spatial structures of firms and business, international trade, and state interventions based on detailed case studies. The course consists of lectures, in class discussions, films, student presentations and exams.
contemporary international affairs in their geographical setting; geographic elements in the development of national power, political groupings, and international disputes. GEOG 128 GEOG 128 Geography of International Affairs (3) (GS;IL)(BA) This course meets the Bachelor of Arts degree requirements. Geography of International Affairs uses the organizing principle of geographic scale to examine the spatial patterns of and interrelationships among political processes and institutions. Particular emphasis is given to developing an integrative view of how global, national, local and individual scale processes interact to produce patterns of peace and conflict. The course analyzes how the actions of individuals, states and other political actors are influenced by their dynamic geographical contexts. The political geography approach does not simply discuss the war, peace, nationalism, terrorism, and religious organizations in isolation; instead, it concentrates on understanding the integration of these processes, and how their integration mediates political decisions and outcomes. For example, the study of terrorism demonstrates how the decision to commit terrorism is made in a multiscalar context of competing states and/or nation-state building. In addition, the spaces of terrorist networks are contrasted with spaces of nation-states to show the geographical complexities involved in effective counter-terrorism. The focus of political geography is unlike the disciplines of political science, international affairs and sociology from which it draws. On the one hand, political science focuses on the processes within separate nation-states. International affairs focuses on the interaction between nation-states, seen as unified actors. Sociology focuses on social organizations and institutions, but usually within the confines of a particular nation-state. One the other hand, political geography concentrates on the interaction of domestic politics, international relations, and trans-national social interactions. Seeing each is mutually constitutive of the other. Geography of International Affairs concerns the geopolitical context, broadly defined—the manner in which spaces and places are combinations of the political and the social, the domestic and the international, the global and the local— and how it partially determines the form and outcomes of politics. Like all geography, five recurring themes permeate Geography of International Affairs: space, place, scale, context, and human-territorial relationships. Political geographers not only are interested in where political phenomena are located on Earth’s surface, but also they want to know the answers to such questions as: • What is special about the political processes that occur in a particular place? • How does the political geography of a place relate to other places in the world? • How do spaces of power, such as states, operate? • How do political processes change and interact as we move up and down spatial scales? • How and why do people use territory in political conflicts, such as ethno-nationalist or religious wars and disputes? Other disciplines typically do not cover these spatial and human territorial themes systematically. As part of the broader discipline, political geographers have developed and adopted many tools to address these themes. Maps are obvious choices, but geographers also use a wide array of statistical and qualitative techniques to study the distribution of political processes and the processes themselves. They use geographic information systems and computer models to manipulate, display, and analyze spatial data. Geography of International Affairs acquaints students with many of these tools. When the above points are taken together, political geography emerges as a unique field of social science. Geography of International Affairs provides a learning experience that students can get in no other discipline— one that takes an integrated view that makes contemporary international affairs relevant and understandable.
Prerequisite: GEOG 160, GEOG 482, or permission of program.

GEOG 479 Cyber-Geography in Geospatial Intelligence (3) This course examines various geospatial intelligence themes and issues such as the geographies of cyberspace, the geopolitics of cyberwar, techniques that might be employed in such a conflict and how they are related to censorship on the Internet, ideas on regulation and network architecture, the politics of censorship and hacking, the politics of grassroots activism enabled by cyber Internet Communication Technologies (ICT), and the role and use of geospatial intelligence in the cyber domain for disaster response and humanitarian relief. Students will interrogate a range of information systems, the emerging landscape defined by the concepts in geosciences and volcanology. Each visits a different type of volcano with unique characteristics and impacts – a shield volcano, a cinder cone, a fissure, a stratovolcano, a lava dome, and a supervolcano. We will examine the tectonic driving forces behind these volcanoes as well as their hazards and environmental impacts. Students will use real data from active volcanic fields, as well as original data collected during home experiments, to calculate physical properties of magmas and to interpret the potential impacts of various volcanic hazards. Sidebars will delve into the less obvious interactions between humans and volcanoes from the perspective of mythology, art, and history. Observations and ideas will be logged in virtual field notebooks.

Changes Effective Spring 2021:
• Add General Education Recertification
• Description

GEOSC 30: Volcanoes (3 Credits) (GN)
Old Listing Effective Through Fall 2020:

Basic concepts in Volcanology and Geosciences are explored through a series of virtual field trips to historic eruptions. GEOSC 30 Volcanoes (3) (GN) Since the dawn of history, humankind has been faced with the destructive power of volcanoes. Volcanic eruptions can wipe out entire populations, destroy food supplies, and alter the Earth's climate for years at a time. At the same time, volcanoes provide fertile soil for growing crops and natural geothermal energy. This course uses virtual field trips to one pre-historic and five historic volcanic eruptions to introduce basic concepts in geosciences and volcanology. Each visits a different type of volcano with unique characteristics and impacts – a shield volcano, a cinder cone, a fissure, a stratovolcano, a lava dome, and a supervolcano. We will examine the tectonic driving forces behind these volcanoes as well as their hazards and environmental impacts. Students will use real data from active volcanic fields, as well as original data collected during home experiments, to calculate physical properties of magmas and to interpret the potential impacts of various volcanic hazards. Sidebars will delve into the less obvious interactions between humans and volcanoes from the perspective of mythology, art, and history. Observations and ideas will be logged in virtual field notebooks.

Changes Effective Spring 2021:
• Add General Education Recertification
• Description

GEOSC 110: The Science of Gemstones (3 Credits) (H) (BA) (GN)
Old Listing Effective Through Fall 2020:

An exploration of the geological uses of gems and of the physical and chemical properties underlying their brilliance and color. GEOSC 110H GEOSC 110H The Science of Gemstones (3) (GN) (BA) This course meets the Bachelor of Arts degree requirements. From Biblical times to the present, gems and precious metals have served as the standard by which empires have measured their worth. Through the ingenious marketing of an international cartel, diamonds have become identified with the oldest and most sacred of human contracts. To what can we attribute the unique allure of pretty minerals? Although we will consider the history and folklore associated with gemstones, this course will focus on the value of gems to scientists. We will see what crystals tell us about the chemical symmetries that govern the atomic architecture of matter, and we will explore the physical attributes that give rise to the brilliance, color, and durability of gems. Finally, we will learn how geologists have used gems to reveal the history and inner structure of the earth.

Prerequisite: high school chemistry and trigonometry

Changes Effective Spring 2021:
• Add General Education Recertification
• Number
• Description
• Prerequisite

GER 157: Pennsylvania Germans: The Culture of the Sectarians (3 Credits) (US) (GH) (BA)
Old Listing Effective Through Fall 2020:

Using this Bulletin

Title

Description

Changes Effective Spring 2021:
Survey of the religious background, beliefs, social life, customs, education, and culture of the Pennsylvania German sectarians, especially the Amish. Conducted in English. GER 157 Pennsylvania Germans: The Culture of the Sectarians (3) (GH;US)(BA) This course meets the Bachelor of Arts degree requirements. Through lectures, discussions, and films, students will be introduced to the culture, history, religion, language, education, occupations, folklore, music, and literature of the Pennsylvania Germans. Since 1683, people coming from the German-speaking territories of Central Europe settled Pennsylvania to a large degree. Many of these immigrants soon blended into American society but others who had been persecuted in Europe for their convictions and religious beliefs refused to be Americanized and retained their style of life in the New World. The best-known are the Amish who arrived in colonial times and still cling to their traditional language, beliefs and values, their economic basis, and even their clothing after living nearly three centuries in now industrialized America. They live in small, stable, and viable communities an austere life dictated by established beliefs and customs totally opposed to the American dream of progress and innovation, individual happiness and material success. By studying their history and culture and that of other groups, such as the Mennonites, Hutterites, and Moravians, students are offered a unique opportunity to learn more about other truly diverse cultures and are enabled to arrive at a better understanding of their own cultural concepts and values. In this course, students may either make a 30-minute presentation or write a 10-page paper on a topic pertaining to the curriculum of the course. Given the number of students, only a small number (approximately six) will have the opportunity to make a presentation. Teaching assistants help grade the papers. In addition, students take two one-hour examinations and a final examination. The course is related to GER 100 and GER 200 by examining the culture of German-speaking peoples. GER 157 differs from those courses, however, by focusing on a German-speaking minority culture found in Pennsylvania and elsewhere in North America. German 157 may not be applied toward the requirements of a German major or a German minor. It may be used for the General Education humanities requirement, for the General Education Intercultural/International Competence requirement, or for a B.A. humanities requirement. The course is offered approximately once a year with an enrollment of 150-180 students.

Changes Effective Spring 2021:

- Recertification
- Add GS Attribute
- Change Number to 157N
- Abbreviated Title
- Title
- Description

GER 408: Advanced German Business Communications (3 Credits) (IL)
Old Listing Effective Through Fall 2020:

Study of German business organization, forms of business communications, business terminology; writing of reports and abstracts.

Prerequisite: GER 308

Changes Effective Spring 2021:

- Prerequisite

GER 420: Genre (3 Credits: Maximum of 9 Credits) (BA) (IL)
Old Listing Effective Through Fall 2020:

Special studies in a particular literary genre in German literature, such as lyrical poetry, drama, or narrative prose.

Prerequisite: GER 310, GER 401

Changes Effective Spring 2021:

- Prerequisite

GER 431: History of German Literature and Culture I (3 Credits) (BA) (IL)
Old Listing Effective Through Fall 2020:

Significant works of German literature before the mid-eighteenth century considered in their cultural context.

Prerequisite: GER 310. Prerequisite or concurrent: GER 401

Changes Effective Spring 2021:

- Prerequisite

GER 432: History of German Literature and Culture II (3 Credits) (BA) (IL)
Old Listing Effective Through Fall 2020:

Significant works of German literature from the mid-eighteenth century to the present considered in their cultural context.

Prerequisite: GER 310. Prerequisite or concurrent: GER 401

Changes Effective Spring 2021:

- Prerequisite

GER 472: Romanticism (3 Credits) (BA) (IL)
Old Listing Effective Through Fall 2020:

A study of both early and late romanticism, including such writers as Novalis, the Schlegels, E.T.A. Hoffmann, and Heine.

Prerequisite OR Concurrent: GER 431 OR GER 432

Changes Effective Spring 2021:

- Prerequisite

HDFS 229: Infant and Child Development (3 Credits) (BA) (GS)
Old Listing Effective Through Fall 2020:

Theory, research, and methods of social/behavioral/biological sciences related to developmental processes and intervention during infancy and childhood. HD FS 229 Infant and Child Development (3) (GS)(BA) This course meets the Bachelor of Arts degree requirements. This course introduces students to the study of children from the prenatal period to (not including) adolescence. Students will become familiar with the most prominent theoretical ideas about child development. The latest research on prenatal development, infancy, early and middle childhood will inform the discussions, and students will become familiar with key studies. The major domains of children's functioning covered include social interactions and emotional development, cognitive changes and acquisition of language, physiological growth in infancy and biological changes that underlie the transition out of childhood into adolescence. A key feature of this course is how processes in these different domains interact to influence children's overall adaptation. Finally, informed by a life course developmental framework, this course will place these developmental processes in context. Students will become familiar with
the theoretical and empirical literature that locates children’s growth and development in the context of families and family change, peer groups, neighborhoods and communities, and the larger cultural context within which they are embedded. Students will be evaluated across several performance areas which may include tests, writing assignments, group projects, and participation in class discussions and panels. This course will be offered five times a year at University Park and varying amounts at Altoona and the Commonwealth Campuses. Enrollments vary by semester and location: Fall/Spring: 15-50 students at the Commonwealth and Altoona locations; 100-200 at University Park. Summer: 10-20 at the Commonwealth and Altoona locations; 20-30 at University Park.

Changes Effective Spring 2021:

• General Education Recertification
• Description

HDFS 239: Adolescent Development (3 Credits) (BA) (GS)
Old Listing Effective Through Fall 2020:

Social, behavioral, and biological development and intervention throughout adolescence. HD FS 239 Adolescent Development (3) (GS) (BA) This course meets the Bachelor of Arts degree requirements. Only in early infancy do minds, bodies, and abilities change as radically as they do during the teenage years. HD FS 239 is an introductory course that explores the developmental processes that shape our lives between puberty and the end of college. Although each life unfolds in its own unique pattern, we will explore the ways biological, psychological, and sociological influences systematically combine to shape its course. This class will help to develop an understanding of the concepts, methods, and research findings central to the study of adolescent development.

Changes Effective Spring 2021:

• General Education Recertification
• Description

HIST 1H: The Western Heritage I (3 Credits) (BA) (GH) (HON)
Old Listing Effective Through Fall 2020:

A survey of the Western heritage from the ancient Mediterranean world to the dawn of modern Europe.

Changes Effective Spring 2021:

• Recertification
• Abbreviated Title
• Title
• Description

HIST 20Y: American Civilization to 1877 (3 Credits) (BA) (US) (GH) (WAC) (BA)
Old Listing Effective Through Fall 2020:

An historical survey of the American experience from its colonial beginnings through the Civil War and Reconstruction.

Changes Effective Spring 2021:

• Recertification
• Abbreviated Title
• Description

HIST 21Y: American Civilization Since 1877 (3 Credits) (US) (GH) (WAC) (BA)
Old Listing Effective Through Fall 2020:

An historical survey of the American experience from the emergence of urban-industrial society in the late nineteenth century to the present.

Changes Effective Spring 2021:

• Recertification
• Description

HIST 83: First-Year Seminar in History (3 Credits) (BA) (FYS) (GH)
Old Listing Effective Through Fall 2020:

Critical approaches to the dimensions and directions in History. HIST 083S First-Year Seminar in History (3) (GH;FYS)(BA) This course meets the Bachelor of Arts degree requirements. Through readings, discussions, lectures, and research projects, students are expected to master the subject material of the course as well as to acquire basic skills useful to the study of the liberal arts. Students will learn to read books and original documents, discuss them, formulate effective arguments, and write essays and papers. Historical analysis of this type will provide students with techniques for appreciating and judging arguments and presentations in many fields of learning, from scholarly to popular. The topics chosen for these seminars will acquaint students with major figures and developments in important historical areas. By reading and understanding historical documents, students will learn to consider the cultural assumptions of different groups and societies and to appreciate their own values and assumptions by contrast with these. Although the course will focus on a specific topic, the instructor will help the student to see the wider implications of the issues and controversies discussed. Whenever possible, the international and intercultural aspects of the topic will be considered. The course will challenge students to express themselves and to gather information through discussion and writing of papers. It will always challenge students to think about social behavior, the nature of the community, and the value of scholarly endeavor as these relate to the particular topic of the seminar. The course fulfills the first-year seminar requirement as well as one of the humanities requirements in general education or a Bachelor of Arts humanity requirement. The course will be offered twice a year in sections of 20 students.

Changes Effective Spring 2021:

• Recertification
• Abbreviated Title
• Description

HIST 108: The Crusades: Holy War in the Middle Ages (3 Credits) (BA) (IL) (GH)
Old Listing Effective Through Fall 2020:

The social and political history of medieval religious warfare in Europe and in the Middle East. HIST 108 The Crusades: Holy War in the Middle East (3) (GH;IL)(BA) This course meets the Bachelor of Arts degree requirements. History 108 is an introductory survey of the so-called holy wars of the High Middle Ages. These wars were fought in theaters from the Baltic to the eastern shores of the Mediterranean, from the Hispanic peninsula to southern France. While the primary emphasis will be given to the expeditions to the Holy Land, two other crusading movements will be studied: the crusades in the Baltic, led by the Teutonic Knights, and the crusades in southern France, against the heretics known as the Albigensians. These conflicts cannot be studied in isolation, and a major topic is the response of Islamic society and non-conformists elements
within medieval Europe. How the various elements in the crusading period co-existed, changed or disappeared provides still more material for the student to contemplate. Students will be evaluated on three essay examinations, regularly scheduled discussions of the assigned readings, the instructor's assessment of the student's ability to read critically, write clearly and knowledgeably, and class participation. History 108 is part of a series of introductory courses to medieval history. It will be accepted but not required for the History Major and Minor. It will be offered once each year with 90 seats per offering.

Changes Effective Spring 2021:

• Recertification
• Abbreviated Title
• Title
• Description

HIST 113: Baseball in Comparative History (3) (IL)
Old Listing Effective Through Fall 2020:

Comparative survey of baseball history from its beginnings to the present. HIST 113 Baseball in Comparative History (3) (IL) This course, which fulfills the International Cultures (IL) requirement, provides an introduction to comparative social history. It uses the broad cultural and geographic diffusion of baseball over time to examine the diverse and changing social, economic, and political meanings of this activity in different cultural settings, emphasizing the ways in which a common activity may acquire unique meanings in different cultures. Although North America, Cuba, and Japan demand attention as the most striking examples of baseball’s pervasive impact, the course will consider baseball as a global phenomenon, exploring the minimal impact or failure of baseball promotions in many European and African societies, for example. As an introduction, the course will confine itself to English language texts, but it will use a wide range of primary sources, including newspapers and journals, memoirs, correspondence, promotional materials, and photographs to introduce students to basic concepts of historical method and problems of evidence. Students will be encouraged to consider baseball’s impact in particular historical contexts as a cultural process, from the manner of its introduction through its adoption to the emergence of distinctive proprietary, even nationalist attitudes and cultural process, from the manner of its introduction through its adoption to the emergence of distinctive proprietary, even nationalist attitudes and styles of play. Among the many topics required of a survey, the course will return periodically to the question of American influence and US imperial aspirations. But the evidence of baseball games in other countries as sites of resistance or hostility to US power and as expressions of a potent nationalist politics raises questions about baseball’s value for many conventional historical models of “empire” as a form of political or economic subordination. Students’ assignments will require a combination of reading, writing, and research skills, and the course will introduce through lecture and discussion the variety of materials available at Penn State for the study of this subject.

Changes Effective Spring 2021:

• Add GH Attribute
• Add BA Attribute
• Add US Attribute
• Description

HIST 116: Family and Sex Roles in Modern History (3 Credits) (BA) (IL) (US) (GS)
Old Listing Effective Through Fall 2020:

Historical perspectives on the Western family since 1500: gender roles, marriage, sexuality, child rearing, and old age; emphasis on United States.

Cross Listing: WMNST 116

Changes Effective Spring 2021:

• Recertification
• Add GH Attribute
• Change Attribute to 116N
• Abbreviated Title
• Title
• Description
• Cross Listing

HIST 120: Europe Since 1848 (3 Credits) (BA) (GS) (IL)
Old Listing Effective Through Fall 2020:

Political, social, and ideological developments; origin and impact of two World Wars; totalitarianism and democracy; changing role in the world.

Changes Effective Spring 2021:

• Recertification
• Add GS Attribute
• Add Inter-Domain Attribute
• Number
• Abbreviated Title
• Title
• Description

HIST 121: History of the Holocaust 1933-1945 (3 Credits) (BA) (IL) (GH)
Old Listing Effective Through Fall 2020:

Historical analysis of holocaust themes. HIST (J ST) 121 History of the Holocaust 1933-1945 (3) (GH;IL)(BA) This course meets the Bachelor of Arts degree requirements. The course will analyze the Holocaust using historical, literary, and philosophical approaches. Various species of evidence will be used and evaluated, including film and literary materials. Emphasis will be placed on discussion, student research projects, problems of ethnicity, race and religion in analyzing the origins of a persecuting mentality and the scapegoating and brutalization of victims, primarily Jews, but also including Gypsies and other groups. The Holocaust is also discussed in the context of global genocidal phenomena. The peculiar structures and dynamics of Jewish ethnic life in Eastern Europe are also treated prominently. Comparative analysis of the relationships between dominant and non-dominant cultures is a major concern of the course. An example of evaluation may include requiring students to complete one major paper on a specific theme covered in the course with a draft of four pages due at the end of six weeks. Students will be required to complete one major paper on a specific theme covered in the course. The course will contribute both to studies in 20th century European and German history, as well as to Jewish Studies. It will form a prominent feature linked to Modern Jewish History HIST/J ST 118 and the History of Anti-Semitism (HIST 302W). The course may be used to count for 3 credits toward the 18 credits required for the History minor and 22 credits required for the Jewish Studies minor. The course will be offered once per year with an enrollment of 20 for HIST and 20 for J ST.

Cross Listing: JST 121
Changes Effective Spring 2021:

- Recertification
- Add GH Attribute
- Abbreviated Title
- Title
- Description

HIST 127: Introduction to U.S. Latina/o History (3 Credits) (US)
Old Listing Effective Through Fall 2020:

This course introduces students to the history of U.S. Latina/o(s), including Puerto Ricans, Dominicans, Chicanos, Cubans, and Central Americans. HIST (LTNST) 127 Introduction to U.S. Latina/o History (3) (US) This course introduces students to the history of U.S. Latina/o(s), drawing on the multiple experiences of Puerto Ricans, Dominicans, Chicanos/Mexicanos, Cubans, and Central Americans. Course content features the divergent development of U.S. Latina/o cultural and political identities rooted in the Caribbean, Mexico, Central American, and the United States. Students will understand the formation of racial and class hierarchies within U.S. Latina/o communities; the processes of (international) migration; gendered hierarchies and responses to sexism; and the complexities of U.S. Latina/o identity. Lectures are supplemented with discussion days in which students respond to readings under the guidance of a graduate teaching assistant. Grading stresses proficiency in analytical, historical writing.

Cross Listing: LTNST 127

Changes Effective Spring 2021:

- Add GH and BA Attributes
- Abbreviated Title
- Description
- Cross-Listing

HIST 134: Introduction to the British Isles, 1400-1800 (3 Credits) (IL) (GH)
Old Listing Effective Through Fall 2020:

Survey of the history and cultures of the British Isles from 1400 to 1800. HIST 134 Introduction to the British Isles, 1400-1800 (3) (GH;IL) This history course, which fulfills the Humanities requirement in General Education (GH) or the International Cultures (IL) requirement, provides an introduction to the history of the British Isles from the fifteenth to the early nineteenth centuries, focusing on the diversity of English, Welsh, Scots, and Irish cultures and customs, their influence on early forms of nationalism in the British Isles, and their importance in the formation of the modern British nation-state. Using a wide range of primary sources, including the work of prominent British writers, the course introduces basic concepts of historical method, while exploring the process whereby an English empire came to govern these four major &ldquo;peoples&rdquo; of the British Isles. Students will be encouraged to consider the dynamism of this process, involving complex interrelationships rather than the simple supremacy of one ethnic group over another. The relationships between English and Scots protestants, the importance of translating the Book of Common Prayer from English to Welsh, the influence of Irish-born families of English descent on the governance of early modern Ireland, were all key elements in the emergence of an empire under the authority of an English dynastic state whose practical control over the territories it claimed to govern often remained quite limited.

Changes Effective Spring 2021:

- Recertification
- Add GH Attribute
- Change Number to 142N
- Description

HIST 142: History of Communism (3 Credits) (BA) (IL) (GS)
Old Listing Effective Through Fall 2020:

Marxism; Leninism and evolution of the Soviet Union; formation and development of the Communist bloc; impact of Chinese Communism. HIST 142 History of Communism (3) (GS;IL)(BA) This course meets the Bachelor of Arts degree requirements. Communism is one of the most powerful ideologies to have ascended in the modern period of history. Fashioned from Marxist philosophy, communism was embraced in the twentieth century to over one billion people from the former USSR, to China, to South Asia, to Africa, to Latin America, and by some here in the U.S. Unquestionably, the institutionalization of communist regimes has left an indelible mark on world history. This course will explore the writings of Marx and his advocates, notably Engels and Lenin, and strive to understand why the first communist regime emerged in the unlikely place of Russia. Using the Soviet Union as a case study, we will examine how Marxist principles were either applied or transformed in the construction of the first communist society. By examining the history of the Soviet Union, including its spectacular and rapid demise, we will come to a greater understanding of communist principles and of the dynamics of capitalism as well. As a counter-example, we will also focus on the Chinese experience of Communism and contrast the divergent paths to reform that have been implemented there. The goal of the class is twofold: to become familiar with the principles of communism by examining their application primarily in the USSR, Eastern Europe and China, and to come to a greater understanding of the dynamics of a capitalist system. The course grade will be determined by the student's performance on in-class essay exams, a research paper, the comprehensive final exam (essays and short answer), participation in class discussions, and regular attendance. This course serves as a prerequisite to History 430 and History of the Soviet Union, and provides valuable background for such related courses as PL SC 413 and 452 and RUS 100. HIST 142 satisfies three credits of any history for History majors. It is also a prerequisite for several upper level history courses dealing with twentieth century Eastern European or Eurasian history. For all other students, this course fulfills a Social and Behavioral requirement in general education. HIST 142 will be offered once each year with 75 seats per offering.

Changes Effective Spring 2021:

- Recertification
- Add GH Attribute
- Change Number to 142N
- Description

HIST 143: History of Fascism and Nazism (3 Credits) (BA) (IL) (GH)
Old Listing Effective Through Fall 2020:

The study of right-wing totalitarianism in the twentieth century, with special emphasis on Fascist Italy and Nazi Germany. HIST 143 History of Fascism and Nazism (3) (GH;IL)(BA) This course meets the Bachelor of Arts degree requirements. History 143 is an introductory survey of fascism and Nazism. The course concerns itself with understanding the social context of fascism, its governing assumptions, ideals, and values, how it worked in practice, and its consequences and
historical implications. The course centers on the analysis of secondary and primary sources, and textual, video, and audio materials are all used. Lectures tie the various materials together, while weekly discussion sessions provide an opportunity for students to engage the materials directly. Students are evaluated on the basis of exams (which include an essay component), papers, and class attendance and participation. The course contributes not only to the study of the history of authoritarianism, antisemitism, and the history of the holocaust, but also contemporary and modern European history and, of course, German, Italian, and Spanish history. History 143 will be accepted, but not required, for the History Major as well as the History Minor. It may function as a service course for the Departments of Political Science and Sociology. It is recommended that it also serve as a general education course in the Humanities. This course is offered once a year with enrollment of up to 150 per offering with small discussion sections once a week.

Cross Listing: JST 143

Changes Effective Spring 2021:
• Recertification
• Add GS Attribute
• Change Number to 143N

HIST 144: The World at War: 1939-1945 (3 Credits) (BA) (IL) (US) (GH)
Old Listing Effective Through Fall 2020:

In-depth study of the origins and conduct of World War II. Political and economic aspects as well as military. HIST 144 The World At War: 1939-1945 (3) (GH;US;IL)(BA) This course meets the Bachelor of Arts degree requirements. This course offers a wide-ranging description and analysis of the second world war, combining military history with political, social and cultural approaches. One major goal is to describe how large-scale war serves as a revolutionary social and cultural force in its own right, massively accelerating social change. In the case of the second world war, the course will describe how the conflict did much to create what we think of as the modern world, not only in political terms (the roots of the cold war, the collapse of European imperialism) but also in radically changing attitudes towards such basic matters as gender relations and generational conflict. Also vital were the new scientific advances of the war years, in nuclear energy, radar, aviation, and perhaps most critical of all, the computer. Particularly important to the educational justification for the course is the stress on the construction of historical memory, a theme with implications far beyond the specific instance of World War II. The course will assess and challenge many of the myths surrounding the war, and to show how subsequent accounts of the conflict were shaped by political and cultural needs. For example, the course will stress the critical importance of the Eastern Front throughout the phenomenon understated in the West because of the patriotic Anglo-American emphasis on D-Day. It will also explore the &quot;Resistance Myth&quot; and suggest the moral compromises necessary to survive in occupied societies of Europe and Asia. Throughout, the course will stress the impacts of war on the home front and civilian society. The course will be offered once every two years, with fifty seats on each occasion. Typically, students will be evaluated on essay exams, written book reviews, and research papers, and are expected to participate fully in class discussions of assigned readings. History 144 is an important complement to several existing courses within the History department, including 120, Europe Since 1848; 121, The History of the Holocaust; 142, History of Communism; 143, Fascism and Nazism; and 160, American Naval History. It also provides an excellent foundation for 400-level courses including 420, Recent European History; 447, Recent American History, and 454, American Military History 144 satisfies general credit requirements for the history major or minor. Majors and non-majors would both be able to use the course to satisfy their general education humanities selection.

Changes Effective Spring 2021:
• Recertification
• Abbreviated Title
• Description

HIST 151: Technology and Society in American History (3 Credits) (BA) (US) (GS)
Old Listing Effective Through Fall 2020:

Development of technology in America from colonial times; its reception and its influence on social, economic, and political life.

Cross Listing: STS 151

Changes Effective Spring 2021:
• Recertification
• Add GH Attribute
• Change Number to 151N

HIST 155: American Business History (3 Credits) (US) (BA) (GH)
Old Listing Effective Through Fall 2020:

Major developments in the history of business and industry from the colonial period to the present. HIST 155 American Business History (3) (GH;US)(BA) This course meets the Bachelor of Arts degree requirements. History 155 surveys the development of business and industry within the United States, from the colonial period to the present. It treats the conduct of business as an integral element of American society and culture. Topics to be discussed will include the colonial commitment to commerce and early debates over what kind of commercialism the new national government should encourage; the effects of new technologies like the cotton gin, canals, and railroads in the 1800s and electrical products, cars, and computers in the 1900s; the emergence of modern large-scale industrial production and changes it brought about in business management, in society, and in politics; the changing fortunes and corporate citizenship; changing ideas about what kind of relationships should exist among governments, citizens, and businesses; the importance of world events for American businesses; and the emergence and importance of mass-market consumer products since the First World War. Materials we will use to cover this comparatively complex set of interrelationships will include textbook, supplementary studies of individuals or particular businesses, and current media coverage of the business world. The course is fast-paced and relies on students self-discipline and analytical skills. Student performance will be evaluated on two essay exams, a class presentation, group discussions, and in-class quizzes, and evaluation will be based on the instructors assessment of the students performance in reading and writing critically and knowledgeably on particular subjects, marshaling evidence in support of coherent arguments, and participating in class discussions.
and presentations. History 155 may complement, but does not compete with, courses offered by other departments or programs. It will be useful for students intending to major in business programs, in Labor and Industrial Relations, and/or to participate in the business world, by deepening their historical knowledge of that world, and will complement the Business/Liberal Arts minor. It will complement History 020 and 021 as well as more advance courses in American history. History 155 will be accepted, but is not required, for the history major and minor. It may be used to fulfill either General Education or Bachelor of Arts requirements in the Humanities for those not majoring in History. HIST 155 will be offered once a year with 45 seats per offering.

Changes Effective Spring 2021:

- General Education Recertification
- Abbreviated Title
- Description
- Cross-Listing

HIST 158: History of American Immigration (3 Credits) (BA) (IL) (US)
Old Listing Effective Through Fall 2020:

The waves of migration to America and an analysis of the resulting minority groups, their reception, assimilation, and persisting identity.

Changes Effective Spring 2021:

- Add GH Attribute
- Abbreviated Title
- Description

HIST 161: The Battle of Gettysburg in American Historical Memory (3 Credits) (BA) (US)
Old Listing Effective Through Fall 2020:

Examines factors shaping understanding of the Civil War’s decisive battle and its meanings as a national symbol.

Changes Effective Spring 2021:

- Add GH Attribute
- Abbreviated Title
- Description
- Cross Listing

HIST 203: History of Monsters, Aliens & The Supernatural (3 Credits) (BA) (IL) (US) (WAC) (GH)
Old Listing Effective Through Fall 2020:

This course explores the history of the preoccupation with monsters, aliens, and the supernatural.

Changes Effective Spring 2021:

- Recertification
- Add GS Attribute
- Remove WAC Attribute
- Change Number to 203N
- Abbreviated Title
- Title
- Description

HIST 210: Freedom's First Generation: African American Life and Work, 1865 to World War II (3 Credits) (BA) (US) (GH)
Old Listing Effective Through Fall 2020:

The course will explore the context and events that shaped African American life over the period 1896-1932.

AFAM 210 / HIST 210 Freedom's First Generation: African American Life and Work, 1865 to World War II (3) (GH;US) (BA) This course meets the Bachelor of Arts degree requirements. This course focuses on the emergence of the Atlantic World Black Diaspora from the 15th through the 19th centuries with the United States as its central focus. We begin with a brief discussion of African societies at the beginning of the Transatlantic Slave trade, discussing the various ethnicities, cultures, societies, and states. We then discuss the emergence of the TST and its consequences for the forging of the modern world and its centrality to the rise of modern capitalism. The forced migration of over 10 million people of African descent resulted in a massive dispersal of various cultures, ideas, religious systems, foods, crops, and ideologies—all of which formed the Black Diaspora. We look at the centrality of these various cultures and ideas to the successful rise of the American colonies, including the skills that Africans brought to the emerging staple crop economies, the knowledge of plants, foods, crops, and healing practices. We look at both the evolution of American slave societies in the North and the South, as well as the rise of Free Black communities. We use documents and readings to understand the multiple contributions of African Americans to science, literature, and music. Of major importance is the formation of slave communities, kinship networks, the rise of an African American religion, and various forms of resistance to slavery that included running away, daily forms of resistance, and actual slave revolts. We also discuss the rise of a special form of "slave politics" that shapes evolving notions of freedom. In addition to discussions of southern and northern slave society, we also look at the role of free blacks in the antebellum reform movements, especially the abolitionist movement. The course concludes with the coming of the Civil War and a discussion of the multiple ways that African Americans played a role in accelerating the road to war and in facilitating their own emancipation.

Cross Listing: AFAM 210

Changes Effective Spring 2021:

- Recertification
- Abbreviated Title
- Title
- Description

HIST 211: Marine Corps Leadership Theory and Techniques (3 Credits) (IL) (US) (GH) (BA)
Old Listing Effective Through Fall 2020:

Introduction to Marine Corps leadership theory and techniques and their application to military-related practical skills and subject matter.

NAVASC 313 Marine Corps Leadership Theory and Techniques (3)
The curriculum for Marine Corps Leadership Theory and Techniques provides students with an in-depth understanding of the physical and mental rigors Marine Corps Officers face while leading Marines in the contemporary operating environment. Students' professional development as future Marine Corps leaders is enhanced through the examination of military-related skills, decision-making and management processes, organizational structures and associated micro-cultures within the military framework. Underlying concepts focus on a historical perspective of fundamentals of leadership, team building, establishing command, organizational safety (to include sexual assault prevention/
response and suicide prevention) and equal opportunity coupled with humanistic functions leading to successful organizations.

Prerequisite: AFAM 100 or HIST 3 or HIST 20 or HIST 21 or HIST 152

Cross-Listing: AFAM 211

Changes Effective Spring 2021:
- General Education Recertification
- Abbreviated Title
- Description
- Remove Prerequisites

HIST 250: Introduction to the Modern Caribbean (3 Credits) (BA) (IL) (GH)
Old Listing Effective Through Fall 2020:

A survey course which explores the historical evolution and emergence of the modern Caribbean. AFAM 250 / HIST 250 Introduction to the Modern Caribbean (3) (GH;IL)(BA) This course meets the Bachelor of Arts degree requirements. This course will explore the evolution of the Caribbean region from the eve of the arrival of Columbus to the 20th century. It will explore the emergence, migration, and evolution of Amerindian societies in the Caribbean islands prior to the arrival of Columbus. It will then explore the European-Amerindian interactions that lead to the disappearance of these indigenous peoples from the region and the consolidation of European colonial empires. The course will then explore the various forms of coercive labor systems that emerged in the region including indentureship, enslavement, transportation of European prisoners and other social outcasts, African slavery, and the establishment of the plantation system that defined the region until the 20th century using both free and unfree labor to maintain its dominance in these island societies until the late 20th century. The course will also cover the issue of slave resistance, the Haitian revolution, the formation of maroon communities, and the role of abolitionist politics as a factor in bringing an end to slavery. It will also look at the re-emergence of indentureship of Asians as a response to the crisis of labor and the growth of peasant agriculture in the 19th century Caribbean. The course will also explore the emergence of nationalist sentiment in the region, especially the way in which the decay of Spanish colonial authority and the rise of American imperial ambitions helped to set the stage for the nationalist awakening that defined the course of the 20th century in the region. This is the course that will complement and expand upon issues raised in AFAM 211 / HIST 211 – The Emergence and Evolution of the Black Diaspora in the Atlantic World. It will also serve as an introduction to the 400-level course on the Caribbean in the 20th century that will be proposed simultaneously. The course will be required for students interested in pursuing the African Diaspora minor. It may be used to fulfill general education and diversity requirements. It can also be used as a course to meet non-Western history requirements in the History major. Evaluation will be based upon a book review, a mid-term, a research paper, and class discussion/participation.

Cross Listing: WMNST 266Y

Changes Effective Spring 2021:
- Recertification
- Abbreviated Title
- Description

HIST 266Y: Sex and Violence in Nineteenth-Century America (3 Credits) (BA) (US) (GH) (WAC)
Old Listing Effective Through Fall 2020:

Historical Overview of Sex and Violence in the Nineteenth-Century United States. HIST (WMNST) 266Y Sex and Violence in Nineteenth-Century America (3) (GH;US)(BA) This course meets the Bachelor of Arts degree requirements. "Sex and Violence in Nineteenth-Century America" is an introductory course in the social and cultural history of the United States designed to reveal the importance of the past to the present by showing how two basic human activities have changed over time in both ideology and practice. Both sex and violence are incredibly broad topics; this class will not provide a comprehensive overview. Rather we will focus on a few intriguing topics, including courtship, prostitution, the early popular culture of sports, slavery, military violence including the Civil War, exploitative journalism, and sex and violence as metaphor. We will also examine the history of sexuality in the nineteenth century, and manner in which masculinity has been historically constructed. The main purposes of the course are to introduce students to some major issues in nineteenth-century social and cultural history, and to acquaint students with those techniques historians use to research and interpret the past.

Cross Listing: WMNST 266Y

Changes Effective Spring 2021:
- Recertification
- Abbreviated Title
- Description

HIST 479: History of Imperialism and Nationalism in Africa (3 Credits) (IL) (BA)
Old Listing Effective Through Fall 2020:

Theories and types of imperialism; varied patterns of colonial administration; initial African responses; nationalism; decolonization and independence.

Prerequisite: HIST 191

Changes Effective Spring 2021:
- Abbreviated Title
- Description
- Add Cross-Listing
- Add Prerequisite

HLS 404: Homeland Security and Defense in Practice (3 Credits)
Old Listing Effective Through Fall 2020:

This course analyzes, evaluates, and critiques homeland security plans in practice. P ADM 404 Homeland Security and Defense in Practice (3) The focus of the course is to apply lessons learned in previous courses to actual organizations. Key material is reviewed, to provide context for the capstone experience that this course provides. Students will apply the Homeland Security framework (the National Response Plan and the National Incident Management System) to case studies, such as FEMA’s response to Hurricane Katrina. The main theme of the course is the need for collaboration (interoperability) across state, local, and national governments as well as with the private sector and other relevant actors. A major portion of the course examines the Commonwealth of
Pennsylvania as a state-level case study. The course will culminate with a paper that applies the framework of Homeland Security and Defense to an organization of the student’s choosing.

Prerequisite: PADM 401

Cross-Listing: PADM 404

Changes Effective Spring 2021:

- Description
- Remove Prerequisite

HLTH 306: Physical Education, Health, and Safety in Elementary Schools (2 Credits)
Old Listing Effective Through Fall 2020:

A study of appropriate activities for elementary-age children. Student participation in physical activities is required. HLTH 306 Physical Education, Health and Safety in the Elementary Schools (3) This course is designed to prepare elementary classroom teachers to provide age appropriate instruction related to issues of health and safety encountered in the school, home, and community. Understanding and demonstrating a knowledge of foundations, lesson planning, instructional strategies, and assessment is a key component of the program. In addition, the pre-service teachers are prepared to organize and implement physical education activities that may be carried out in the classroom, playground and/or appropriate indoor facilities. The physical education aspects of the program are generally provided as ancillary activities to the program provided under the guidance and direction of a certified Health and Physical Education instructor.

Prerequisite: eighth-semester standing in Elementary Education Program

Changes Effective Spring 2021:

- Abbreviation to EDUC
- Description
- Prerequisite

HM 271: Introduction to Hospitality Technology
Old Listing Effective Through Fall 2020:

Introduction to technologies used in the hospitality industry including networks, security, e-commerce, social media, spreadsheets, databases and property management systems. HM 271 Introduction to Hospitality Technology (3) This course is designed to introduce students to the technology used in the hospitality industry and to the concepts of information technology. The objectives are to describe how managers in the hospitality industry use various information technologies to solve problems and make decisions, describe the role of hospitality managers in information system development and management, describe the functions of network and security systems within in hospitality technology systems, explain the role of hospitality information systems, e-commerce, distribution technologies, and social media in strengthening an operation or company’s competitive position, and demonstrate competency in the use of spreadsheet, database and property management system software with skills applicable to the hospitality industry.

Prerequisites: Enforced Prerequisite or Concurrent at Enrollment: HM 201

Changes Effective Spring 2021:

- Credits
- Title
- Abbreviated Title
- Description

HM 311: Introduction to Wines of the World (2 Credits)
Old Listing Effective Through Fall 2020:

The course introduces students to viniculture and viticulture and the sensory evaluation of wine. It focuses on the complexities of production, storage, grape-growing, and the intersection of agriculture, commerce, and hospitality businesses. Special emphasis is given to the climates, topographies, and other natural conditions that make some regions more suited to certain wine cultivation than others and how these conditions are replicated around the world. It concentrates on the sensory elements of wine that make it a global economic and culture phenomenon with emphasis on Old World and New World traditions, food pairing, new entries to the marketplace, and trends in the wine business. It covers the important role wine plays in the delivery of dining experiences in both hospitality enterprises such as catering and restaurant venues as well as retail and social experiences. Wine sales makes a substantial contribution to the profitability and marketability of many food service operations. The wine industry is replete with specific and technical vocabulary that when mastered enables students to engage in wine activities knowledgably and successfully, whether as a consumer or hospitality professional.

Enforced Prerequisite at Enrollment: Students must be 21 years of age or older to register for this course. Enrollment by non-HM majors by permission only.

Changes Effective Spring 2021:

- Remove Prerequisites
- Add Recommended Preparation

HM 388: Gaming Operations Management
Old Listing Effective Through Fall 2020:

Students will learn casino mathematics, game protection, floor layout methods, departmental organizational structure, and performance analysis.

Prerequisites: Enforced Prerequisite at Enrollment: A grade of C or better in: STAT 200 and HM 201 and HM 386 Concurrent: HM 387

Changes Effective Spring 2021:

- Title
- Abbreviated Title
- Description
- Enforced Prerequisites

HM 495A: Penn State Hospitality Services Hotel Internship (3 Credits: Maximum of 3 Credits)
Old Listing Effective Through Fall 2020:

HM 495A Penn State Hospitality Services Hotel Internship (3) Students will obtain hands-on work experience through employment in one or more departments with Penn State Hospitality Services. Experience may include front desk, housekeeping, maintenance, sales, accounting, food and beverage, culinary, banquets, or reservations. Students will
work 15-20 hours per week throughout the semester and attend weekly classroom sessions.

Prerequisite: Employment offer from Penn State Hospitality Services, approval of internship assignment by program, and a minimum overall grade point average of 2.50

**Changes Effective Spring 2021:**
- Number
- Long Title
- Abbreviated Title
- Credits
- Description
- Prerequisite

**HM 495B: Penn State Hospitality Services Executive Internship (3 Credits)**

Old Listing Effective Through Fall 2020:

HM 495B Penn State Hospitality Services Executive Internship (3)

Students will participate in project-based internship under the guidance of a department head with Penn State Hospitality Services. Students will work approximately 15-20 hours per week over the course of a semester. The goal of this internship is to provide students with a variety of work and project experiences to develop their managerial competencies. These assignments will vary from student to student, based on his or her interests and professional development needs.

Prerequisite: Selection by Penn State Hospitality Services department head, approval of internship assignment by instructor, minimum overall grade point average of 2.50, and HM 495A

**Changes Effective Spring 2021:**
- Number
- Abbreviated Title
- Credits
- Description
- Prerequisite

**HM 495C: Penn State Housing & Food Service Internship (3 Credits: Maximum of 3 Credits)**

Old Listing Effective Through Fall 2020:

HM 495C Penn State Housing & Food Service Internship (3)

Students will obtain hands on-experience through employment with Penn State Housing and Food Services. Experience may include preparing for concerts and sporting events, front-of-house and back-of-house food and beverage operations, shadowing managers, and supervising employees. Students will work 15-20 hours per week throughout the semester and attend weekly classroom sessions.

Prerequisite: Employment offer from Penn State Housing and Food Services, approval of internship assignment by instructor, and a minimum overall grade point average of 2.50

**Changes Effective Spring 2021:**
- Number
- Long Title
- Abbreviated Title
- Credits
- Description
- Prerequisite

**HORT 131: Herbaceous Perennial and Annual Identification (3 Credits)**

Old Listing Effective Through Fall 2020:

Herbaceous and annual plant identification; landscape use of herbaceous perennials and greenhouse and garden annuals.

Prerequisite: BIOL 127, BIOL 110, or HORT 101

**Changes Effective Spring 2021:**
- Number
- Abbreviated Title
- Description
- Prerequisite

**HORT 201: Applied Arboriculture (2 Credits)**

Old Listing Effective Through Fall 2020:

Overview of methods used to diagnose problems and provide for the long term care of large trees. HORT 201 Applied Arboriculture (2)

The objective of this course is to provide students with the opportunity to develop an appreciation of the skills required to properly care for large trees. The course provides information that is especially useful to those in the Landscape Management option of the Landscape Contracting major. The course will provide an overview of the methods used to diagnose problems and provide for the long term care of large trees. Areas of emphasis will include accessing the upper parts of large trees; safety when working in and around large trees; and the proper selection, use, and maintenance of the equipment used in the arboriculture profession. The course will be taught each Fall semester and will have an enrollment limit of 18. Students will be evaluated by quizzes, exams, and laboratory assignments.

Prerequisite: Students must be physically capable of safely handling a running chainsaw, and pulling their weight up a rope.

**Changes Effective Spring 2021:**
- Number
- Abbreviated Title
- Description
- Prerequisite

**HORT 202: Plant Propagation (3 Credits)**

Old Listing Effective Through Fall 2020:

Principles and practices of asexual and sexual plant propagation.

Prerequisite: BIOL 027, BIOL 110, or HORT 101

**Changes Effective Spring 2021:**
- Number
- Abbreviated Title
- Description
- Prerequisite

**HORT 269: Residential Landscape Planning (3 Credits)**

Old Listing Effective Through Fall 2020:

Principles and techniques in landscape design; preparation of plans of small properties.

Prerequisite: Landscape Contracting majors, in the Design/Build Option
Changes Effective Spring 2021:

• Abbreviated Title

HORT 301: Principles of Arboriculture (3 Credits)
Old Listing Effective Through Fall 2020:

Overview of the concepts and methods prescribed for the evaluation and care of large trees in urban settings. HORT (FOR) 301 Principles of Arboriculture (3) The objective of the course is to introduce students to the theories and practices related to the care of trees in developed areas. The course provides information that is especially useful to those in the Landscape Management option of the Landscape Contracting major, and the Urban Forestry option of the Forestry major. This course will provide an overview of the concepts and methods prescribed for the evaluation and care of large trees in urban settings. Emphasis will be placed on maintaining the long-term health of large trees. Major topic areas will include methods for characterization of tree health, diagnosing problems in trees, the influence of environmental factors on tree health, and the assessment of hazard trees. Proper pruning techniques and factors to consider when making decisions regarding long-term tree care in urban areas will be discussed. The course will be taught each spring semester. Students will be evaluated by quizzes, exams, and laboratory assignments.

Prerequisite: BIOL 110 and SOILS 101

Changes Effective Spring 2021:

• Abbreviated Title

HORT 315: Environmental Effects on Horticultural Crops (3 Credits)
Old Listing Effective Through Fall 2020:

Horticultural plants respond to the environmental factors of light, temperature, water, and fertilizer both in controlled and field environments.

Prerequisites: HORT 101, HORT 202

Changes Effective Spring 2021:

• Prerequisites

HORT 408: Landscape Plant Establishment and Maintenance (4 Credits)
Old Listing Effective Through Fall 2020:

The principles and practices involved in the establishment of plants in the landscape, and their subsequent maintenance.

Prerequisite: HORT 137 or HORT 138 ; SOILS101

Changes Effective Spring 2021:

• Abbreviated Title

HORT 410: Issues in Landscape Contracting (3 Credits) (WF)
Old Listing Effective Through Fall 2020:

This will be a survey of business management, regulatory, and environmental issues facing the landscape contracting profession. Laboratory.

Prerequisite: HORT 408

Changes Effective Spring 2021:

• Abbreviated Title

HORT 412: Post-Harvest Physiology (3 Credits) (WF)
Old Listing Effective Through Fall 2020:

Harvesting, handling, storage, and transportation of horticultural crops; primary emphasis on physiological response to pre- and post-harvest environmental factors.

Prerequisite: 6 credits in horticulture or other plant sciences

Changes Effective Spring 2021:

• Abbreviated Title

HORT 431: Small Fruit Culture (3 Credits)
Old Listing Effective Through Fall 2020:

Cultural requirements and production practices of the principal small fruit crops: strawberries, grapes, blueberries, brambles, and cranberries.

Prerequisite: HORT 101 , HORT 315

Changes Effective Spring 2021:

• Abbreviated Title

HORT 453: Flower Crop Production and Management (3 Credits)
Old Listing Effective Through Fall 2020:

Production of greenhouse flower and foliage plants; development of management skills for a greenhouse business.

Prerequisites: HORT 101, HORT 315

Changes Effective Spring 2021:

• Abbreviated Title

HORT 464: Landscape Construction I (4 Credits)
Old Listing Effective Through Fall 2020:

Standards, processes, and computations for site grading, drainage, earthwork, vehicular circulation, parking; detailing, and finishing of landscape construction materials.

Prerequisites: HORT 269
IE 436: Six Sigma Methodology (3 Credits)
Old Listing Effective Through Fall 2020:

Techniques for structured problem-solving to improve the quality and cost of products and processes. I E 436 Six Sigma Methodology (3) Six Sigma is a structured, quantitative approach to improving the quality and cost of products and processes. It provides a framework for quality improvement that builds upon statistical tools to achieve business results. Although statistical techniques are emphasized throughout, the course has a strong engineering and management orientation that will prepare students for synthesizing the material that comprises the Six Sigma body of knowledge. Important aspects of the Six Sigma approach include a strong focus on the customer, proactive management, fact-based decision-making, and interdisciplinary collaborations. The course objectives are: (1) to give students a fundamental understanding of and experience with solving a problem using the structured problem-solving approach of Define-Measure-Analyze-Improve-Control (DMAIC); (2) to provide an opportunity for students to solve or be involved with solving business problems with statistical tools; and (3) to help students build confidence in their business sense and statistical skills.

Prerequisite: I E 323

IE 468: Optimization Modeling and Methods (3 Credits)
Old Listing Effective Through Fall 2020:

Mathematical modeling of linear, integer, and nonlinear programming problems and computational methods for solving these classes of problems. I E 468 Optimization Modeling and Methods (3) This course provides an analytic treatment of optimization models in linear, integer, and nonlinear programming. In particular, the course is concerned with the development of mathematical optimization models and computational solution techniques for solving these problems. The mathematical modeling of real-world applications is complemented with the use of modeling software such as LINGO or GAMS (General Algebraic Modeling System), which allows the user to readily develop large-scale mathematical models. The course also considers solution techniques for solving these optimization problems. Students will develop a basic understanding of the solution techniques through actual implementation of simple algorithms, as well as the use of commercial software such as those provided by LINDO, LINGO, and GAMS.

Prerequisite: I E 405, MATH 231
Changes Effective Spring 2021:

• Prerequisites

IE 470: Manufacturing System Design and Analysis (3 Credits)
Old Listing Effective Through Fall 2020:

Contemporary design and analysis methodologies used to organize systems for economic manufacture of products. IE 470 Manufacturing System Design and Analysis is a senior level course in manufacturing, required for all the baccalaureate students in the Department of Industrial and Manufacturing Engineering. Students will be exposed to the contemporary techniques used to design and analyze manufacturing systems for economic manufacture of products. Students will learn to design manufacturing systems (human and automated) to satisfy differing types of product demand. Students taking this course should be familiar with introduction to manufacturing and product specifications and introduction to manufacturing process design and analysis.

Prerequisite: Prerequisite or concurrent: with manufacturing process elective

Changes Effective Spring 2021:

• Add Concurrents

INART 62: West African and African American Arts: from the 1960s to the present
Old Listing Effective Through Fall 2020:

An introduction to West African and African American Arts from the 1960s to the present. INART 062 West African and African American Arts: From the 1960’s to the Present (3) (GA;US;IL)(BA) This course meets the Bachelor of Arts degree requirements. This course focuses on the interrelationship and parallel development of arts in West Africa and the United States from the 1960s to the present. The cultural ties between the slave trading states of West Africa and the slaves and their descendants of the Americas, though weakened by over three centuries of separation, were never completely erased and the similar experiences of colonial oppression in Africa and slavery in America created expressions in art of remarkable similarity and correspondence. Although this comparable and often equivalent development in artistic expression on both sides of the Atlantic was, by and large, unrecognized and unacknowledged, the emergence of black nationalism in the 1960s reestablished the historic cultural associations between African and African American arts and created a remarkable artistic interchange that continues to the present day. The 1960s was a pivotal period for both African and African American art. The Civil Rights movement in the United States and the collapse of colonial rule in West Africa gave rise to a new sense of black identity for Africans and those of African descent and a new art that embodied and expressed that newfound identity. During the 1960s, the visual, performing, and literary arts of Africa and Black America celebrated their shared cultural heritage and found common use as instruments of political and social change. The sense of shared history and like experience on both continents influenced and informed black art in powerful ways and continues to motivate and inspire artists as they reflect and comment on their geographically separate, though spiritually linked, worlds. This course focuses on works of art drawn from many diverse traditions in both Africa and the United States and sets those works in the context of the social, political, and cultural movements that helped to create them. Examples of African and African American visual, performing, and literary arts will be examined, compared, and contrasted in order to gain insight into those works while serving as a vehicle for gaining a better understanding of the cultures that created them. INART 062 is a wholly online course that will be offered simultaneously by Penn State and Kwame Nkrumah University of Science and Technology in Ghana. This will allow students in Africa and the United States to participate as members of the same class in discussions and joint projects created on the World Wide Web. Grading will be based on participation in weekly online discussions, an objective mid-term and final, and the successful completion of a collaborative online project developed by students in both countries. INART 062 will be offered in the fall and spring semesters each year.

Changes Effective Spring 2021:

• Course Abbreviation
• Title
• Abbreviated Title
• Description

INART 110: The Dramatic Arts in the Mass Media (3 Credits) (BA)(GA)
Old Listing Effective Through Fall 2020:

The place of television-radio-film drama in our culture; relationship with other art forms; standards of evaluation. INART 110 Dramatic Arts in the Mass Media (3) (GA)(BA) This course meets the Bachelor of Arts degree requirements. INART 110 examines the history and development of the dramatic arts of the mass media with a particular focus on television as the strongest exemplar of media practice. The primary goal of the course is to help students develop a critical and analytical approach to dealing with the dramatic arts of the contemporary mass media. The course presupposes some familiarity with modern popular media and takes as its content both historical and contemporary examples as sources for analysis. While the class offers facts and data, the central focus of the course in the theory, stylistic elements, and structural workings of media content. The pedagogical goal of this approach is to examine not just what the mass media arts are but also where they come from, how they function, and what effects they have on our culture and society. The key to this goal is understanding the effects and influence of dramas in the mass media on our society and its beliefs and values. Class meetings consist of lectures and in-class discussions that illustrate modern critical approaches to popular culture and the terminology used in presenting critical arguments and ideological viewpoints on the dramatic arts of the mass media. Reading assignments will support classroom work by presenting students with a diversity of opinion on mass media and the influence of television dramas and comedies. Further, examples of historically significant radio and television dramatic works will be shown in class and then discussed in relation to the concepts and critical viewpoints covered in lectures. In addition to regular scheduled classes, students will participate in an on-line Television Journal that requires watching and critically responding to assigned television programs. Each week, students will be required to watch and critically respond to assigned television programs. Their critical responses will be posted on the online Television Journal and made available to all members of the class. Grades will be based on three equally weighted objective examinations that will account for 75% of the semester grade. The remaining 25% of the grade will be determined by participation in the online Television Journal.

Changes Effective Spring 2021:

• Add General Education Recertification
• Description
INART 220: Stand-Up Comedy: A Cultural History (3 Credits) (US) (GA)
Old Listing Effective Through Fall 2020:

An American cultural history from mid-19th through mid-20th Century as seen through the prism of stand-up comedy. INART 220 Stand-Up Comedy: A Cultural History (3) (GA;US;BA) This course meets the Bachelor of Arts degree requirements. Stand-up comedy, the art of making an audience laugh through primarily the spoken word, is a vital and revealing part of American cultural history. The best American comedians from Mark Twain and his sardonic monologues to Lenny Bruce and Richard Pryor’s unexpurgated free form rants not only entertained, but illuminated, challenged, reflected the times, and at their best influenced the culture for the better. This course, through rare uncensored video and audio clips, readings, and lecture, offers an American cultural history through the lens of stand-up comedy covering a span from the mid-19th through the 20th Century. Topics of consideration include the art of the joke and stand-up comedy performance, the evolution of American comedy genres and venues, the significant performers, the impact of technologies such as radio and television, as well as a variety of issues ranging from racism, ethnic, and gender stereotyping to freedom of speech and political and social change.

Prerequisite: sophomore standing

Changes Effective Spring 2021:

- General Education Recertification

IST 110: Information, People and Technology (3 Credits) (GS)
Old Listing Effective Through Fall 2020:

The use, analysis and design of information systems and technologies to organize, coordinate, and inform human enterprises. IST 110 Introduction to Information, People and Technology (3) (GS) Information, People and Technology presents the high points of an education in the College of Information Sciences and Technology. It opens an intellectual journey through the ideas and challenges that IT professionals face in the world. It will address major questions such as: How can we use technology to organize and integrate human enterprises? How can technology help people and organizations adapt rapidly and creatively? What can we do about information overload? Three perspectives (or facets) address the core issues: information or the basic science of data encoding, transmission and storage; people or the interactions among technologies, institutions, regulations and users; and technology or the design and operation of basic information technology devices. Students completing the course will be confident users and consumers of information technology. Students will develop research and analytical skills to evaluate specific devices and understand how those devices function in larger socio-technical systems. Students will be able to predict and anticipate the impact of new technologies on human institutions as well as understand the potential impact of institutions on the use and design of information technologies. The course employs an action-oriented approach. Students learn by doing—formulating and solving problems drawn from professional contexts, detecting and recovering from errors related to technology use, and locating, reading and studying materials that support their analysis and problem-solving. Students will accomplish this by participating in team-based learning. The course provides students with the opportunity to use, modify, and evaluate software to search for, frame, and express ideas with fluency. A variety of mechanisms are used to assess student performance. These evaluation methods typically include exams, quizzes, homework assignments, group projects, and peer and self-assessments. IST 110 is the introductory course in IST, and, as such, serves as a prerequisite for 200-level (intermediate) IST courses. It is a required course for all majors and minors in IST, and meets requirements for a General Education or Bachelor of Arts Social Science (GS) course. The course is delivered with significant student interaction with technology. At University Park, it is offered in multiple sections (typically 40-60 students per section), in the Fall and Spring semesters. At other Penn State campuses, it would be offered in class sizes typically ranging between 20-50 students.

Changes Effective Spring 2021:

- Recertification
- Description

IST 237: Digital Entrepreneurship (3 Credits)
Old Listing Effective Through Fall 2020:

Introduction to foundational concepts for starting and operating digital business, including business models, funding, strategic, operational, structural, and cultural components. IST 237 Digital Entrepreneurship (3) The proliferation of new IT combined with the reach of the Web, Internet, and mobile devices is opening up new possibilities for individuals and companies to leverage IT to create new digital businesses. This course provides a broad overview of the role of entrepreneurial thinking and innovation in advancing IT-focused businesses. Students will examine how these skills can be leveraged to create new IT-driven businesses as well as to create competitive advantage for existing businesses via new IT products and services (i.e., intrapreneurship). This course provides a broad overview of the role of entrepreneurial thinking and innovation in advancing IT-focused businesses and familiarizes students with the processes and tools used to conceptualize and plan new innovative products and/or services that leverage IT as a core component of their business model. Students will be introduced to concepts, tools, and principles of business management including business strategy, finance, marketing, human resources, and leadership within the context of IT business models. This will be a very hands-on active class. Using problem-based learning (PBL) and a “flipped” classroom, students will spend time outside class learning key concepts and time inside class applying them. Students will have the opportunity to work in teams to practice skills related to identifying novel ideas, assessing market opportunities, defining customer segments, identifying key partners, and building IT-based business models. In addition to regular in-class hands-on activities, each student will be expected to contribute to a class blog.

Changes Effective Spring 2021:

- Description
- Add Prerequisite

IST 337: Technologies for Digital Entrepreneurs (3 Credits)
Old Listing Effective Through Fall 2020:

Introduction to the tools available to IT entrepreneurs considering starting-up or looking to develop new applications. IST 337 Technologies for Digital Entrepreneurs (3) This course introduces the student to the applications, technologies, and tools for entrepreneurs engaging in or considering engaging in a start-up or running a small-to-medium size business. Although there will be some consideration of product concept development and implementation, much of the course will be devoted to the tools and infrastructure need to support a start-up up a small-to-medium size business. These concepts and skills will also support entrepreneurs looking to develop new applications to open new market opportunities. This will be a very hands-on and active class that relies on
approaches such as problem-based learning (PBL), &ldquo;flipped&rdquo; classrooms, and learning by doing. Students will spend time outside class learning key concepts and time inside class applying them. Students will have the opportunity to implement applications of the back-end technologies in support of a start-up or small- or medium-sized enterprises.

**Changes Effective Spring 2021:**

- Description
- Add Prerequisite

**JST 60: Society and Cultures in Modern Israel (3 Credits) (IL) (GS)**

Old Listing Effective Through Fall 2020:

An introduction to the society and cultures of the State of Israel from 1948 to the present.

Cross-Listed Courses: ANTH 60 PLSC 60 SOC 60

**Changes Effective Spring 2021:**

- General Education Recertification
- Add GH Attribute
- Add Inter-Domain Attribute
- Number
- Description
- Cross-Listing

**JST 106: Mysticism and Kabbalah (3 Credits) (IL) (BA) (GH)**

Old Listing Effective Through Fall 2020:

A survey of the history, philosophy, and cultural impact of various mystical traditions in relation to world religions.

Cross-Listed Courses: RLST 106

**Changes Effective Spring 2021:**

- General Education Recertification

**JST 116: Jewish Great Books (3 Credits) (BA) (IL) (GH)**

Old Listing Effective Through Fall 2020:

Historical and cultural survey of key texts of the Jewish Tradition, from The Bible to the present. CMLIT (J ST) 116 Jewish Great Books (3) (GH;IL)(BA) This course meets the Bachelor of Arts degree requirements. This course will introduce students to the rich and diverse expanse of the Jewish tradition through a survey of that tradition's most important texts. Starting from the Bible, moving up through the contemporary world, and spanning the globe, the course will examine religious, cultural, folkloric, philosophical, national, and literary traditions, and attention will be paid to both breadth and depth; emphasizing the vast range and diversity of Jewish thought and writing; and examining the material. Students will learn methods and practices of textual, cultural, and historical criticism as they engage in analysis of Jewish textual traditions, of the relationship between representation and history, and of the productive interchanges between representation, history, and identity.

Cross Listing: CMLIT 116

**Changes Effective Spring 2021:**

- Recertification

**JST 131: Jewish Literature: An International Perspective (3 Credits) (BA) (IL) (US) (GH)**

Old Listing Effective Through Fall 2020:

Literature of the Jewish tradition in various cultures and contexts, such as Europe, Israel, Islamic countries, and the Americas. J ST 131 (CMLIT 110) Jewish Literature: An International Perspective (3) (GH;US;IL) (BA) This course meets the Bachelor of Arts degree requirements. CMLIT 110 (J ST 131) will provide an introduction to the multiple worlds of Jewish experience and the different literatures they continue to inspire. Jewish literary creativity has varied widely with the personal and communal experience of writers in many parts of the world, and in many different time periods. Readings usually range from the first Jewish literary text, the Hebrew Bible, to twentieth-century works, including writings about the Holocaust. The course typically includes units such as Jewish writing and culture in Eastern Europe, in the Americas, in Spain during the Middle Ages, and in Israel and the Middle East today. The material may be organized chronologically, thematically, or by regions or languages. Texts that critique or apparently suppress Jewish identity, as well as texts with representations of Jews by writers of other heritages, may be included for comparative purposes. We will include writings by Jewish authors who have written in languages usually associated with Jewish tradition (such as Hebrew and Yiddish) and in other languages (such as Spanish, Arabic, German, English, etc.). Topics discussed in the literature may focus on questions of Jewish identity and continuity, the situation of Jews as a minority people, the immigrant and diasporic experience, representations of the Holocaust, and the establishment of Israeli culture as a mixture of several traditions. We will question generalizations about the meaning of &quot;Jewish&quot; by showing the wide range of characteristics associated with Jewish literary productions, and the great diversity of depictions of Jews and Jewish lifestyles, in different times and places. In addition to our primary focus on literary texts, we may include examples of other cultural productions (film, music, the visual arts, philosophy, etc.). All offerings of the course include writing assignment and discussion in the evaluation methods. The syllabus often includes 2 or 3 midterm exams (with essay questions); a final exam, paper, or project; oral presentations; participation in online discussions. CMLIT 110 (J ST 131) counts towards the Comparative Literature major and the World Literature minor. No prior knowledge of Jewish tradition is required, and General Education students are welcome. This course also fulfills the General Education Humanities requirement, the Bachelor of Arts Humanities requirement, and the United States and International Cultures requirement.

Cross Listing: CMLIT 110

**Changes Effective Spring 2021:**

- Recertification
- Description

**JST 195: Genocide in Global perspectives: Twentieth Century and beyond (3 Credits) (IL) (BA)**

Old Listing Effective Through Fall 2020:

The history and memory of the Holocaust, the Armenian, Cambodian and other forms of genocide are often taught separately in different disciplines. This course will examine them together through the various ways different societies dealt with, experienced and understood these. Using the extensive literature on the history of genocide this course further suggests ways in which these tragic events affected and were
entangled by each other's. Specific content will vary according to individual instructor, but topics may include victim cultures, ethnic cleansing, trauma, human rights, dark tourism, memorials, architecture as well as the general impact of these tragedies on global politics, or the way the memories of the tragedies were entangled with the civil rights and other struggles in American and global history.

Cross-Listed Courses: HIST 195

Changes Effective Spring 2021:

- Cross-Listing

JST 401: Ancient Technologies and Socio-cultural History in the Ancient Levant (3 Credits) (IL) (BA)
Old Listing Effective Through Fall 2020:

Social and intellectual development in the Ancient Levant as they affected and were affected by technological development.

Prerequisite: RL ST 110

Changes Effective Spring 2021:

- Prerequisites

JST 405: Jews and Food (3 Credits) (IL)
Old Listing Effective Through Fall 2020:

Jewish laws, customs and attitudes with regard to food production, agricultural policy and eating from biblical to modern times. JST 405 / RLST 405 Jews and Food (3) (IL) This course examines Jewish laws, customs and attitudes with regard to food production, agricultural policy and eating from biblical to modern times. These tenets of the Jewish tradition presently underwrite modern movements concerned with land use and food sustainability, as well as ethical behaviors in food production. The goal of the course is to understand how Jewish tradition can inform and contribute to improvements in the modern food system. The starting point is the ancient world of the Israelites. Students will study agrarian interpretations of the Hebrew Bible as well as extra-biblical sources and archaeological data. The biblical attitudes toward food, eating, and agricultural practices are then traced into the post-biblical period and rabbinic periods. The course then jumps ahead to the present day, to shed light on a number of modern Jewish agricultural and food initiatives concerned with issues such as healthy land use, sustainability, and justice in food production and distribution. These movements proceed from various interpretations of Jewish law and custom, and illustrate how some modern Jewish attitudes toward food and eating are responsible for reimagining, and in some cases reinvigorating, biblical ideas and practices. At the conclusion of this course, students will be able to identify and understand the historical and theological significance of diet and eating practices of ancient Israelites and will understand the development of Jewish food laws and practices in the post-exilic and early rabbinic eras. Students will be able to evaluate the extent to which ancient Jewish thought has influenced modern Jewish attitudes and actions regarding food and social responsibility, and will be able to envision the ways in which Jewish tradition, both ancient and modern, can contribute to current progress and future improvement in our systems of food production, distribution and consumption. While a wide variety of derivative topics will be discussed, this course is particularly appropriate for students pursuing programs of study dealing with the biblical world, the development of early Judaism, Jewish ethics, and/or modern Jewish thought, as well as those studying agriculture and food systems who are interested in how Jewish tradition addresses these universal concerns.

Cross-Listed Courses: RLST 405

Prerequisite: J ST 010 or permission of the program

Changes Effective Spring 2021:

- Prerequisites

JST 411: Jewish Studies (3 Credits) (US) (IL) (BA)

Study of the life and thought of a particular period or movement in the history of Judaism.

Cross-Listed Courses: RLST 411

Prerequisite: 3 credits in religious studies

Changes Effective Spring 2021:

- Add Travel Component
- Prerequisites

JST 424: Monotheism and the Birth of the West (3 Credits) (H)
Old Listing Effective Through Fall 2020:

The birth of monotheism and its relation to social organization, the idea of individuality, and science. J ST (HIST/RL ST) 424H (PHIL 434H) Monotheism and the Birth of the West (3) Learn about the formation of Western culture, while learning to analyze the texts and other evidence about its formation from a critical, rather than naive, viewpoint. The idea of monotheism probably arose very early and was even briefly implemented as a state cultic policy in Egypt in the 14th century BCE. Why, then, did it take another seven centuries to become widespread—appearing in ancient Judah, Babylon, and Ionia almost simultaneously? To answer this question, the course focuses on several developments, through the medium of primary texts and archaeology: the shift from a state hinterland based in extensive agriculture and household processing to one organized for intensive agriculture and industrial processing; the rise of recognizable modern science; the promotion of individuation and an international elite culture in the context of Assyrian and Babylonian imperial ambitions; the development of the historical and archaeological arts in the context of archaizing in order to reinvent local traditions; and the socialization of monotheism and of democracy. Students will be evaluated on their discussion of the textual evidence as well as on reports in class and a final paper. This is the sole honors course treating the birth of the West. It expands on knowledge acquired in courses listed as prerequisites and in CAMS/J ST/RL ST 012; CAMS 044; ANTH/CAMS 133; CAMS/PHIL 200; HIST 100; HIST/J ST 102; and PHIL 200 and enriches the student experience in CAMS 400, CAMS 440, and CAMS 480; HIST 402; J ST 411; PHIL 437, PHIL 453, and PHIL 461. This course counts toward the major in Jewish Studies, History, and Religious Studies and toward the minor in Jewish Studies and Religious Studies. This course will be offered once every other year with 35 seats per offering.

Prerequisite: J ST 004, J ST 102, J ST 110, or J ST 120

Changes Effective Spring 2021:

- Prerequisites
JST 457: Jewish Communities: Identity, Survival, and Transformation in Unexpected Places (3 Credits) (US) (IL)
Old Listing Effective Through Fall 2020:

Examines the global array of smaller Jewish communities that have flourished outside the main urban centers of Jewish settlement. JST 457 / ANTH 457 / SOC 457 Jewish Communities: Identity, Survival, and Transformation in Unexpected Places (3 US;IL) This course addresses an understudied aspect of Jewish experience. It aims to expand our understanding of Jewish communities by focusing on those that are, alternatively, small, situated in out-of-the-way places, culturally outside the Jewish urban mainstream, or embedded in a larger society with markedly different values and traditions. These communities often constitute the points-of-contact between Jews and non-Jews, and in so doing sometimes transform Jews, non-Jews, and the relationships among them. Other such communities constitute experiments in Jewish lifeways and provide mainstream Jews with pilot projects for potential social and cultural change. This course will explore the significance of small, little-known, idiosyncratic, and anomalous Jewish communities on Jewish history and culture, and draw on them to instruct students on the social and cultural processes of small or unusual communities generally. The communities studied will be located both in the U.S. and elsewhere in which Jews have lived as a minority community during modern times. The course will look at the founding, growth, and decline of such communities and at their social processes and institutions. It will explore how to understand and analyze such communities, which vary from one part of the world to another. The social world of Jewish communities, large and small, is a core interest of Penn State’s Jewish Studies Program. This course will complement the current offerings in Jewish Studies, strengthening the social, cultural, and contemporary perspectives available in the Program. It will provide students with an opportunity to explore individual experience and micro-level processes among Jews, and to study the dynamics of identity and survival. It will complement the current offerings in Sociology and Anthropology by affording an opportunity to focus on community-level social processes and by adding a course on contemporary Jewry. The course will integrate knowledge from a variety of sources and fields, promote intercultural understanding, and meet US and IL requirements. Materials will be interdisciplinary, and will include ethnographies, sociological studies, population studies, histories, and personal narratives. They will include primary texts, creative works, and scholarly analyses. The assignments will be structured to facilitate preliminary experience in independent analysis, library research, or field research. The course will be offered approximately once a year. Enrollment will be limited to 30 students in order to promote active, engaged learning. Evaluations will be based on short papers and outlines that will prepare students for their final, term papers.

Cross-Listed Courses: ANTH 457 SOC 457

Prerequisite: ANTH 001 or ANTH 045, HEBR 010, J ST 010, SOC 001, SOC 005, SOC 007, SOC 015

Changes Effective Spring 2021:
• Prerequisites

JST 474: Hiroshima & the Holocaust in History and Memory (3 Credits) (IL)
Old Listing Effective Through Fall 2020:

The history and memory of the Holocaust and Hiroshima and Nagasaki are often taught separately in different disciplines. This course will examine them together through the various ways different societies remembered, understood and commemorated these. Using the extensive literature on the history of memory, this course further suggests ways in which these memories and histories affected and were entangled by each other. Specific content will vary according to individual instructor, but topics may include victim cultures, cold war nuclear history, trauma, human rights, dark tourism, memorials, architecture as well as the general impact of these tragedies on the fraught politics of memory in East Asia and the Middle East, or the way the memories of the tragedies were entangled with the civil rights and other struggles in American and global history.

Cross-Listed Courses: ASIA 457 HIST 457

Prerequisite: HIST 457, JST 474

Changes HIST 457, JST 474

Changes Effective Spring 2021:
• Prerequisites

KINES 20: Modern Dance (1.5 Credits)
Old Listing Effective Through Fall 2020:

A course designed to teach the basic skills of modern dance and to develop a further appreciation of modern dance.

Changes Effective Spring 2021:
• Add GHW Attribute
• Description

KINES 56: Introduction to Martial Arts (1.5 Credits) (GHA)
Old Listing Effective Through Fall 2020:

A course designed to give students an introduction to martial arts, and the use of martial arts for lifelong fitness. KINES 056 Introduction to Martial Arts (1.5) (GHA) Martial arts have been practiced for centuries as a method of integrating mind, body, and spiritual well-being. While improving physical fitness and emotional health, martial arts have been the cornerstone of unarmed self-defense throughout the ages. Martial arts training can be performed at any level across all ages. If done properly, martial arts training will promote comprehensive wellness while developing important lifelong motor skills. For many, the emotional and psychological benefits of martial arts training will be as rewarding as the physical improvements experienced. Kinesiology 056 will introduce the student to the historical development and significance of the martial arts. Students will first learn supportive activities such as meditation and yoga, which will be used to optimally prepare the mind and body, respectively, for martial arts training. Once the students are mentally and physically prepared to begin training, they will begin to learn the traditional martial art Karate. After several weeks of training, the students will then begin to study the relatively newer and more passive martial art Aikido. Ample time will be devoted to allow students to acquire an appreciation of and basic skill of both Karate and Aikido. In addition, students will learn proper “dojo” etiquette which will allow them to comfortably enter and train in any traditional martial arts dojo. Throughout the semester, students will improve in physical fitness and learn how martial arts such as Karate and Aikido contribute to improved fitness and overall wellness. The basic principles of organizing, planning, and implementing a physical fitness program will be taught using martial arts training as a method of exercise. The fitness principles learned in class can be applied to any form of activity the student chooses. At the end of the course, the students will be invited to explore their personal health and fitness goals and how martial arts training may be incorporated into their lifelong fitness plan. Although the concept of “self-defense” will not be stressed...
in this class, some introduction to self-defense will be given, and it is likely that by the end of the course students will feel more physically confident in their ability to avoid and deal with conflict situations. Various evaluation techniques will be used to assess individual progress in Kinesiology 056. These techniques will include (but are not limited to) conventional objective testing, skill testing, and writing assignments.

**Changes Effective Spring 2021:**

- General Education Recertification
- Description

**KINES 57: Personal Defense (1.5 Credits) (GHA)**

A course designed to give students an understanding of and a proficiency in martial arts and self-defense. KINES 057 Personal Defense (1.5) (GHA) The term “martial art” is used in western idiom to describe a wide variety of Asian self defense systems. Some of these combat systems evolved in civil settings as methods for physical development, personal self defense, and sport. Taekwondo is perhaps the best example today because of its role in the Olympic Games. This unarmed method evolved in Korea and it can be traced back to the koguryo dynasty, founded 2000 years ago through the study of the ancient Korea and its history. While improving physical fitness and emotional health, martial arts have been the cornerstone of unarmed self defense throughout the ages. Martial arts training can be performed at any level across all ages. If done properly, martial arts training will promote comprehensive wellness while developing important life-long motor skills. For many, the emotional and psychological benefits of martial arts training will be as rewarding as the physical improvements experienced. KINES 057 introduces the student to the historical development and significance of the martial arts. Students first learn supportive activities such as relaxation and breathing techniques, which will be used to optimally prepare the mind and body, respectively, for martial arts training. Students start applying mental discipline into the acquired techniques as soon as they learn it and practice it throughout the semester. Throughout the semester students improve in physical fitness and learn how personal self defense, such as taekwondo and Aikijujitsu, contribute to improved fitness and overall wellness. The basic principles of organizing, planning and implementing a physical fitness program will be taught using martial arts training as a method of exercise. The fitness principles learned in class can be applied to any form of activity the students chooses. At the end of the course the student will be invited to explore their personal health and fitness goals and how martial arts training may be incorporated into their lifelong fitness plan. It is likely that by the end of the course students will feel more physically and mentally confident in their ability to avoid and deal with conflict situations. Various evaluation techniques will be used in KINES 057. The techniques will include (but are not limited to) conventional objective testing, skill testing, journaling and other writing assignments. The department plans to offer up to three sections of this course every fall and spring semester with a maximum enrollment of 30 students per section.

**Changes Effective Spring 2021:**

- General Education Recertification
- Description

**KINES 295B: Careers/Observations in Kinesiology**

KINES 295B (1 credit) is a required course for students in the Movement Science Option of the Kinesiology curriculum. It is the first of three practicum courses that exposes students to general and specific career information, an observational experience, research and professionals in Kinesiology related fields of studies. Course Objectives: By the end of the course, students should: 1. Develop a basic understanding of career exploration as a lifelong process. 2. Develop an understanding of the availability of career opportunities that can be achieved with an educational background in Kinesiology. 3. Be exposed to research in the Kinesiology discipline. 4. Be exposed to professionals in the Kinesiology field. 5. Learn about and have the opportunity to practice being a professional.

Prerequisites: Enforced Prerequisite at Enrollment: 3rd Semester Standing

**Changes Effective Spring 2021:**

- Title
- Abbreviated Title
- Description
- Enforced Prerequisites

**KINES 358: Ergogenic Aids**

Skills development including research identification and evaluation of work-enhancing methods and devices as related to human performance and wellness. KINES 358 KINES 358 Ergogenic Aids (1) In this course students will learn about the research identification and evaluation of work-enhancing methods and devices as they relate to human performance and wellness. The course will overview historical and ethical issues associated with the use of ergogenic aids, as well as the mechanisms that delineate how they affect body systems. Ergogenic aids will be classified as hormonal, pharmacological, psychological, physiological, mechanical and nutritional. In the course students will also look at various restorative and accelerate healing agents. As a consequence of this course students, will be able to identify specific ergogenic aids, their actions, their legality, advantages, disadvantages, and safety concerns. Students will also understand the research issues involved with ergogenic aids, as well as developing a philosophy for dealing with clients who approach them interested in these kinds of enhancements. Student learning will be evaluated by exams, by the preparation of a mock experiment, and by various written assignments. This course will take an in-depth look at an important area reviewed only superficially in other courses. Because of the topic’s relevance to work in this field, this course gives students knowledge necessary to function effectively as a professional. No special facilities are needed to teach the course and it will be offered annually to approximately 15-25 students.

Prerequisites: Enforced Prerequisite at Enrollment: BIOL 141 and NUTR 251

**Changes Effective Spring 2021:**

- Description
- Enforced Prerequisites

**KINES 401: Applied Group Fitness Exercise Prescription and Program Design (3 Credits: Maximum of 3 Credits)**

Skills and practical knowledge to design safe and effective exercise classes for a variety of populations to improve health. The primary purpose of this course is to provide students interested in applied exercise and health careers (group fitness instructors, health and...
physical education teachers, personal trainers, wellness professionals, corporate fitness professionals, physical therapists) with skills and practical knowledge to design as well as instruct safe and effective exercise classes for a variety of populations to improve cardiovascular health, strength, and flexibility. Students will learn how to prepare for a class, which includes participant monitoring as well as evaluation and progresses to developing the skills for both programming as well as leading group exercise classes. Students will gather and apply the current literature regarding the ideal training strategies and practical tips for both healthy adults as well as special populations (i.e. asthma, obesity, youth, pregnancy, older adults). They will also learn how to verbally and physically cue and demonstrate the exercises to a group. Strategies for adherence to assist in behavior modification will be a focus throughout the course. At the conclusion of KINES 401, the students will be able to demonstrate a knowledge and understanding of group fitness class components. Inherent in the course goals is an understanding of the adaptations that occur as a result of programs of cardiorespiratory and muscular exercise in apparently healthy, at-risk, and diseased populations. Content knowledge is integrated with application of skills in fitness exercise, and instruction and will be put to use in a learning laboratory setting which students will have the opportunity to engage in hands-on instructional experiences.

Prerequisites: Enforced Prerequisite at Enrollment: KINES 367 and KINES 368

Changes Effective Spring 2021:

• Add Concurrents

KINES 425W: Physical Activity in Diverse Populations (3 Credits)
(WF) (US)
Old Listing Effective Through Fall 2020:

An examination of the social, cultural, political, and environmental influences on health and physical activity promotion among diverse populations. Includes examination of issues related to race, ethnicity, geography, income status, and other social factors across the lifespan for promoting physical activity through public health strategies.

Prerequisites: Enforced Prerequisite at Enrollment: KINES 321

Changes Effective Spring 2021:

• Abbreviated Title
• Description
• Prerequisites

KINES 426: Physical Activity and Public Health (3 Credits)
Old Listing Effective Through Fall 2020:

Examines the role of physical activity in public health. Includes population level strategies for promoting physical activity in communities. KINES 426 Physical Activity and Public Health (3) An examination of the role of physical activity in public health. The first half of the course will provide an introduction to public health and basic epidemiology, measurement, dose-response relationships, chronic disease prevention. We will examine the historical progression of physical activity as a part of public health, including landmark studies showing the relationships between physical activity and chronic disease morbidity and mortality. Current public health guidelines and national policies related to physical activity will be discussed in detail. Students will debate the scientific foundation for current issues in the field, including fitness vs. fatness as a predictor of health outcomes and comparing behavior vs. objectively measured variables. The role of physical activity in preventing cardiovascular disease, type 2 diabetes, obesity, and cancer, colon and prostate cancer will be discussed. We will focus on large scale epidemiologic studies that highlight prevention. The second half of the class will focus on a social ecological framework for promoting physical activity and will address population level approaches through policy and environmental strategies, following the Centers for Disease Control and Prevention Task Force for Community Preventive Services guidelines. We will study how features of the built environment can encourage or discourage walking and biking and refer to current research in the field that examines these relationships in different populations (urban/rural, youth/older adults). We will learn about the challenges associated with assessment and measurement at a population level. Policy level approaches to physical activity promotion; including local, state and national; will also be discussed. We will discuss various community level approaches including: point-of-decision prompts, mass media campaigns, enhancing access to physical activity opportunities and other strategies outlined in the guidelines. Lastly, we will examine how physical activity promotion is addressed in other countries through community, policy and environmental strategies in Canada, Australia, Brazil and throughout Europe.

Prerequisites: Enforced Prerequisite at Enrollment: KINES 321

Changes Effective Spring 2021:

• Description
• Prerequisites

KINES 460: Movement Disorders
Old Listing Effective Through Fall 2020:

Major peripheral and central movement disorders and methods of their treatment.

Prerequisites: Enforced Prerequisite at Enrollment: KINES 360 and KINES 384

Changes Effective Spring 2021:

• Description
• Enforced Prerequisites

KINES 488: Mechanics of Locomotion (3 Credits)
Old Listing Effective Through Fall 2020:

This course examines the forces and motions characteristic of locomotion, with emphasis on walking, the most common human activity. Walking has been described as the most commonly performed human activity. Diseases or injuries that reduce the ability to walk independently and efficiently are especially likely to adversely affect quality of life. KINES 488 introduces students to the elements of normal walking and how walking motions are affected by changes in age, walking speed, and pathological conditions. Advanced topics covered in this course include other forms of locomotion, including running and cycling, and the use of mathematical models to understand phenomena related to locomotion. Students enrolled in this course learn the particulars of human locomotion, but in so doing they also gain an understanding of kinematics and kinetic analysis, joint mechanics, and the clinical treatment of movement disorders. Basic principles of mechanics are applied to establish how walking motions result from forces produced by muscles, gravity, and contact with the ground. Students planning to pursue graduate study in movement biomechanics or in clinical areas such as physical therapy are especially likely to benefit from
the focus on these areas. Laboratories introduce students to current experimental methods used to measure motions, forces, and muscle activity during locomotion. Completion of several case studies during the semester gives students practical experience with the interpretation of motion analysis data, the factors that influence clinical decisions in the treatment of movement disorders, and ethical considerations in biomechanics research.

Prerequisites: Enforced Prerequisite at Enrollment: KINES 101 AND KINES 202

Changes Effective Spring 2021:

• Prerequisites

KINES 492W: Programming for Business and Agencies (3 Credits) (WF)
Old Listing Effective Through Fall 2020:

Fundamentals of program development applied to corporate and private physical fitness businesses. KINES 492W Programming for Business and Agencies (3) This course will use an experiential approach to acquire knowledge and skills necessary to assess, plan, implement and evaluate health/wellness/fitness programs within a business/corporate setting. Students will actively participate in a process-oriented, student-centered learning environment that includes cooperative learning, critical thinking, effective communication, assessment, and problem solving. Students will assess, plan, implement and evaluate a health-related program (i.e., wellness fair, career fair, road race, fitness programs). Students will write business letters, operating plans, mini-grants, budgets, flyers, press releases, newspaper articles, surveys, and other written communication projects relevant to the fitness/wellness business. Students will access and evaluate health/wellness resources (i.e., agencies, Internet, media, speakers). This is a writing intensive course and will follow university guidelines for such courses. Most of the assignments will involve group-based problem solving. This course is offered Spring Semesters with a maximum enrollment of 35.

Prerequisites: Enforced Prerequisite at Enrollment: KINES 395B

Changes Effective Spring 2021:

• Description
• Prerequisites

LDT 467: Emerging Web Technologies and Learning (3 Credits)
Old Listing Effective Through Fall 2020:

This course examines emerging Web technologies and explores their application to learning and education.

Prerequisite: sixth semester standing

Changes Effective Spring 2021:

• Prerequisites

LER 409: Leadership Development: A Life-Long Learning Perspective (3 Credits) (BA)
Old Listing Effective Through Fall 2020:

The course examines the continuing influence of social and environmental factors in shaping leadership and leadership development. LER (OLEAD) 409 Leadership Development: A Life-Long Learning Perspective (3)(BA) This course meets the Bachelor of Arts degree requirements. Current social conditions, such as financial crises, ineffective solutions to local, national, and international problems and corrupt leaders, call for more effective and ethical leadership on a broad scale. The positive and moral transformation of social institutions requires active participation and leadership of more authentic transformational leaders. This course will discuss authentic transformational leadership development from a life span developmental perspective. More specifically, it will focus on how an individual develops his/her leadership skills, potential, and capacity in his/her childhood, school, social organizations, colleges, and work organizations. The primary purpose of this course is to help students understand how family, educational, and other environmental factors have helped and/or will help them develop their transformational leadership potential and leadership effectiveness, in addition to gaining a better understanding of their strengths and weaknesses in respect to personality, individual difference, motivation, values, emotions, self-awareness, and identity. The fundamental objectives of this course are to help students 1) increase self-awareness; 2) to help students to know more about their sense of self, including self-identity, self-awareness, self-efficacy, and other types of self-concepts; 3) to understand the effect of life span influences in an individual’s leadership development.

Prerequisite: 6th semester standing

Changes Effective Spring 2021:

• Add Cross listing
• Prerequisites

LER 475: Labor in the Global Economy: U.S. and South African Perspectives (3 Credits: Maximum of 3 Credits) (H)
Old Listing Effective Through Fall 2020:

This course focuses on how the nature of work is changing in the global economy, and the implications for economic opportunity and inequality in both. LER (GEOG) 475H Labor in the Global Economy: U.S. and South African Perspectives (3) This seminar focuses on how the nature of work is changing in the “new economy” and the implications for economic opportunity and inequality in both the United States and South Africa. Sections of the course examine: theoretical approaches to understanding contemporary process of labor restructuring, including globalization, rise of an information economy, and growth in service sector employment; case studies of restructuring processes in different industrial sectors in both the U.S. and South Africa; and innovative labor organizing initiatives at a local, regional and global scale. This course aims to develop a framework for understanding the nature of contemporary processes of economic restructuring and its impact on the world of work. Drawing on research in both a South African and U.S. context, key case studies in the changing nature of work will be examined. This will provide a deeper understanding of how broad macro-level changes in the nature of contemporary capitalism are mediated by a variety of technological, political, and socio-economic factors in particular industries and geographic contexts. Finally, an in-depth look at workers’ responses to these changes at different scales (local, regional, global) will help deepen our understanding of the contested nature of workplace restructuring while exploring promising strategies for improving working conditions. This is a reading-intensive course dealing with the theoretical literature on rapid economic restructuring and how this is shaping work and employment. It is run in collaboration with the Sociology of Work Program at the University of Witwatersrand in Johannesburg, South Africa, with video-conference discussions linking the two courses.
Prerequisite: a minimum of 12 GEOG or LER credits before taking the course (or permission of the program)

Changes Effective Spring 2021:

- Number
- Long Title
- Description
- Prerequisite

LTNST 100: Introduction to Latina/o Studies (3 Credits) (BA) (US)

Old Listing Effective Through Fall 2020:

This course provides an interdisciplinary introduction to the study of Latinas/os in the U.S. LTNST 100 Introduction to Latina/o Studies (3) (GH;US)(BA) This course meets the Bachelor of Arts degree requirements. This course provides an interdisciplinary introduction to the study of Latinas/os in the U.S. It begins with a historical overview of the major events in the U.S. southwest, Mexico, and the Caribbean that led to the creation of Latina/o communities in this country; we explore in this historical context the reasons for migration and the effects on identity of movement between countries and within the U.S. The course then moves to a consideration of the social protest movements of the 1960s, including Chicano and Puerto Rican nationalism, the farmworker movement, and Latina feminism. It then proceeds to present-day issues as they affect the major Latina/o groups in the U.S., attending to both similarities and differences within and between the major groups. The goal is to show that "Latino" is not a monolithic category but that it does unite various populations (Chicano, Dominican, Cuban, Puerto Rican, etc.) for strategic purposes. The class addresses Latina/o participation/incorporation in the economy, the political system and public education, with attention to how public sphere participation is shaped by language, legal status, and connection to countries of origin. The class analyzes how Latina/o families are shaped by these social issues, with particular emphasis to how generation shapes life experiences. Finally, the course considers Latina/o cultural production, analyzing how artists across genres such as literature, film, performance, and music represent their cultures and respond creatively to the issues discussed throughout the semester.

Changes Effective Spring 2021:

- Recertification
- Abbreviated Title
- Title
- Description

MATH 81: Technical Mathematics I (3 Credits) (BA) (GQ)

Old Listing Effective Through Fall 2020:

Algebraic expressions, equations, systems of equations, trigonometric functions, graphs, solution of triangles, vectors.

Prerequisite: MATH 4 or satisfactory performance on the mathematics placement examination

Changes Effective Spring 2021:

- Add General Education Recertification
- Description

MATH 82: Technical Mathematics II (3 Credits) (BA) (GQ)

Old Listing Effective Through Fall 2020:

Exponents, radicals, complex numbers, theory of equations, inequalities, half angle and double angle formulas, inverse trigonometric functions, exponential, logarithm, conic sections.

Prerequisite: MATH 81

Changes Effective Spring 2021:

- Add General Education Recertification
- Description

MATH 83: Technical Calculus (4 Credits) (BA) (GQ)

Old Listing Effective Through Fall 2020:

Limits, derivatives of algebraic functions, implicit differentiation, related rates, applied extrema problems, curve sketching, integration, numerical integration, applications of integration, integration techniques, differential equations.

Prerequisites: MATH 82

Changes Effective Spring 2021:

- Add General Education Recertification
- Description
- Prerequisite

MCHT 111: Mechanics for Technology: Statics (3 Credits)

Old Listing Effective Through Fall 2020:

Forces; moments; resultants; two- and three-dimensional equilibrium of force systems; friction; centroids and moments of inertia of areas. MCH T 111 Mechanics for Technology Statics (3)MCH T 111 will provide practical and compressive coverage of elementary statics. In addition to the theoretical approach, the course will demonstrate the practical applications of statics concepts. Students entering this course should have basic knowledge of algebra as well as geometry and trigonometry. Course will introduce the definition of scalar and vector quantities. This will be followed by vector addition, vector subtraction, resolution of vectors, addition of systems of coplanar forces, rectangular components of a vector, etc. Course will also introduce the concept of moments and couples. This will be followed by introducing free-body diagrams as a tool for solving statics problems. Emphasis will be placed on equations of equilibrium for particles and rigid bodies. Students will be exposed to 2D and 3D equilibrium. Course will put emphasis on truss and frame analysis as well as pulleys. Distributed loads will also be discussed. Course will also introduce the concept of friction, angle of friction, wedges, etc. Belt friction and rolling resistance as well as friction in bearings will also be discussed. Course will also introduce the concept of centroids, center of gravity, and moment of inertia of an area. Emphasis will be put on calculating centroidal moment of inertia of composite areas. Polar moment of inertia and mass of moment of inertia will also be introduced. Student will learn not only problem solving strategy but also develop ability to present results in clear manner.

Prerequisite: MATH 26 or MATH 81

Changes Effective Spring 2021:

- Course Abbreviation to MET
MCHT 112: Statics Laboratory (1 Credit)
Old Listing Effective Through Fall 2020:

Laboratory experimentation associated with basic engineering mechanics principles and concepts including forces, moments, equilibrium, trusses, frames, friction, and centroids. MCH T 112 Statics Laboratory (1)MCH T 112 facilitates the basic understanding of certain principles and concepts of elementary engineering mechanics. The course provides the hands-on experience essential to learn the fundamental engineering mechanics topics including forces, moments, equilibrium, frames, trusses, friction, and centroids. Laboratory experiments will be supported by lectures presented in MCH T 111 (taken concurrently), demonstrations, and associated computer software utilization.

Prerequisite: MATH 26 or MATH 81; Concurrent: MCHT 111

Changes Effective Spring 2021:
- Course Abbreviation to MET

MCHT 213: Strength and Properties of Materials (3 Credits)
Old Listing Effective Through Fall 2020:

Axial stress and strain; shear; torsion; beam stresses and deflections; combined axial and bending stresses; columns, ductility, resilience, and toughness. MCH T 213 Strength and Properties of Materials (3)MCH T 213 includes analysis and computations of axial stress and strain, shear and bearing stress; stress-strain diagrams, mechanical properties of materials including yield strength, ultimate strength, modulus of elasticity, percent elongation, poisson’s ratio; stress concentration, axial deformations, statically-indeterminate axially loaded members, thermal stress and strain; torsion analysis including shear stress, angle of twist, power, rotational speed; beam bending analysis including shear force and bending moment diagrams, flexure stress, beam shear stress, , beam deflections; combined axial and bending stresses; columns.

Prerequisite: MCHT 111, MATH 26 or MATH 81

Changes Effective Spring 2021:
- Course Abbreviation to MET

MCHT 214: Strength and Properties of Materials Laboratory (1 Credit)
Old Listing Effective Through Fall 2020:

Measurement of mechanical properties of materials; structural testing, data acquisition and analysis; technical laboratory report writing.

Prerequisite or CONCURRENT: MCHT 213 or EMET 222

Changes Effective Spring 2021:
- Course Abbreviation to MET

ME 300: Engineering Thermodynamics I (3 Credits)
Old Listing Effective Through Fall 2020:

Basic thermodynamics concepts, properties of pure substances, first and second law analysis of systems and control volumes. M E 300 Engineering Thermodynamics I (3) This course is designed to develop an understanding of thermodynamic concepts and their application for the student by providing an integrative modeling and analysis approach to thermal-fluids systems. The course emphasizes the integration and application of fundamental principles of mass and energy conservation and fundamental ideal gas and non-ideal working fluids concepts to fundamental engineering systems. These systems include basic spark-ignition engines and turbojet engines as well as basic and extended Rankine and refrigeration cycles. Emphasis is on creating engineering models of these systems and indicating how the idealized versions of these systems can be extended to more realistic descriptions. Besides these mass and energy conservation concepts the course introduces the basic concepts of heat transfer and mass flow, providing a foundation in these subjects to be further expanded in later courses. The course aims to develop knowledge and initiate skills for "thinking like an engineer."

Prerequisite or Concurrent: CHEM 110, Concurrent: MATH 141

Changes Effective Spring 2021:
- Enforced Prerequisite
- Enforced Concurrent

ME 315: Heat Transfer Laboratory (1 Credit)
Old Listing Effective Through Fall 2020:

This one-credit laboratory course is structured to reinforce the various principles taught in the corresponding 3-credit lecture course – ME 410, Heat Transfer. The laboratory includes several different experiments whose objective is to reintroduce and reinforce the various principles associated with conduction, convection, radiation and heat exchangers. Each laboratory session begins with a thorough review of the relevant material covered in the lecture course, including the use of energy conservation on control volumes related to the experiment and related simplifications. Prior to conducting any experiment, the students are informed about the particular safety issues that vary from one experiment to another. The students are then briefed about the setup of the data acquisition systems, what type of data the need to be collected, and how the data then is coupled to the review of the specific laboratory topic. At the end of the semester, the students should be able to interface a typical data acquisition system with those used in industry and elsewhere. The students generally work in groups to collect data, with reports prepared individually after an experiment is completed.

Prerequisites: ME 320. Prerequisite or Concurrent: ME 345, ME 410

Changes Effective Spring 2021:
- Remove Prerequisite
- Enforced Prerequisite or Concurrent

ME 320: Fluid Flow (3 Credits)
Old Listing Effective Through Fall 2020:

This course is an introduction to fluid mechanics, and emphasizes fundamental concepts and problem-solving techniques. Topics to be covered include fluid properties (density, viscosity, vapor pressure, surface tension); fluid statics (hydrostatic pressure, pressure forces on planar and curved surfaces); fluid kinematics (flow visualization, vorticity, Reynolds transport theorem); control volume analysis (conservation laws of mass, momentum, and energy, Bernoulli equation); dimensional analysis (dimensional homogeneity, method of repeating variables, experimental testing, similarity); internal flows (pipe flows, major and minor losses, piping networks, matching pumps to systems); differential analysis (Navier-Stokes equation, creeping flow, potential flow, boundary layers); external flows (lift and drag, pressure vs. friction drag); and compressible flow (isentropic flow through nozzles, shock waves). Brief
introductions to computational fluid dynamics (CFD), and turbomachinery (pumps and turbines) will also be provided.

Prerequisites: EMCH 212, MATH 251; ME 201 or ME 300; MATH 230 or MATH 231

Changes Effective Spring 2021:

• Prerequisite

ME 325: Fluids Laboratory (1 Credit)
Old Listing Effective Through Fall 2020:

The course is designed for students to understand basic concepts of fluid mechanics through analysis of experimental data from various sources. The course emphasizes hands-on experience to take measurements, analyze and interpret experimental data. An important component of this course fosters an ability to write laboratory reports and to creatively generate independent ideas that involve the study of fluid mechanics through development and execution of final project. The course aims to develop teamwork (no hyphen needed, this is one word) skills and advanced proficiency in professional communications and interactions.

Prerequisites: ME 320, ME 345

Changes Effective Spring 2021:

• Prerequisite

ME 330: Computational Tools (3 Credits)
Old Listing Effective Through Fall 2020:

This course gives students physical insights as well as introductory skills on the use of modern computational tools in solving mechanical engineering problems. The course has two main thrusts: 1) finite element analysis for structural/thermal mechanics and 2) computational fluid dynamics for fluid flows. Students will use commercial codes to solve fundamental problems associated with statics, dynamics, mechanics of materials, heat transfer, and fluid dynamics. Particular emphasis will be placed on comparing simulation results to analytical solutions. Students will also use the computational tools to parametrically study the solution space that enable informed design strategies. This class will prepare mechanical engineering students to solve technical problems in their courses, summer internships, and ultimately in their engineering career.

Prerequisites: EMCH 212, EMCH 213, MATH 251, PHYS 212

Changes Effective Spring 2021:

• Enforced Prerequisite

ME 340: Mechanical Engineering Design Methodology (3 Credits)
Old Listing Effective Through Fall 2020:

The design process; problem definition, conceptual design, system design, detail design, evaluation and test, implementation, documentation and communication. M E 340 Mechanical Engineering Design Methodology (3) This course is intended to provide mechanical engineering students with the fundamental tools to produce an effective design solution in a realistic professional environment with conflicting customer needs and technical capabilities. The students will identify the system design targets through interaction with the “customer”, develop multiple conceptual designs, select the best design solution and produce a functional prototype. The course is project driven with significant input from the students in defining the work objectives and goals. Initially several mini-projects will be assigned with specific objectives such as identifying customer needs, quantifying technical design specifications and decision making. The course culminates with a student team based design competition. The competition provides an opportunity to apply the design process to an open-ended mechanical engineering problem.

Prerequisites: EDSGN 100; Prerequisite or Concurrent: ME 320 or BME 409; ME 360

Changes Effective Spring 2021:

• Enforced Prerequisite

• Prerequisite or Concurrent

ME 345: Instrumentation, Measurements, and Statistics (4 Credits)
Old Listing Effective Through Fall 2020:

Fundamentals of statistics, sensors, instrumentation, and measurement of mechanical phenomena such as temperature, flow, pressure, force, stress, displacement, and acceleration. M E 345 Instrumentation, Measurements, and Statistics (4) This course is required for all mechanical engineering students, and is taken in the junior year. It serves as an introduction to the fundamental principles of instrumentation and measurement, along with statistics, and integrates and applies what the students have learned in their electrical engineering course. The course includes a 3-hour-per-week hands-on laboratory where students apply the material learned in the lecture. For many students this is the first time they have actual hands-on experience with electronics and measurement equipment, such as oscilloscopes, breadboards, function generators, digital data acquisition systems, integrated circuits strain gages, displacement meters, thermocouples, tachometers, dynamometers, filters, volume flow meters, velocity meters, pressure transducers, etc. Students learn not only how to use these devices in the lab, but also the fundamental principles of their operation. Statistical analysis is integrated into the course, especially in the hands-on laboratories, where statistics is used to analyze and interpret acquired data.

Prerequisites or Concurrent: EE 212 or EE 211 or equivalent

Changes Effective Spring 2021:

• Prerequisite

ME 348: Circuit Analysis, Instrumentation, and Statistics (4 Credits)
Old Listing Effective Through Fall 2020:

ME 348 Circuit Analysis, Instrumentation, and Statistics (4) This course is required for all mechanical engineering students, and is taken in the junior year. It serves as an introduction to the fundamental principles of circuit analysis, instrumentation and measurement, as well as statistics. The course includes a 3-hour-per-week, hands-on laboratory where students explore the concepts taught in the lecture. For many students this is the first time they have actual hands-on experience with electronics and measurement equipment, such as oscilloscopes, breadboards, function generators, digital data acquisition systems, integrated circuits strain gages, displacement meters, thermocouples, tachometers, dynamometers, filters, volume flow meters, velocity meters, pressure transducers, etc. Students learn not only how to use these devices in the lab, but also the fundamental principles of their operation. Statistical analysis is integrated into the course, especially in the hands-on laboratories, where statistics is used to analyze and interpret acquired data.

Prerequisites: MATH 251, PHYS 212
Changes Effective Spring 2021:

- Enforced Prerequisite

**ME 355: Dynamic Systems Laboratory (1 Credit)**  
Old Listing Effective Through Fall 2020:

Experimental investigation of simple position, velocity, and temperature control systems with analog and digital controllers. ME 355 Dynamic Systems Laboratory (1) The objective of the Dynamic Systems Laboratory is to enable students to experimentally investigate the calibration, response characteristics, modeling, and control of mechanical and fluid systems. This course is intended to allow students to develop some hands-on experience and working knowledge of basic dynamic and control systems. Specifically, to 1. Identify the actuators, sensors, plants, and controllers of physical control systems. 2. Calibrate encoders, temperature, laser displacement, and flow sensors. 3. Measure steady state, step, and frequency response of thermal, fluid, and mechanical systems. 4. Compare simulation and experimental results to validate theoretical model. 5. Design PID controllers for thermal, fluid, and mechanical systems. 6. Implement and test PID controllers for thermal, fluid, and mechanical systems.

Prerequisites: ME 345; Prerequisite or Concurrent: ME 450

Changes Effective Spring 2021:

- Enforced Prerequisite

**ME 360: Mechanical Design (3 Credits)**  
Old Listing Effective Through Fall 2020:

Specification of components such as shafts, bearings, and power transformers; optimal designs for operational, environmental, and manufacturing requirements. ME 360 Mechanical Design (3) This course is required for all mechanical engineering students, and is taken in the junior year. It is an introduction to analysis and design of mechanical components. It helps provide practical insight into theory provided by Prerequisites in engineering mechanics and materials science. Students initially perform yielding and fatigue failure predictions for general structural elements and then focus on specific mechanical components such as gears, fluid film bearing, rolling element bearings, screws, shafts and springs. Use and interpretation of finite element analyses (FEA) are also introduced. The overall goals are for students to learn to make basic design decisions regarding the suitability of different materials in mechanical components (e.g. steel versus aluminum); and to make basic design decisions regarding the suitability of different components in a mechanical system (e.g. ball bearings versus fluid film bearings).

Prerequisites: CMPSC 200, EMCH 213

Changes Effective Spring 2021:

- Prerequisite
- Concurrent

**ME 370: Vibration of Mechanical Systems (3 Credits)**  
Old Listing Effective Through Fall 2020:

Modeling and analysis of vibration characteristics of mechanical systems with single degree and multiple degrees of freedom. Vibration control by isolation, absorption and balancing. ME 370 Vibration of Mechanical Systems (3) The course studies vibration characteristics of mechanical systems and vibration control. It is divided into four main topics. Fundamental aspects of mechanical vibrations are studied first. Types and causes of various vibratory motions are described. The concepts of mathematical modeling of the vibratory systems are presented. Model elements including mass/inertia, spring and damper elements and their corresponding describing equations are studied. Single degree-of-freedom vibrations are modeled and analyzed. Equations describing free vibrations of undamped and damped systems are derived. Natural frequency and damping ratio are defined and their physical significance discussed. Harmonically excited vibrations are studied with many practical application problems; resonance and its physical significance are emphasized. The theoretical aspects of general periodic vibrations and non-periodic vibrations are formulated by means of Fourier analysis and convolution integral. Vibrations of multiple degrees-of-freedom systems are studied. Mathematical models governing free vibrations are formulated. Equations determining the natural frequencies and mode shapes of the system are derived with relation to eigenvalue problems. Harmonically excited vibrations are analyzed with practical applications. Vibration control in relation to engineering design is the last topic studied. Various vibration control concepts and techniques are presented including vibration isolation, vibration absorption and balancing to reduce the intensity of the source of excitation.

Prerequisite: EMCH 212, CMPSC 200, MATH 220, MATH 251

Changes Effective Spring 2021:

- Prerequisite

**ME 375: Vibrations Laboratory (1 Credit)**  
Old Listing Effective Through Fall 2020:

Experimental measurement and analysis of mechanical system dynamics. This laboratory course provides an opportunity to apply the fundamental vibrations theory taught in ME 370 to actual mechanical hardware. The experiments illustrate fundamental concepts from an experimental vibration perspective. Experimental vibration measurement methods are applied to estimate simplified dynamic models for vibrating mechanical systems. The students compare analytical to experimental results to gain a sense of the limitations of both modeling and experimentation. Experiments include: free vibration of linear and nonlinear systems, response, measurement of translational and rotational, forced harmonic vibration, spectral analysis of vibration signals, experimental data uncertainty and comparison of finite element model dynamic results to experimental data. Throughout the course the students will: 1. Plan, implement and debug instrumentation to measure vibrations of mechanical systems. 2. Implement experimental test systems using vibration transducers and data acquisition to maximize measurement quality. 3. Recognize the dominant behavior seen in many larger, more complicated engineering systems. 4. Estimate the system vibration parameters 5. Use software to compare measured and predicted dynamic behavior. 6. Recognize dominant nonlinear behavior and implement a nonlinear simulation using software. 7. Verify the results of computer analyses of dynamic systems by various methods including experimental measurement and analytical modeling.

Prerequisite or Concurrent: ME 370, ME 345

Changes Effective Spring 2021:

- Prerequisite or Concurrent

**ME 400: Thermodynamics of Propulsion and Power Systems (3 Credits)**  
Old Listing Effective Through Fall 2020:
Analysis and modeling of propulsion and power systems, including combustion, compressible flow through nozzles, chemical equilibrium, and moist air systems. M E 400 Thermodynamics of Propulsion and Power Systems (3) This course is specifically designed to take advantage of the senior level standing of the student by providing an integrative modeling and analysis approach to thermal-fluids systems. The course emphasizes the integration and application of fundamental principles of mass, momentum, and energy conservation to relatively complex systems. These systems include spark-ignition and diesel engines, gas-turbine engines for power production, and turbojet engines. The integration of the topics of combustion, compressible flow, and psychrometrics allow these systems to be analyzed in their totality. Emphasis is on creating engineering models of these systems. The course aims to integrate previous knowledge and develop skill in “thinking like an engineer.”

Prerequisite: ME 300 and ME 320; Prerequisite or Concurrent: ME 410

Changes Effective Spring 2021:

• Prerequisite or Concurrent

ME 403: Polymer Electrolyte Fuel Cell Engines (3 Credits)
Old Listing Effective Through Fall 2020:

Introduction to Fundamentals of Polymer Electrolyte Fuel Cells (PEFCs). Includes fundamentals of electrochemistry, thermodynamics, fluid mechanics, heat transfer materials, and manufacturing issues of PEFCs. A brief survey of other fuel cell types is also included. ME 403 Polymer Electrolyte Fuel Cell Engines (3) This course is intended for the engineering student interested in obtaining a fundamental background required for polymer electrolyte fuel cell (PEFC) modeling and diagnosis. Those students with interest in the basic design, operation, and characteristics of PEFC systems should also benefit. This course serves as an introduction to the fundamental principles of electrochemistry, thermodynamics, heat and mass transfer, materials and manufacturing issues related to PEFC engines. The various types of PEFC components and technologies are dissected in detail, including direct inject 3ernative fuel systems. A survey of cutting-edge issues in fuel cell technology including the future direction of PEFC technology will be presented as time permits. The student will also participate in an experimental lab study to aide in the understanding of these systems, a computer-based simulation project, and a group-based fuel cell system design project. Issues of specific interest to mechanical engineers, including water management and heat and mass transfer in thin film porous media, will be dealt with in depth. A brief survey of other fuel cell types is also presented.

Prerequisite: ME 300 Prerequisite or Concurrent: ME 320; Concurrent: ME 410 or equivalent

Changes Effective Spring 2021:

• Prerequisite or Concurrent

ME 404: Gas Turbines (3 Credits)
Old Listing Effective Through Fall 2020:

This course enables students with the proper background to gain specialized knowledge as a step towards becoming practitioners in the field of gas turbines. The information imparted covers from basic cycles to properties of materials required to put together these impressive machines. Competent course performance requires knowledge of basic thermodynamics, fluids and heat transfer. The homework is carefully graduated in order to highlight key aspects already covered in the lectures, with new thinking an unavoidable part. As an optional part of the course, students can run and acquire data in an actual gas turbine. Additionally, those with a strong background in fluids can design blades and study the flow around them with CDF. Course Objectives: Upon completion of this course, students should be able to: 1. Analyze cogeneration plants. 2. Analyze turbofans, jets and turbojets. 3. Specify a typical gas turbine installation, including auxiliaries. 4. Carry out conceptual design of gas turbine engines for different applications. 5. Specify construction materials to withstand typical operating conditions. 6. Demonstrate professionalism in interactions with colleagues, faculty, and staff. Program Objectives: This course covers the following program objectives: 1. Demonstrate ability to solve differential equations 2. Demonstrate familiarity with linear algebra 3. Perform analysis of thermal/fluid components 4. Perform analysis of thermal/fluids systems 5. Work effectively on multidisciplinary teams 6. Demonstrate ability to communicate effectively with the written word 7. Demonstrate ability to communicate effectively in oral communications 8. Demonstrate professionalism in interactions with colleagues, faculty, and staff

Changes Effective Spring 2021:

• Prerequisite
with colleagues, faculty, and staff. Program Objectives: a. demonstrate knowledge of chemistry. b. demonstrate ability to solve differential equations. c. demonstrate familiarity with statistics. d. perform analysis of thermal/fluids components and thermal/fluids systems. e. demonstrate an appreciation of the economic, global, social, and ethical context of their work. f. demonstrate professionalism in interactions with colleagues, faculty, and staff. g. make effective use of spreadsheets as an analysis tool. h. use software such as Matlab and MathCAD to solve engineering problems including ODE’s, systems of linear equations, and numerical integration.

Prerequisite: ME 320 or equivalent

Changes Effective Spring 2021:

• Prerequisite

ME 408: Energy Systems (3 Credits)
Old Listing Effective Through Fall 2020:

Theory, analysis, design, selection, and application of energy conversion systems. This course is intended for mechanical engineering students to reinforce the topics taught in thermodynamics, fluid mechanics, and heat and mass transfer; gives students familiarity with energy conversion systems using traditional and renewable energy sources which are typically encountered by mechanical engineers, and improves students’ analytical and design skills. Coverage of materials include heat exchanger analysis, selection, and design with respect to heat transfer, pressure drop, and fluid pumping requirements; analysis and design of power cycles based on thermodynamic principles; fundamentals of combustion processes; introduction to wind energy and wind turbine aerodynamic analysis; fuel cell fundamentals and analysis of fuel cell problems and systems based on thermodynamics and heat transfer principles. Students will be evaluated by homework assignments; individual and small team projects; and exams.

Prerequisite: ME 320, ME 410

Changes Effective Spring 2021:

• Prerequisite

ME 410: Heat Transfer (3 Credits)
Old Listing Effective Through Fall 2020:

Thermal energy transfer mechanisms: conduction (steady, transient), convection (internal, external), radiation; lumped parameter method; heat exchangers; introduction to numerical methods. M E 410 Heat Transfer (3) M E 410, Heat Transfer, is a required course for mechanical and nuclear engineering students. The course presents the three modes of heat transfer: conduction, convection, and radiation. One-dimensional steady and transient conduction is studied for planar, cylindrical, and spherical geometries. The lumped capacitance analysis is used for transient conduction when appropriate. Analytical and numerical methods are presented for twodimensional conduction problems, including the analysis of extended surfaces. Convection heat transfer is studied in both internal and external geometries and under laminar and turbulent flow regimes. External flows include cooling on flat plates due to laminar and turbulent boundary layer flows, and cooling of cylinders due to cross flow. The convection heat transfer analysis in internal flows considers laminar and turbulent pipe flows. Free convection is also considered where heat transfer is due to flow induced by fluid buoyancy. Boiling and condensation considers the effect of two-phase flows on surface heat transfer. Radiation heat transfer is studied by considering both the general characteristics of radiation as well as the properties of radiating surfaces and radiation heat transfer between surfaces. Methods for solving multi-mode heat transfer are presented throughout the course. Heat exchangers and heat transfer from extended surfaces are two applications studied in the course.

Prerequisite: ME 320 or BME 409; CMPSC 200 or CMPSC 201; MATH 220 or NUCE 309

Changes Effective Spring 2021:

• Prerequisite

ME 420: Compressible Flow I (3 Credits)
Old Listing Effective Through Fall 2020:

Introductory compressible flow (gas dynamics), mathematical background, and physical concepts of isentropic flow, shock waves, expansion waves, and applications.

Prerequisites: ME 320

Changes Effective Spring 2021:

• Prerequisite

ME 421: Viscous Flow Analysis and Computation (3 Credits)
Old Listing Effective Through Fall 2020:

Apply analytical and computational methods to solve the differential equations describing fluid flow. Incompressible external flows past objects and internal flows in pipes and ducts are some problems considered. M E 421 Viscous Flow Analysis and Computation (3) M E 421 is an intermediate course in fluids mechanics that bridges between the required undergraduate fluid mechanics course and the graduate fluid mechanics courses. Steady and unsteady flows are considered past objects and in pipes, ducts, and annuli. Analytical and numerical methods are used to solve the boundary layer and Navier-Stokes equations that describe fluid motion. Analytical methods include solutions for steady and unsteady internal flows with heat transfer. Similarity equations for boundary layer flows are derived and then solved numerically using the Runge-Kutta method. Finite difference methods for viscous flows are introduced and applied. Turbulence modeling is presented and applied in a boundary layer code. The stages of transition from laminar to turbulent flow and methods for the prediction of transition are introduced. Topics in M E 421 include: 1. Analytical solutions for one-dimensional viscous flows in Cartesian and cylindrical coordinates with heat transfer. 2. Unsteady viscous flow solutions using Separation of Variables. 3. Boundary layer similarity solutions using the Runge-Kutta method. 4. Panel method for incompressible inviscid flows. 5. Finite-differenced equations for viscous flows and the accuracy and stability of the schemes. 6. Using a commercial CFD code for a simple geometry. 7. Algebraic turbulence models and the approximations of each. 8. Higher-order turbulence models and the approximations used. 9. Stages of transition from laminar to turbulent flow. 10. Methods to predict boundary layer stability and transition.

Prerequisite: ME 201, ME 320, AERSP 308, AERSP 311 or CE 361; CMPSC 200 or CMPSC 201 or CMPSC 202; MATH 220; MATH 250 or MATH 251

Changes Effective Spring 2021:

• Prerequisite
ME 432: Rocket Propulsion (3 Credits)
Old Listing Effective Through Fall 2020:

Design and performance of rocket propulsion components and systems; thermodynamics, solid and liquid fuels, heat transfer, materials, controls, and instrumentation.

Prerequisites: ME 320, ME 410

Changes Effective Spring 2021:
- Enforced Prerequisite

ME 440: Mechanical Systems Design Project (3 Credits) (WF)
Old Listing Effective Through Fall 2020:

Design and analysis of mechanical components and systems. Application of fundamental design and analysis methods to open ended engineering problems. Students develop and practice skills and techniques for managing and executing engineering design projects. These skills are applied to an industry-sponsored project. Project teams perform all facets of product and process design. This includes problem identification, planning of the project, formulation of design specifications, the development and evaluation of alternative conceptual designs, the development of detailed designs, the specification of manufacturing processes, prototyping of manufacturing processes and parts, and analysis and documentation of results. Students will visit industrial sites to gain an understanding of existing processes and problems and to assess the customer’s needs. Students will present their design process and final design in several formats: oral presentations, poster presentations, web pages, and reports.

Prerequisites: ME 340, Concurrents: IE 312, ENGL 202C

Changes Effective Spring 2021:
- Enforced Prerequisite
- Enforced Concurrent

ME 441: Thermal Systems Design Project (3 Credits) (WF)
Old Listing Effective Through Fall 2020:

Design of thermal systems through component design and/or selection, system simulation and optimization. Assessment of system economics and energy efficiency. ME 441 Thermal Systems Design Project (3)

Students develop and practice skills and techniques for managing and executing engineering design projects related more to thermal design but not excluding mechanical design. These skills are applied to projects mostly sponsored by the industry. Project teams perform all facets of product and process design either on paper via use of computer models and/or as a physical product. This includes problem identification, planning of the project, formulation of design specifications, the development and evaluation of alternative conceptual designs, the development of detailed designs, the specification of manufacturing processes, prototyping of manufacturing processes and parts, design computations, drawings and performance via use of CFD and analysis and documentation of results. Students will visit industrial sites when possible to gain an understanding of existing processes and problems and to assess the customer’s needs. Students will present their design process and final design in several formats: oral presentations, poster presentations, web pages and reports.

Prerequisite: ME 340; ME 410; Prerequisite or Concurrent: ENGL 202C

Changes Effective Spring 2021:
- Enforced Prerequisite

ME 442: Advanced Vehicle Design I (2)(WF)
Old Listing Effective Through Fall 2020:

Part one of a two course sequence; applications of design and analysis methods to open-ended advanced transportation vehicles. Two semester course; satisfies Senior Design or ME Technical Elective requirements (when combined with M E 443W). Students develop and practice skills and techniques for managing and executing engineering design projects. This is done in the context of an international University-level engineering design competition that is sponsored by government agencies and/or by industry. The competitions are structured to span a full calendar year, with the competition itself taking place in late Spring. For that reason, the course is spread over two semesters. In the Fall semester, there is approximately equal emphasis on classroom lectures and hands-on laboratory activities; in the Spring semester, the emphasis is on hands-on laboratory activities. The focus is advanced powertrain technology for personal transportation vehicles. Broader aspects of energy efficiency, security, and sustainability also will be discussed. The specific technologies that are targeted will evolve with time to remain ahead of what is available in current production vehicles. Project teams perform all facets of product and process design. This includes problem identification, planning of the project, formulation of design specifications, the development and evaluation of alternative conceptual designs, the development of detailed designs, the specification of manufacturing processes, prototyping of manufacturing processes and parts, and analysis and documentation of results. Students also will participate in broader aspects of the design competition. This may include securing sponsorship and funding, participating in outreach and public relations events, developing a business plan, developing a web site, and traveling to competition workshops and to the annual competition. Students will present their design process and final design in several formats: oral presentations, poster presentations, web pages, and reports.

Prerequisites: ME 340; Concurrents: IE 312, ENGL 202C

Changes Effective Spring 2021:
- Enforced Prerequisite
- Enforced Concurrent

ME 444: Engineering Optimization (3 Credits)
Old Listing Effective Through Fall 2020:

Problem formulation, algorithms and computer solution of various engineering optimization problems. M E 444 Engineering Optimization (3) Students will learn to formulate and solve a variety of engineering optimization problems. Basic concepts, problem formulation, scaling, use of different optimizers, effect of tuning parameters and starting points and solution interpretation will be taught. Example problems will be taken from mechanical, aerospace, nuclear, civil, chemical, electrical and other engineering disciplines. This course will complement other engineering design courses, such as capstone design. Students will learn how optimization can reduce product turnaround time, and to make decisions involving weight, stiffness, strength, performance, energy utilization, and other attributes. Pedagogy will focus on hands-on experience through computational problem-solving and graphical understanding. Technology classrooms and computer labs for instruction will be used. A by-product of this course is increased math and computer skills.
processes of energy storage and dissipation, which are common for thermal, fluid systems and their combinations (mixed systems). The degree-of-freedom dynamical systems, including mechanical, electrical, course covers modeling, analysis, and control of single and multiple dynamic response. M E 450 Modeling of Dynamics Systems (3) This Classical and state variable methods; digital simulation; stability and Modeling and analysis of dynamic interactions in engineering systems. Classical and state variable methods; digital simulation; stability and dynamic response. M E 450 Modeling of Dynamics Systems (3) This course covers modeling, analysis, and control of single and multiple degree-of-freedom dynamical systems, including mechanical, electrical, thermal, fluid systems and their combinations (mixed systems). The processes of energy storage and dissipation, which are common for different kinds of dynamic systems, will be emphasized in investigating general principles for modeling various dynamic systems. Basic concepts in system theory such as state variables and stability notions will be introduced. Most of the content will be restricted to linear-time-invariant systems (LTIs); however, local linearization around nominal operating points will be taught to analyze nonlinear systems. Introduction to classical control analysis and design methods will also be given.

Changes Effective Spring 2021:

• Prerequisite

ME 445: Microcomputer Interfacing for Mechanical Engineers (4 Credits)
Old Listing Effective Through Fall 2020:

Interfacing of electro-mechanical systems to microcomputers for data acquisition, data analysis and digital control.

Prerequisite: ME 345 and seventh-semester standing

Changes Effective Spring 2021:

• Prerequisite

ME 446: Reliability and Risk Concepts in Design (3 Credits)
Old Listing Effective Through Fall 2020:

Introduction to reliability mathematics. Failure data collection and analysis. Components and systems reliability prediction. Effects of maintenance on reliability. Risk Analysis. Case studies in engineering applications. ME 446 / NUCE 446 Reliability and Risk Concepts in Design (3) The course covers materials reliability in design including mechanical, electrical and system aspects. Five main topics will be studied. The course starts by introducing engineering risk and reliability, highlighting its interdisciplinary nature and its significance in system design. The concept of reliability as a probability is introduced and the basic laws of probability are reviewed. The discussion centers on the mathematics needed to understand and analyze complex systems including components in series and parallel. The topics include the independence, mutual exclusivity, truth tables and Venn diagrams. These concepts are then applied to simple systems consisting of one, two and three components in various configurations. The equivalency of the various methods is discussed. The effect of maintenance on a system's reliability is presented along with discussions of various maintenance strategies. Then, the failure modes and effects analysis is introduced and examples discussed. The concept of fault trees and event trees and their application to reliability analysis are presented. Risk analysis is then introduced as a case study in the application of reliability analysis. A nuclear power plant system is analyzed to quantify the risk to the public from its operation.

Prerequisite: MATH 250 or MATH 251; ME 345 or NUCE 309

Cross-Listed Courses: NUCE 446

Changes Effective Spring 2021:

• Enforced Prerequisite

ME 450: Modeling of Dynamic Systems (3 Credits)
Old Listing Effective Through Fall 2020:

Modeling and analysis of dynamic interactions in engineering systems. Classical and state variable methods; digital simulation; stability and dynamic response. M E 450 Modeling of Dynamics Systems (3) This course covers modeling, analysis, and control of single and multiple degree-of-freedom dynamical systems, including mechanical, electrical, thermal, fluid systems and their combinations (mixed systems). The processes of energy storage and dissipation, which are common for different kinds of dynamic systems, will be emphasized in investigating general principles for modeling various dynamic systems. Basic concepts in system theory such as state variables and stability notions will be introduced. Most of the content will be restricted to linear-time-invariant systems (LTIs); however, local linearization around nominal operating points will be taught to analyze nonlinear systems. Introduction to classical control analysis and design methods will also be given.

Prerequisite: ME 370; Prerequisite or Concurrent: ME 345

Changes Effective Spring 2021:

• Prerequisite

ME 453: Powertrain System Modeling, Simulation, and Control (3 Credits)
Old Listing Effective Through Fall 2020:

This course introduces students to the control-oriented state-space and transfer function modeling of powertrain components and systems. Relevant application domains include conventional automotive powertrains, hybrid powertrains, locomotive propulsion systems, marine and submarine propulsion systems, and stationary power generation systems. The course introduces students to the use of fundamental principles from thermodynamics, fluid mechanics, and rigid body mechanics for powertrain modeling. Simple, control-oriented models are emphasized. Model integration and simulation topics, including numerical stiffness, solver selection, and integration step size selection are emphasized. Applications of powertrain modeling and control covered in the course include servocircuit problems (e.g., air-fuel ratio control) and supervisory power management in hybrid powertrains.

Prerequisites: ME 370 Concurrent: ME 450; ME 357

Changes Effective Spring 2021:

• Enforced Prerequisite
• Enforced Concurrent

ME 454: Mechatronics (3 Credits)
Old Listing Effective Through Fall 2020:

Interfacing of electro-mechanical hardware to microcomputers and microcontrollers for data acquisition, data analysis, and digital control. The course addresses the need for today's mechanical engineer to understand the architecture of engineering systems and not just the mechanical hardware. The course has a significant lab component in the form of weekly, two-hour labs. Examples of lab topics include the design and building of a complete autonomous vehicle including the drive system, steering, sensors, obstacle avoidance, and computer control.

Prerequisite: ME 345; ME 345W; ME 348

Changes Effective Spring 2021:

• Prerequisite

ME 455: Automatic Control Systems (3 Credits)
Old Listing Effective Through Fall 2020:

This course covers the characterization and feedback control of linear time invariant (LTI) dynamic systems, classical feedback control theories will be emphasized. Basic concepts of analyzing, predicting and specifying the performance of dynamic systems, including transfer functions, dynamic response, block diagram, stability notions and sensitivity will be introduced. A thorough treatment of feedback
controller design via Root-Locus method will be provided, which includes the design of lead/lag compensation and PID controller. Frequency domain controller design will also be introduced thoroughly, from the characterization of open-loop frequency response using Bode plot to the analysis of closed-loop frequency response. In this process, the notions of gain-phase relationship, Nyquist stability criterion, and stability margin will be discussed. Finally, the method of adding dynamic compensation to adjust the frequency response and improve the stability and performance of the system will be introduced.

Prerequisites: ME 320, ME 450 or ME 357

Changes Effective Spring 2021:

- Enforced Prerequisite

ME 456: Introduction to Robotics (3 Credits)
Old Listing Effective Through Fall 2020:

This course is a technical elective where students learn about the present and future status of robot applications, and are required to apply fundamental knowledge of physics, mechanics, and mathematics to develop software to analyze and control robots. The course deals with mechanics and control of mobile robots, flying robots and robot manipulators. First, students are taught to describe position and orientation of a rigid body, including rotation matrix, roll-pitch-yaw angles and Euler angles. In addition, a brief introduction to feedback control system is provided. After these background materials, students learn about the following topics: a. kinematics and control of wheeled mobile robots, car-like mobile robots and quadrotor and b. 3-D kinematics, statics, dynamics and control of robot manipulators. Sensors, actuators and software used in industrial robots are discussed.

Prerequisites: EMCH 212, ME 360; ME 367

Changes Effective Spring 2021:

- Enforced Prerequisite

ME 460: Advanced Machine Design Problems (3 Credits)
Old Listing Effective Through Fall 2020:

This course is designed to approach and analyze fundamental problems in the design of advanced level machine components and systems. It integrates advanced concepts in fatigue, vibrations, mechanics of materials and tribology for component and system level reliability. The course emphasizes elements of power transmission through detailed discussion on kinematics and reliability-based design of cams, flywheels, transmission couplings and gear chains. Example cases involve single and multiple cylinder automotive engine system with analysis of dynamics and balancing, power transmission through both flexible and rigid elements as well as different kinds of differentials built of spur, helical, bevel and worm gears. Another thrust is the application of tribology on machine design with special focus on hydrostatic and hydrodynamic bearings. Through case studies drawn from design and failure from real life systems, the course develops knowledge and skills for translating design concepts from components to system level.

Prerequisite: ME 360, ME 370

Changes Effective Spring 2021:

- Enforced Prerequisite

ME 461: Finite Elements in Engineering (3 Credits)
Old Listing Effective Through Fall 2020:

Computer modeling and fundamental analysis of solid, fluid, and heat flow problems using existing computer codes. E MCH (M E) 461 Finite Elements in Engineering (3) This is an introductory course in the Finite Element Method. Through this course, students gain knowledge in finite element theory and problem modeling. The mathematical formulation of the method is presented and then applied to problems in elasticity and heat transfer. Projects are assigned to demonstrate the finite element method in simplified problems using hand calculations and computer programs such as Matlab. The use of commercial FEA programs is introduced and problems of increased complexity are assigned to demonstrate their use in a computer lab. Finally, problems of realistic complexity are assigned such that students can practice solving, documenting and presenting their use of commercial FEA programs.

Prerequisite: EMCH 213, EMCH 210H, or EMCH 210; CMPSC 200, CMPSC 201 or CMPSC 202

Cross-Listed Courses: EMCH 461

Changes Effective Spring 2021:

- Enforced Prerequisite

ME 462: Lubrication in Machine Design (3 Credits)
Old Listing Effective Through Fall 2020:

Lubricants and lubrication with applications to design aspects of machines and mechanisms including bearings, gears, cams, and automotive engines. M E 462 Lubrication in Machine Design (3) The course covers interdisciplinary materials on lubrication in machine design including mechanical, mechanics and chemistry aspects. Six main topics will be studied. The course starts by introducing engineering tribology, highlighting its interdisciplinary nature and its significance in machine design. Surfaces of machine components in contact are studied, including surface physiochemistry, surface topography, topographical measurements and characterization and classification of regimes of lubrication. Lubricants used in machine design are discussed in length, including types of industrial lubricants, properties of lubricating oils: compositions, viscosity and additives, synthetic lubricants and engine oils. The course will develop the theory of fluid-film lubrication, including the mechanisms of pressure generation, configuration of tribo-contacts and the Reynolds equation. Hydrodynamic lubrication is studied. The topics include the machine components with hydrodynamic lubrication, thrust bearings, journal bearings and design considerations of these devices. The last topic to be covered is the theory and application of Elastohydrodynamic lubrication (EHL). First, the machine components with concentrated contacts are introduced. Then, the Hertz theory of contact in studied and the governing equations for EHL are derived. Thermal EHL and traction are studied, and design calculations for rolling bearings, cams and gears are developed in relation to the geometrical and kinematic features of these components.

Prerequisite: MATH 251, ME 360

Changes Effective Spring 2021:

- Enforced Prerequisite

ME 471: Noise Control in Machinery (3 Credits)
Old Listing Effective Through Fall 2020:


Nature of noise sources in machine elements and systems. Propagation and reduction of noise. Effects of noise on man. **M E 471 Noise Control in Machinery (3)** Course Objectives: This course prepares students to perform effectively as noise control engineers in industries with noise and vibration applications, e.g., during the early stages in product design or environmental noise control in industrial settings. Much of the material presented builds on second and third year courses covering such topics as dynamics, vibration, fluid mechanics and electrical components. Hands-on laboratory experiments (both programmed and open-ended) coordinated with focused lectures provide students with a working knowledge of the disciplines associated with noise and vibration and their practical applications for identifying, analyzing, and solving real world problems. The first part of the course centers on learning modules that cover the fundamentals of acoustics and noise control. Each module consists of two lectures followed with a laboratory experiment that demonstrates the relevant principles. These take place in small group settings (8 students maximum). Students are required to write individual reports based on the results of each of the laboratory experiments. The modules are followed with a laboratory project competition wherein each small group is given a noisy, small machine with the challenge to reduce its noise and vibration signatures. The course concludes with formal Power Point presentations of the results from each small group to an assessment team consisting of the industrial sponsors and selected professors and graduate students. This course is offered annually during the fall semester with an enrollment limited to 32 students (8/laboratory group).

Prerequisite: ME 320, ME 370

**Changes Effective Spring 2021:**
- Prerequisite

**ME 480: Mechanism Design and Analysis (3 Credits)**

**Old Listing Effective Through Fall 2020:**

Design and analysis of mechanical linkages including kinematic synthesis and dynamic analysis. Linkages for a variety of applications are considered. M E 480 Mechanism Design and Analysis (3) The student who takes this course will develop a basic understanding of the analysis and synthesis of planar linkage mechanisms. Students will develop the ability to model real linkage mechanisms using kinematic diagrams, including identification of links and joints. They will also learn to use Gruebler’s equation to calculate the mobility or number of degrees of freedom of linkages based on the kinematic diagram. Students will also become familiar with real mechanism applications in the context of mechanism synthesis, where they will learn to determine the required dimensions of a mechanism for a specific application. Students will apply these dimensional synthesis methods in a design project which includes building a simple linkage prototype. They will learn kinematic analysis methods, i.e., analysis of position, velocity, and acceleration of planar linkages. These methods consist of graphical, algebraic, and complex number approaches. Students will also learn to use commercial software packages, e.g. Working Model, to predict position, velocity, and acceleration of planar linkages, and will compare their predictions to those using analytical approaches. Finally, students will learn to do dynamic force analysis of planar linkages to predict joint forces and motor torques. They will use commercial software packages to predict joint forces and motor torques of planar linkages, and will compare their predictions to those using analytical approaches.

Prerequisites: EMCH 212

Concurrents: CMPSC 200

**Changes Effective Spring 2021:**
- Prerequisite
- Prerequisite or Concurrent

**ME 481: Introduction to Computer-Aided Analysis of Machine Dynamics (3 Credits)**

**Old Listing Effective Through Fall 2020:**

Techniques and formulations for computer based kinematic and dynamic analyses of machines. M E 481 Introduction to Computer-Aided Analysis of Machine Dynamics (3) This course addresses computer methods for kinematic and dynamic analyses of two-dimensional (2D) multi-body machines at the advanced undergraduate and introductory graduate level. The course introduces the formalism of kinematic mobility and topology to help students recognize constrained kinematic chains embedded in larger engineering systems. Classic kinematic and Newtonian dynamic methods are reformulated using modern matrix methods. The latter half of the course focuses on underlying algorithms and theory behind commercially available mechanism analysis software packages that employ differential-algebraic equation (DAE) solvers. Students program their own numerical integration methods for time domain simulation of forward dynamics of a simple system to reinforce the theory. The overall goals are for students to be able to identify forward versus inverse dynamic problems; and to be able to plan, implement and debug an appropriate computer-based design tool to analyze kinematics and dynamics of 2D constrained mechanisms.

Prerequisites: EMCH212 AND Prerequisite or Concurrent CMPSC 200

**Changes Effective Spring 2021:**
- Prerequisite
- Prerequisite or Concurrent

**METEO 411: Synoptic Meteorology Laboratory (4 Credits)**

**Old Listing Effective Through Fall 2020:**

Techniques of analyzing synoptic scale weather situations; introduction to weather forecasting.

Prerequisite: METEO 101 or METEO 200A and METEO 200B or METEO 201; MATH 230 or MATH 231 Prerequisite or Concurrent: METEO 421 and METEO 431

**Changes Effective Spring 2021:**
- Description
- Prerequisite
- Concurrent

**METEO 426: Inside Numerical Weather Prediction Models (3 Credits)**

**Old Listing Effective Through Fall 2020:**

This course will teach the student a practical understanding of the structure of numerical weather prediction (NWP) models in the context of their application to real world precipitation forecasting. The course combines lecture material on the inner workings of NWP models with a forecasting module that applies the lecture material to daily precipitation forecasts. Topics covered during the semester include the mathematical structure of weather models, including their historical development, techniques for initializing models (data assimilation), basic numerical
methods used to advance the model in time, techniques to account for phenomena not directly resolved by the model (parameterizations), as well as the theory behind, and creation of, ensemble model forecasts. Current, and next generation, operational NWP models will be used as examples for each topic. Students will use the lecture material and other forecasting techniques to issue precipitation forecasts three days per week in the form of a class-wide forecast contest.

Prerequisites: METEO 411; METEO 421

Changes Effective Spring 2021:

- Description
- Prerequisite

METEO 434: Radar Meteorology (3 Credits)
Old Listing Effective Through Fall 2020:

Fundamental operating principles of radars, with application to observation of meteorological phenomena. METEO 434 Radar Meteorology (3) Students will learn the basic operation principles of weather radar as it affects the taking and interpreting of measurements of weather phenomena. To achieve this ability, students must master concepts of radar design and operation, electromagnetic propagation through and scattering by atmospheric constituents, and the characteristics of atmospheric scatterers. With these tools in hand, the class will focus on interpreting weather phenomena. One-third of each lecture will be dedicated to the discussion and interpretation of student-provided radar images. Students will actively participate in the class through bringing radar observations to class for discussion. They will be required to access data from the World Wide Web, organize it for a computer-based presentation, do an in-class presentation and lead the subsequent discussion. Students should have a basic background in electromagnetic theory, such as can be acquired in a physical meteorology course (METEO 437), as well as have either completed or be co-registered for a mesoscale meteorology class (METEO 414). Students will be evaluated based on class participation, homework and two exams.

Prerequisite: METEO 437; Concurrent: METEO 414

Changes Effective Spring 2021:

- Description
- Concurrent

METEO 494M: Thesis Research (3 Credits) (H) (WF)
Old Listing Effective Through Fall 2020:

In this course, students will write a professionally structured thesis based on solid research foundations. They will learn the elements of good science writing and effective oral presentation.

Prerequisites: METEO 494M

Changes Effective Spring 2021:

- Description
- Prerequisite

MGMT 321: Leadership and Motivation (3 Credits)
Old Listing Effective Through Fall 2020:

Applies organizational behavior theories, concepts, and skills to leading and motivating individuals and groups.

Prerequisite: MGMT 301 , SCM 310

Changes Effective Spring 2021:

- Prerequisites
 Importance of microorganisms in health and disease, agriculture, and industry; descriptive course for students not planning advanced study in microbiology. The combination of MICRB 106 GN and 107 GN must be taken to receive General Education credit in biology. MICRB 106 Elementary Microbiology (3) (GN)(BA) This course meets the Bachelor of Arts degree requirements. Microbiology 106 is an introductory lecture course intended for students who do not plan to pursue further study in microbiology. It is particularly appropriate for students in allied health fields, agriculture, environmental engineering, and restaurant and institutional food management. The course can be used to meet natural science (GN) General Education requirements. To receive GN credit, however, MICRB 106 must be taken with its companion laboratory course, MICRB 107. Students taking this course will come to understand and appreciate the unique nature of microorganisms and their importance to life on earth. Microbes were the first form of life to evolve, and even though different in structure from other forms of living things, many similarities can be found in terms of genetics, metabolism, and the roles they play in nature. Bacteria, viruses, and other forms of microscopic life will be examined in some detail, as well their biological activities both beneficial and harmful. Most people think of microbes in their negative roles: disease, food spoilage, and bio-deterioration. Indeed, we spend a lot of time and resources combating microbes in our environment and treating diseases they cause. But microbes are found naturally on and within the human body with beneficial effect. They are also important in the production of food, vitamins, drugs, and other useful products. They are used extensively in biotechnology. They have important ecological roles and are essential to the continued existence of life on earth. MICRB 106 uses a lecture format supplemented with contemporary videos to highlight the current challenges and benefits that microbiology brings to our society and our collective and individual health. Also included in the course are active learning activities that involve critical thinking and investigation of internet resources.

Changes Effective Spring 2021:

• Prerequisites
• Description

MICSB 476: Independent Studies (1-18 Credits)
Old Listing Effective Through Fall 2020:

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses.

Changes Effective Spring 2021:

• Course Abbreviation to MNG

MIS 435: Systems Design and Implementation (4 Credits)
Old Listing Effective Through Fall 2020:

Logical and physical design of information systems and implementation. MIS 435 Systems Design and Implementation (3) Current systems development methods involve a use-case based, and iterative and incremental approach. This is the approach generally used on object-oriented systems development projects and is the approach taught in this course. Design aspects of the course will emphasize design patterns and their application to systems design using the standard software design notation—The Unified Modeling Language. An Agile (light-weight) approach to systems design will be emphasized. Implementation aspects of the course will focus on object-oriented programming using a modern object-oriented programming language.

Prerequisite: MIS 430 and a second-level programming course

Changes Effective Spring 2021:

• Prerequisites
• Description

MIS 450: System Design Project (3 Credits)
Old Listing Effective Through Fall 2020:

A project in the design, specification, and programming of a system in an application area. MIS 450 System Design Project (3) MIS 450, Systems Design Project, is a required course for information systems majors in the business program. MIS 450 is the capstone course. The primary objective of this course is for students to develop Information Systems (IS) solutions to real-life problems by following the entire systems development lifecycle (SDLC). The course allows students to demonstrate their mastery of the SDLC methodologies and analytical skills. Students develop a team project to foster problem solving, communication, and team skills. Individual assessment is evaluated through demonstration of the understanding of IS skills (i.e. application development, oral presentations, and written communication). Individuals are required to prepare professional written documents (i.e. definition document, the solution proposal, and the design document). Then students develop a solution prototype matching the criteria outlined in their requirement documents.

Prerequisite: MIS 307, MIS 465; MIS 448; 3 additional credits of MIS at the 300- or 400-level; seventh or eighth semester standing

Changes Effective Spring 2021:
• Prerequisites

**MIS 465: Database Management (3 Credits)**  
Old Listing Effective Through Fall 2020:

Provides a comparison of techniques, methodology of systems, limitations, and applications of various database management systems. MIS 465 Database Management (3) INF SY 445, Database Management, is a required course for information systems majors in the business program. The objective of the course is to present database design and development, specifically relational database management systems (RDBMS), along with project work on developing database systems. The course coverage includes conceptual data modeling, relational data model, structured query language (SQL), data normalization, database integrity, and database administration. Advanced topics such as distributed databases and data warehousing are also discussed briefly. The course prerequisite is CMPBD 204 or CMPSC 101 or CSE 103 and INF SY 390. This course is centered on a project group involving the design and development of a relational DBMS. Student groups also work on case and homework problems related to database design. A suitable relational database package, like ORACLE, is used by students in the group project. Database design and development involving the creation of tables, queries, forms, and reports are the center piece of the group project. INF SY 445 will be offered once per semester with multiple sections based on student enrollment and demand.

Prerequisite: CMPSC 102 or CMPSC 101 or CMPSC 121 and MIS 390

**Changes Effective Spring 2021:**

• Description
• Prerequisites

**MKTG 480: Intermediate Social Media Marketing (3 Credits)**  
Old Listing Effective Through Fall 2020:

Social Media Marketing tools, techniques, and strategies to build brands and customers. MKTG 480 Intermediate Social Media marketing (3) in today's business world, marketers must become more creative in the ways in which they present their company on an Internet based platform such as Twitter, Facebook, and LinkedIn in order to present increasingly relevant products and services to a more receptive customer base. The course, Intermediate Social Media Marketing, is designed to provide hands-on experiences with the use of Social Media Marketing tools and techniques while adhering to socially acceptable and ethical standards and protocols. The technology tools and platforms include but not limited to: Facebook, LinkedIn, Twitter, YouTube, Google+, Pinterest, Foursquare, Friendster, Technorati, Blogs, Vlogs, Podcasts, Hootsuite, Radian6, various search engines, and QR codes. These social media tools can be used to find, reach, connect, and automate marketing messages to efficiently and effectively build relationships, stronger brands and loyalty. These technologies may be utilized with or without a fully realized marketing automation structure, allowing ideas to be shared on a global platform. Students will learn and apply the major categories of Social Media tools, the how's and why's of their use, and decide what venues to use to reach the social media marketing objectives of firms, which may include improving the content to increase online presence, brand awareness, fan likenings, customer inquiries, and sales. During this course, students will devise a social media marketing plan for a local firm (or firms) that addresses (1) platform, (2) content, and (3) interaction. This course will achieve academic excellence by having students research the latest techniques and practices of social media, mobile, and direct marketing to build a social media marketing plan for a local firm (or firms) to expand its markets. Students will be analyzing a firm's current traditional and social media marketing practices, and short-term and long-term goals for its target markets.

Prerequisites: MIS 204 and MKTG 301

**Changes Effective Spring 2021:**

• Prerequisites

**MKTG 495: Internship (1-18 Credits: Maximum of 18 Credits)**  
Old Listing Effective Through Fall 2020:

Supervised off campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

Prerequisite: B A 303 OR MKTG 301

**Changes Effective Spring 2021:**

• Prerequisites

**MNG 401: Introduction to Mining Operations**  
Old Listing Effective Through Fall 2020:

An introduction to underground and surface mining methods; selection of extraction equipment; relevant auxiliary operations. Not intended for Mining Engineering majors.

Prerequisites: EMCH 211

**Changes Effective Spring 2021:**

• Description
• Prerequisites

**MNG 404: Mine Materials Handling Systems (2 Credits: Maximum of 2 Credits)**  
Old Listing Effective Through Fall 2020:

The objective of this course is to provide students with the basic principles and methodology involved in design of material handling systems used in the mining industry. The course will cover various types of material handling methods and equipment including continuous and cyclic loading and transportation systems. The course will review surface mining equipment including loaders, shovels, draglines, trucks, rail, dozers and scrapers. It will also discuss underground mining and various equipment such as loaders, rail, shuttle cars and coal haulers, panel conveyance and vertical transportation including hoisting and vertical conveyor. The design approaches will be discussed including the calculation of cycles, capacity of the system and equipment selection.

Prerequisites: MNG 230

**Changes Effective Spring 2021:**

• Remove Prerequisites
• Add Concurrents

**MNG 411: Mine Systems Engineering (2 Credits)**  
Old Listing Effective Through Fall 2020:

Applied operations research and systems methods for decision making in mine operations; time and systems studies to improve productivity.

Prerequisite: MNG 404
Changes Effective Spring 2021:

- Description
- Prerequisites

**MUSIC 51: Intermediate Class Piano: Non-Music Major (1 Credit) (BA) (GA)**

Old Listing Effective Through Fall 2020:

Instruction in harmonizing melodies, accompanying techniques, improvisation, and repertoire. MUSIC 051 Intermediate Class Piano: Non-Music Major (1) (GA)(BA) This course meets the Bachelor of Arts degree requirements. MUSIC 051 is course designed to provide the intermediate non-music major student with strategies for developing some of the advanced skills required for playing the piano. Some knowledge of music or piano is assumed and MUSIC 050 or a placement audition is a Prerequisite for this course. The course emphasizes strategies for learning to read and interpret musical notation from two clefs and musically realize the notation in real time with a healthy physical approach to the keyboard. Practice of these strategies outside the class is expected and checked. Objectives include learning to accurately sight-play a multiple voice musical texture with many extensions and shifts beyond a five-finger position. Special facilities required to teach the course include a 17-keyboard midi piano lab with visual displays for teacher demonstrations. The course is offered every semester.

Prerequisite: MUSIC 50 or placement audition

Changes Effective Spring 2021:

- Add General Education Recertification
- Description

**MUSIC 54: Beginning Class Guitar: Non-Music Major (1 Credit) (BA) (GA)**

Old Listing Effective Through Fall 2020:

Introduction to the keyboard, notation, chord progressions, transposition, improvisation, and simple accompanying techniques for the non-music major. An additional fee is required for this course. MUSIC 050 Beginning Piano: Non-Music Major (1) (GA)(BA) This course meets the Bachelor of Arts degree requirements. MUSIC 050 is a course designed to provide the beginning non-music major student with strategies for developing some of the basic skills required for playing the piano. No knowledge of music or piano is assumed and there are no Prerequisites for the course. The course emphasizes strategies for learning to read and interpret musical notation from two clefs and musically realize the notation in real time with a healthy physical approach to the keyboard. Practice of these strategies outside the class is expected and checked. Objectives include learning to accurately sight-play a single voice divided between the hands with some extensions and shifts beyond a five-finger position. Special facilities required to teach the course include a 17-keyboard Midi piano lab with visual displays for teacher demonstrations. The course is offered every semester, including summers, often with multiple sections.

Changes Effective Spring 2021:

- Add General Education Recertification
- Description

**MUSIC 50: Beginning Piano: Non-Music Major (1 Credit) (BA) (GA)**

Old Listing Effective Through Fall 2020:

Design of surface mining for noncoal and coal minerals; emphasis on quarry and strip mining planning parameters: unit operations, systems, haulroads, draglines, spoil stability, reclamation, legal requirements, and health and safety.

Prerequisites: CE 360, MNG 030

Changes Effective Spring 2021:

- Description
- Prerequisites
- Add Concurrernts

**MNG 441: Surface Mining Systems and Design**

Old Listing Effective Through Fall 2020:

Class instruction in guitar for non-music majors. MUSIC 054 Beginning Class Guitar: Non-Music Major (1) (GA)(BA) This course meets the Bachelor of Arts degree requirements. This course provides opportunity to explore the structure of various styles of folk music while developing basic skills for playing guitar and reading guitar tablature. Meter, tonality, harmonic progressions, texture, and form as well as stylistic features of various strumming techniques comprise the core knowledge that is developed through the process of playing guitar. The course assumes no previous formal study of music. Assessments are performance-based with students demonstrating knowledge and skill acquired through individual “playing tests” scheduled throughout the semester.

Changes Effective Spring 2021:

- Add General Education Recertification
- Description

**MNC 422: Mine Ventilation and Air Conditioning**

Old Listing Effective Through Fall 2020:

Removal of the class members within a wind ensemble (one player per part)

**MUSIC 76: Chamber Orchestra**

Old Listing Effective Through Fall 2020:

Chamber orchestra rehearsal and performance.

Prerequisites: Audition

Changes Effective Spring 2021:

- Remove Prerequisites

**MUSIC 78: Symphonic Wind Ensemble**

Old Listing Effective Through Fall 2020:

Rehearsal and performance of wind repertoire and concert band literature. MUSIC 78 Symphonic Wind Ensemble (1 per semester/maximum of 8) (GA)(BA) This course meets the Bachelor of Arts degree requirements. The goals of this course are to develop the instrumental performance skills, music reading abilities, and interpretive capabilities of the class members within a wind ensemble (one player per part)
concert band setting. The repertoire includes original concert band literature, transcriptions, and concert marches. The available literature covers a range of historical time periods from pre-Baroque to the present. Students are assessed by the use of performance evaluations, assessment of participation and contribution to established goals of the ensemble, and attendance at rehearsals and concerts. The course is designed for those students who have advanced performance skills on standard wind and percussion instruments. The Symphonic Wind Ensemble has performed at the Eastern Division Conference of the College Band Directors National Association, the Pennsylvania Music Educators Association In-Service Conference and the National Association for Music Educators Eastern Division Conference. It was also invited to open the 2005 Flicorno D'Oro international band festival in Riva del Garda, Italy, the first American band to be so honored. The ensemble has concertized in some of the country's most prestigious performing venues, including Heinz Hall (Pittsburgh), the John F. Kennedy Center for the Performing Arts (Washington D.C.), the Kimmel Center (Philadelphia), The Music Center at Strathmore (North Bethesda, MD) and Lincoln Center (New York). An audition is required.

Prerequisite: Audition

Changes Effective Spring 2021:

• Remove Prerequisites

MUSIC 79: Pep Band (1 per semester/maximum of 8)
Old Listing Effective Through Fall 2020:

A band to perform at selected athletic events.

Prerequisite: audition

Changes Effective Spring 2021:

• Add GA Attribute
• Description
• Remove Prerequisite

MUSIC 80: Symphonic Band
Old Listing Effective Through Fall 2020:

Rehearsal and performance of wind repertoire and concert band literature. MUSIC 80 Symphonic Band (1 per semester/maximum of 8) (GA)(BA) This course meets the Bachelor of Arts degree requirements. The goals of this course are to develop the instrumental performance skills, music reading abilities, and interpretive capabilities of the class members within a full concert band setting. The repertoire includes original concert band literature, transcriptions, and concert marches. The available literature covers a range of historical time periods from pre-Baroque to contemporary music written by living composers. Students are assessed by the use of performance evaluations, assessment of participation and contribution to established goals of the ensemble, and attendance at rehearsal sand concerts. The course is designed for those students who have advanced performance skills on standard wind and percussion instruments. An audition is required.

Prerequisites: Audition

Changes Effective Spring 2021:

• Remove Prerequisites

MUSIC 82: Concert Band
Old Listing Effective Through Fall 2020:

Rehearsal and performance of concert band literature. MUSIC 82 Concert Band (1 per semester/maximum of 8) (GA)(BA) This course meets the Bachelor of Arts degree requirements. The goals of the course are to develop the instrumental performance skills, music reading abilities, and interpretive capabilities of the class members within a moderately advanced large concert band setting. The repertoire includes original concert band literature, transcriptions, and concert marches. The available literature covers a range of historical time periods from pre-Baroque to the present. Students are assessed by the use of performance evaluations, assessment of participation and contribution to established goals of the ensemble, and attendance at rehearsals and concerts. The course is designed for those students who have moderate performance skills on standard wind and percussion instruments. An audition is required.

Prerequisite: Audition

Changes Effective Spring 2021:

• Remove Prerequisites

MUSIC 83: Campus Band
Old Listing Effective Through Fall 2020:

Rehearsal and performance of concert band literature. MUSIC 83 Campus Band (1 per semester/maximum of 8) (GA)(BA) This course meets the Bachelor of Arts degree requirements. The goals of the course are to develop the instrumental performance skills, music reading abilities, and interpretive capabilities of the class members within a moderately advanced large concert band setting. The repertoire includes original concert band literature, transcriptions, and concert marches. The available literature covers a range of historical time periods from pre-Baroque to the present. Students are assessed by the use of performance evaluations, assessment of participation and contribution to established goals of the ensemble, and attendance at rehearsals and concerts. The course is designed for those students who have had only limited experience in instrumental music but who have had previous instruction on their instruments. No audition is required, although basic music literacy is.

Prerequisites: Audition

Changes Effective Spring 2021:

• Remove Prerequisites

MUSIC 86: Percussion Ensemble (1 Credit: Maximum of 8 Credits)
(BA) (GA)
Old Listing Effective Through Fall 2020:

Study and performance of percussion chamber music in various instrumental combinations, focusing on the classical and contemporary repertoire. MUSIC 086 Percussion Ensemble (1 per semester/maximum of 8) (GA)(BA) This course meets the Bachelor of Arts degree requirements. Percussion Ensemble involves the rehearsal and performance of works for various combinations of percussion instruments in a chamber music setting. It also involves the group study of the various percussion instruments and techniques as described by or demonstrated by the conductor of the ensemble (percussion faculty member). The objectives of the course are to teach the art of ensemble performing (i.e., performing music well in a collaborative sense rather than just individually), to augment the understanding of the role
of percussion within the discipline of music, and to foster the skills of organization and cooperation through rehearsal and performance of music requiring (generally) three to twelve players. Due to the nature of this type of musical organization and given the wide variety and large number of instruments which may be involved at any given time, there is also an inherent study of logistics involved when setting up or moving the instruments from one venue to another. Students performing in Percussion Ensemble are generally also involved in performing in other larger heterogeneous instrumental performing groups such as the bands and orchestras. Skills learned in the Percussion Ensemble setting directly affect the ability of these students to contribute a highly developed sense of musical unity in the larger performing groups. They also learn specific skills which are necessary for successfully entry and acceptance into professional music performance circles. The course is offered each semester and the enrollment is generally between eight and fifteen performers.

Prerequisite: audition

Changes Effective Spring 2021:

- Add GA Attribute
- Description
- Remove Prerequisites

MUSIC 87: Mallet Ensemble
Old Listing Effective Through Fall 2020:

Study and performance of music for keyboard percussion instruments.

Prerequisites: Audition

Changes Effective Spring 2021:

- Remove Prerequisites

MUSIC 88: Campus Choir (1 Credit: Maximum of 8 Credits) (GA) (BA)
Old Listing Effective Through Fall 2020:

Building skills needed for successful choral singing including vocal production, sight singing, ear training, and music fundamentals. MUSIC 088 Campus Choir (1) (GA)(BA) This course meets the Bachelor of Arts degree requirements. The goals of this course are to develop the vocal skills and sight-reading abilities of the class members within a choral context. The choral repertoire will include standard vocal and choral selections. Students will be assessed by the use of periodic quizzes and vocal performance examinations. The course is designed for those students who have an interest in choral singing but who have limited background. There is no audition necessary.

Changes Effective Spring 2021:

- Recertification
- Description

MUSIC 89: University Choir (1 Credit: Maximum of 8 credits) (BA) (GA)
Old Listing Effective Through Fall 2020:

Rehearsal and performance of choral repertoire appropriate to mixed-voice ensemble of 100-150 voices. MUSIC 089 University Choir (1 per semester/maximum of 8) (GA)(BA) This course meets the Bachelor of Arts degree requirements. The University Choir is the largest mixed-voiced ensemble on the University Park campus. The choir participates in two campus performances per semester and has toured Europe, Canada, and the eastern region of the United States. Membership is determined by audition and is open to both undergraduate and graduate students. The goal of the ensemble is to provide artistic, meaningful, and successful choral performances. To achieve this goal, the learning objectives for individual students include attention toward individual vocal development, increased musicianship skill, and the discovery of new means of artistic expression. In addition to these individual objectives, the conductor of the ensemble also teaches directly toward the objectives of ensemble tone, blend, balance, intonation, dynamics, diction, phrasing, etc. Grades are determined by a combination of vocal and musicianship assessments (both written and aural) and attendance at rehearsals and performances.

Prerequisite: audition

Changes Effective Spring 2021:

- Recertification
- Description
- Remove Prerequisites

MUSIC 90: Glee Club
Old Listing Effective Through Fall 2020:

Rehearsal and performance of music composed for lower voices from the sixteenth to the twentieth centuries, including sacred and secular compositions. MUSIC 90 Glee Club (1 per semester/maximum of 8) (GA) (BA) This course meets the Bachelor of Arts degree requirements. The Glee Club is an auditioned ensemble of 50-65 tenor/bass voices singing music from medieval chant to commissioned twenty-first century choral works. The Glee Club performs on campus at least once per semester, tours yearly and has performed throughout Pennsylvania, the United States, Europe and New Zealand. The goal of the ensemble is to provide artistic, meaningful, and successful choral performances. To achieve this goal, the learning objectives for individual students include attention toward individual vocal development, increased musicianship skill, and the discovery of new means of artistic expression. In addition to these individual objectives, the conductor of the ensemble also teaches directly toward the objectives of ensemble tone, blend, balance, intonation, dynamics, diction, phrasing, etc. Grades are determined by a combination of vocal and musicianship assessments (both written and aural) and attendance at rehearsals and performances.

Prerequisites: Audition

Changes Effective Spring 2021:

- Remove Prerequisites

MUSIC 91: Oriana Singers (1 Credit: Maximum of 8 Credits) (BA) (GA)
Old Listing Effective Through Fall 2020:

Rehearsal and performance of choral repertoire for treble voices from the sixteenth to twentieth centuries, including sacred and secular compositions. MUSIC 091 Oriana Singers (1.0 per semester/maximum of 8) (GA)(BA) This course meets the Bachelor of Arts degree requirements. Oriana Singers was founded in 1994 to serve the musical needs of highly talented undergraduate and graduate women. The 65-voice ensemble performs repertoire representing every musical period, genre and style in its two campus concerts per semester. The choir has been invited to perform at prestigious regional and national music conferences and has participated in tours within the state of Pennsylvania. Membership is
determined by audition. The goal of the ensemble is to provide artistic, meaningful, and successful choral performances. To achieve this goal, the learning objectives for individual students include attention toward individual vocal development, increased musicianship skill, and the discovery of new means of artistic expression. In addition to these individual objectives, the conductor of the ensemble also teaches directly toward the objectives of ensemble tone, blend, balance, intonation, dynamics, diction, phrasing, etc. Grades are determined by a combination of vocal and musicianship assessments (both written and aural) and attendance at rehearsals and performances.

Prerequisite: audition

**Changes Effective Spring 2021:**
- Add General Education Recertification
- Remove Prerequisites

**MUSIC 92: Chamber Music for Voices (1 Credit: Maximum of 8 Credits) (BA) (GA)**

Old Listing Effective Through Fall 2020:

Select groups of singers performing choral chamber music. MUSIC 092 Chamber Music for Voices (3) (GA)(BA) This course meets the Bachelor of Arts degree requirements. Chamber Music for Voices is a course which includes four small auditioned chamber choirs comprising of members of four large ensembles. The repertoire of these 9-16 member ensembles is selected from a wide range of choral literature. Membership in Section 1 is open to Oriana Singers members; Section 2 is open to Glee Club members; Section 3 is open to University Choir members; and Section 4 is open to Women's Chorale members. The goal of the ensembles is to provide artistic, meaningful, and successful choral performances. To achieve this goal, the learning objectives for individual students include attention toward individual vocal development, increased musicianship skill, discovery of new means of artistic expression, and the specific skills necessary to sing in a small ensemble with only two or three singers per voice part. In addition to these individual objectives, the conductor of the ensemble also teaches directly toward the objectives of ensemble tone, blend, balance, intonation, dynamics, diction, phrasing, etc. Grades are determined by a combination of vocal and musicianship assessments (both written and aural) and attendance at rehearsals and performances.

Prerequisites: audition

**Changes Effective Spring 2021:**
- Recertification
- Description
- Remove Prerequisites

**MUSIC 103: Concert Choir**

Old Listing Effective Through Fall 2020:

Rehearsal and performance of choral repertoire appropriate to mixed-voice ensemble of approximately forty-five voices. MUSIC 103 Concert Choir (1 per semester/maximum of 8) (GA)(BA) This course meets the Bachelor of Arts degree requirements. Repertoire is selected from a wide range of choral literature from medieval chant to commissioned twenty-first century choral works. Membership is open to undergraduate and graduate students. The goal of the ensemble is to provide artistic, meaningful, and successful choral performances. To achieve this goal, the learning objectives for individual students include attention toward individual vocal development, increased musicianship skill, and the discovery of new means of artistic expression. In addition to these individual objectives, the conductor of the ensemble also teaches directly toward the objectives of ensemble tone, blend, balance, intonation, dynamics, diction, phrasing, etc. Grades are determined by a combination of vocal and musicianship assessments (both written and aural) and attendance at rehearsals and performances.

Prerequisites: audition

**Changes Effective Spring 2021:**
- Remove Prerequisites

**MUSIC 104: Chamber Singers**

Old Listing Effective Through Fall 2020:

Rehearsal and performance of choral repertoire appropriate to mixed-voice ensemble of approximately twenty-four voices. MUSIC 104 Chamber Singers (1 per semester/maximum of 8) (GA)(BA) This course meets the Bachelor of Arts degree requirements. Chamber Singers is a premier chamber choir at the University. The repertoire of the 14-voiced ensemble is selected from a wide range of choral literature from medieval chant to commissioned twenty-first century choral works. Membership is open to undergraduate and graduate students. The goal of the ensemble is to provide artistic, meaningful, and successful choral performances. To achieve this goal, the learning objectives for individual students include attention toward individual vocal development, increased musicianship skill, and the discovery of new means of artistic expression. In addition to these individual objectives, the conductor of the ensemble also teaches directly toward the objectives of ensemble tone, blend, balance, intonation, dynamics, diction, phrasing, etc. Grades are determined by a combination of vocal and musicianship assessments (both written and aural) and attendance at rehearsals and performances.

Prerequisite: audition

**Changes Effective Spring 2021:**
- Remove Prerequisites

**MUSIC 106: Early Music Ensemble**

Old Listing Effective Through Fall 2020:

Ensemble for the performance and study of Baroque or early music on instruments of the era. MUSIC 106 Early Music Ensemble (1 per semester/maximum of 8) (GA)(BA) This course meets the Bachelor of Arts degree requirements. The Early Music Ensemble will meet for a single two-hour rehearsal each week. Extra rehearsals may be scheduled when circumstances warrant them, i.e., when visiting ensembles come to Penn State. Membership of the ensemble will remain essentially constant from one semester to the next. Vacancies arising when a student leaves or graduates will be filled as needed. It is integral to the ensemble's activities that faculty and students perform alongside each other; thereby providing a unique learning opportunity for the students. A constant membership encourages performers' understanding of early music performance practice. The ensemble will give concerts on campus. Off-campus performances may be considered outreach opportunities and as valuable experiences for the students.

Prerequisites: audition

**Changes Effective Spring 2021:**
- Remove Prerequisites
MUSIC 113: Music Theatre–Class Voice I  
Old Listing Effective Through Fall 2020:
Group study emphasizing development of sound vocal and musicianship skills fundamental for music theatre. This class is designed for freshman BFA Musical Theatre majors and freshman BFA Acting majors and is the start of a year long exploration of vocal musical production for the stage. The purpose of this class is to lay introductory foundations in singing techniques and skills currently required for a career in the theatre. Students become familiar with the basic concepts of voice production, as well developing an understanding and awareness of vocal health issues. Additionally, students are exposed to a variety of musical theatre and classical sung repertory while they are encouraged to develop perceptive listening skills by interacting and responding to their peers in class and other performers. In MUSIC 113, students are encouraged and required to develop an appreciation of all genres of sung performance from classical to contemporary. Another important element of the course is helping students develop the necessary vocabulary to respond in writing to vocal performance. Toward that goal, attendance at vocal events scheduled around campus and the community is required. These vocal events will include performances by professionals in many genres. Faculty will provide students with lists of approved events. To help students develop their music performance vocabulary, students are required to respond to some vocal events with written critiques. Aesthetically, students are encouraged to appreciate and practice vocal performance in a variety of stage genres. On the practical side, students learn effective practice skills, music reading, and appreciation of all areas of vocal performance. Students are evaluated based on readings, short writing assignments, evaluations of a number of memorized song performances, and classroom attendance and participation.

Prerequisites: Admission to BFA in Musical Theatre or BFA in Acting

Changes Effective Spring 2021:
- Remove prerequisites

MUSIC 119: First-Year Music Seminar  
Old Listing Effective Through Fall 2020:
Individual applied instruction and group activities; orientation, area recitals, and studio classes as required by instructor.

Prerequisites: Permission of instructor

Changes Effective Spring 2021:
- Remove Prerequisites

MUSIC 121: Basic Musicianship I  
Old Listing Effective Through Fall 2020:
Elementary sight singing and dictation.

Prerequisites: ability to reproduce simple rhythm and tonal patterns;
Concurrent: MUSIC131

Changes Effective Spring 2021:
- Remove Prerequisites
- Add Recommended Preparation

MUSIC 129S: First-Year Performance Seminar  
Old Listing Effective Through Fall 2020:
Individual applied instruction and group activities; orientation, area recitals, and studio classes as required by instructor.

Prerequisites: permission of instructor

Changes Effective Spring 2021:
- Remove Prerequisites

MUSIC 131: Music Theory I  
Old Listing Effective Through Fall 2020:
Review of rudiments; introduction to the fundamental linear and vertical features of tonal music, integration of written and aural skills.

Prerequisites: ability to read musical notation; knowledge of musical rudiments.;
Concurrent: MUSIC121

Changes Effective Spring 2021:
- Add Recommended Preparation

MUSIC 162: Introduction to Music History (2 Credits) (IL) (BA)  
Old Listing Effective Through Fall 2020:
An introduction to Western music history and world music of selected cultures through the study of representative works. MUSIC 162 Introduction to Music History (2) (IL)(BA) This course meets the Bachelor of Arts degree requirements. This course is an introduction to music history and world music. The course has four objectives: 1. to provide an overview of the different types of music that have prevailed in the West during the past 1500 years; 2. to introduce music from other parts of the world; 3. to examine the many ways that music has functioned in society; 4. to "stretch the students' ears" through exposure to a wide range of technical musical materials. The course serves as the first in a sequence of three music history courses taken by all music majors. Evaluation methods include written tests, listening tests, and class participation.

Concurrent: MUSIC 132

Changes Effective Spring 2021:
- Remove BA/IL Attribute
- Description

MUSIC 173: First-Year Composition Seminar  
Old Listing Effective Through Fall 2020:
Individual composition instruction for freshman composition majors (Fall semester) and group activities.

Prerequisites: admission to the BM degree in Composition

Changes Effective Spring 2021:
- Remove Prerequisites

MUSIC 190: Chamber Music for Strings (1 Credit: Maximum of 8 Credits) (BA) (GA)  
Old Listing Effective Through Fall 2020:
Preparation for performance of advanced chamber music literature involving primarily string instruments--string quartets, piano trios, clarinet quintets. MUSIC 190 Chamber Music for Strings (1 per semester/ maximum of 8) (GA)(BA) This course meets the Bachelor of Arts
degree requirements. Chamber Music for Strings meets at least two hours per week - once with the instructor for coaching and at least once for an additional rehearsal without the instructor’s presence. Course objectives include, but are not limited to, the development of rehearsal and ensemble skills, an increased awareness of musical styles, public performance(s) of works prepared, and the development of the interpersonal skills necessary for the players to operate as a unit. Chamber music is an integral part of instrumental musical training. It is an important partner with conducted ensembles in the performance preparation of musicians. Evaluation of student work is based on participation in rehearsals, the progress made by the ensemble, and the quality of the ensemble’s performances. The course is offered during fall and spring semesters.

Prerequisite: permission of instructor

Changes Effective Spring 2021:

- Recertification
- Description

MUSIC 191: Chamber Music for Woodwinds (1 Credit: Maximum of 8 Credits) (BA) (GA)

Old Listing Effective Through Fall 2020:

Preparation for performance of advanced chamber music literature involving primarily woodwind instruments—woodwind quintets and quartets. MUSIC 191 Chamber Music for Woodwinds (1 per semester/maximum of 8) (GA)(BA) This course meets the Bachelor of Arts degree requirements. Chamber Music for Woodwinds meets at east two hours per week - once with the instructor for coaching and at least once for an additional rehearsal without the instructor’s presence. Course objectives include, but are not limited to, the development of rehearsal and ensemble skills, an increased awareness of musical styles, public performance(s) of works prepared, and the development of the interpersonal skills necessary for the players to operate as a unit. Chamber music is an integral part of instrumental musical training. It is an important partner with conducted ensembles in the performance preparation of musicians. Evaluation of student work is based on participation in rehearsals, the progress made by the ensemble, and the quality of the ensemble’s performances. The course is offered during fall and spring semesters.

Prerequisite: permission of instructor

Changes Effective Spring 2021:

- Recertification
- Description

NAVSC 313: Marine Corps Leadership Theory and Techniques (3 Credits)

Old Listing Effective Through Fall 2020:

Introduction to Marine Corps leadership theory and techniques and their application to military-related practical skills and subject matter. NAVASC 313 Marine Corps Leadership Theory and Techniques (3) The curriculum for Marine Corps Leadership Theory and Techniques provides students with an in-depth understanding of the physical and mental rigors Marine Corps Officers face while leading Marines in the contemporary operating environment. Students’ professional development as future Marine Corps leaders is enhanced through the examination of military-related skills, decision-making and management processes, organizational structures and associated micro-cultures within the military framework. Underlying concepts focus on a historical perspective of fundamentals of leadership, team building, establishing command, organizational safety (to include sexual assault prevention/response and suicide prevention) and equal opportunity coupled with humanistic functions leading to successful organizations.

Changes Effective Spring 2021:

- Abbreviated Title
- Title
- Description

NAVSC 411: Amphibious Warfare (3 Credits)

Old Listing Effective Through Fall 2020:

A historical survey and evaluation of twentieth-century amphibious warfare operations. NAVSC 411 Amphibious Warfare (3) NAVSCI 411 Amphibious Warfare (3) The curriculum for Amphibious Warfare provides students with an in-depth historical basis of the progressive development of military amphibious operations from the early 400 B.C. period to present day military operations. Integral to the course is the understanding of the evolution of military tactics, techniques and procedures in relation to technological advances throughout history and the role of time, space and logistics in military operations. Students conduct detailed research projects of current amphibious operations ranging from amphibious operations in the littorals, humanitarian assistance/disaster relief and non-combatant evacuation operations around the world. The conclusion of the course explores emerging threats which challenge future amphibious operations and the continuance of developing advanced technology, tactics, techniques and procedures currently in the research and development phase within the U.S. Marine Corps.

Prerequisite: 6 credits of Navy ROTC courses
Changes Effective Spring 2021:

- Abbreviated Title
- Title
- Description

NURS 245: Violence and the Impact on Society (3 Credits) (GS)
Old Listing Effective Through Fall 2020:

Interdisciplinary discussion of violence, its perpetrators, victims and its impact on society as well as possible solutions for violence reduction.

Changes Effective Spring 2021:

- Recertification
- Description

NURS 464: Dying and Death (3 Credits) (IL) (US)
Old Listing Effective Through Fall 2020:

Explores attitudes toward death and dying; concept of grief; responsibilities to the dying person and the family. NURS 464 focuses on the exploration of attitudes toward death and dying, concept of grief, responsibilities to the dying person and the family. The student will explore theories and research related to death and dying, identify one’s individual attitudes and beliefs about death, identify effective strategies to assist individuals and families to cope with death. Course topics include thanatology, expressions of attitudes toward death, factors affecting familiarity with death, learning about death, socialization, understanding death through the life course, a mature concept of death, death of a companion animal, social and cultural influences, cross-cultural and historical perspectives and inter faith dimensions and religious rituals, including traditional culture, western culture and cultural viewpoints and diversity. The course focuses on an overall understanding of the experience of loss, bereavement, grief and mourning as it relates to different populations and different methods of death for example suicide, war, illness and violence RECOMMEND PREPARATION: PSYCH 100 or SOC 1

Changes Effective Spring 2021:

- Add GHW Attribute
- Description

NURS 466: Systems and Community Responses (3 Credits)
Old Listing Effective Through Fall 2020:

An exploration of the multidisciplinary response to child maltreatment. CMAS 466 / NURS 466 Systems and Community Responses (3) An exploration of the multidisciplinary response to child maltreatment. The roles, responsibilities, and interconnected relationships between the systems that interact when responding to child maltreatment issues will be analyzed. The forensic medical response, challenges, and multidisciplinary team best practices to child maltreatment case are examined. Students will explore responses and best practices within the health care, judicial, child protection, social service, educational, mental health, human service, and community systems. This course provides students with the opportunity to work with a variety of majors and understand more clearly the interdisciplinary nature of child maltreatment prevention, advocacy, and response.

Prerequisite: CMAS 258 or HDFS 258 or SOC 258
Cross Listing: CMAS 466

Changes Effective Spring 2021:

- Prerequisite

NUTR 175Z: Healthy Food for All: Factors that Influence What we Eat in the US – LINKED (3 Credits) (US) (GHW)
Old Listing Effective Through Fall 2020:

This course encompasses the study of eating behavior and how fundamentals of nutrition-policy (e.g., farm bill, child nutrition act that provides food education and food assistance in relation to Dietary Guidelines for Americans and Dietary Reference Intakes), the food environment, and behavioral economics influence food choice thereby affecting the overall health, nutrition, and well-being of individuals and communities within the United States. While aspects of this are covered in a variety of disciplines (e.g., nutrition, food science, agriculture, economics, sociology, and others), these aren’t always integrated for students. The purpose of this course is to provide an interdisciplinary perspective of how individuals, including those living in poverty, make food choices within their communities, and how these choices impact health and wellness. Topics include an introduction to what we eat, why we eat, and the key roles of diet on health with focus on the links among poverty, food security and obesity. The politics of food discusses portions of the Farm Bill and Child Nutrition Act with focus on the Women, Infants and Children Supplementary Food Program (WIC), the Special Nutrition Assistance Program (SNAP), and school lunch, and the influence these programs have on what is produced and consumed. The behavioral economics of food will focus on determinants of food choice including taste, cost, nutrition, and convenience as well as provide an overview of the biology and psychology of eating through hand-on experiential activities. Through these experiences, students will gain household budgeting skills across income levels that provides perspective to barriers to eating healthy. Lastly, food access dimensions will be discussed (e.g., food desserts, food swamps, grocery stores, targeted advertising/marketing) will be discussed. This course is a linked course with AGBM 170Z meets the General Education Integrative Studies requirement.

Prerequisite: NUTR 100 or NUTR 251 or FDSC 105

Changes Effective Spring 2021:

- Remove Prerequisite

NUTR 446: Micronutrient Metabolism (3 Credits)
Old Listing Effective Through Fall 2020:

Nutrition 446 is designed to provide a foundation in integrated metabolism, metabolic functions, biochemistry, as well as cellular and molecular biology of the micronutrients (vitamins and minerals). It is an advanced nutrition course that will build upon your basic knowledge in physiology, biology, chemistry and nutrition. Students need to have a solid understanding of macronutrient metabolism (NUTR 445) in order to fully understand the micronutrient metabolism material presented in this course.

Prerequisites: Enforced Prerequisites at Enrollment: NUTR 445
Concurrent Courses: NUTR 452

Changes Effective Spring 2021:

- Remove Concurrency
NUTR 494: Senior Honors Thesis (1-6 Credits: Maximum of 6 Credits) (HON)
Old Listing Effective Through Fall 2020:

Independent study related to a student’s interests directed by a faculty supervisor and culminating in the production of a thesis.

Changes Effective Spring 2021:
• Title
• Abbreviated Title
• Description
• Prerequisites

OLEAD 410: Leadership in a Global Context
Old Listing Effective Through Fall 2020:

This course explores the science and practice of leadership around the globe through pertinent scholarly literature and related instructional resources. OLEAD 410 Leadership in a Global Context (3) (IL)(BA) This course meets the Bachelor of Arts degree requirements. This course will explore the science and practice of leadership across the globe. In particular, cross-cultural differences in leadership styles and methods from around the planet will be examined. Emphasis will be made on gaining knowledge of various cultural perspectives from around the world. That knowledge will then be used to examine successful leadership interactions between diverse cultures. Upon completion of Leadership in a Global Context, students will be able to understand differences within and between cultures, understand how diversity can impact an organization; recognize there are various sources of information to learn about culture; utilize various sources of information to gain knowledge of culture; develop the ability to recognize cultural differences in leadership situations, and think about developing leadership in global situations based on culture.

Prerequisites: OLEAD 100

Changes Effective Spring 2021:
• Prerequisites

OLEAD 411: Women and Leadership
Old Listing Effective Through Fall 2020:

Overviews scholarship relating to women in positions of leadership in groups and organizations, as well as obstacles to their success.

Prerequisites: OLEAD 100

Changes Effective Spring 2021:
• Description
• Prerequisites

PHIL 403: Environmental Ethics
Old Listing Effective Through Fall 2020:

Examines ethical theories, justice, rights, community, and human values revolving around such issues as preservation, conservation, pollution, sustainability, and population.

Prerequisites: 9 credits of philosophy, including PHIL 103 or 6 credits of philosophy at the 200 level or 5th semester standing

Changes Effective Spring 2021:
• Title
• Abbreviated Title
• Description
• Prerequisites

PLANT 461: Emerging Issues in Plant Sciences (3 Credits)
Old Listing Effective Through Fall 2020:

A discussion-based capstone course that elucidates the current and up-and-coming issues in the plant sciences. PLANT 461 Emerging Issues in Plant Sciences (3) Emerging Issues in Plant Sciences is a capstone course designed for the Plant Sciences, and is also available to students from other majors. This highly participatory course emphasizes many of the interdisciplinary topics in the plant sciences today, with a focus on balancing plant production with environmental conservation. Topics include: conservation cropping systems and tillage, soil health; transgenic crops; managing landscapes for ecosystem services, climate change, pest and nutrient management alternatives; biofuels; urbanization and regional food systems. It is a team taught course with guest lectures by experts on specific topics and includes student analysis and discussion with the guidance of the instructors. Students will read and write about publications from the peer reviewed literature and research and present about an emerging issue.

Prerequisite: AGRO 028 or HORT 101, AGECON 201 or BIOL 127 or HORT 202, ENT 313, and SOILS 101

Changes Effective Spring 2021:
• Abbreviated Title
• Description
• Prerequisites

PLSC 83: First-Year Seminar in Political Science (3 Credits) (BA) (FYS) (GS)
Old Listing Effective Through Fall 2020:

Exploration of current topics of interest in political science, international relations, and/or political theory. PLSC 0835 First-Year Seminar in Political Science (3) (GS;FYS)(BA) This course meets the Bachelor of Arts degree requirements. Every first-year seminar in Political Science focuses on several of the major questions of the field. Many of these questions concern the constitutional arrangements of governments: What is it that we want governments to do, and what is the ideal government arrangement? Why does every nation (and every state and city) have somewhat different constitutional provisions for legislation, judicial, military and executive functions of government? What can we learn from careful comparisons of different types of government? What is unique to the American system and what are the consequences of this uniqueness? Other questions concern power. To what extent do wealthy individuals and wealthy organizations have disproportionate power in society? Is this appropriate or not? What is the impact of governmental attempts to limit the influence of the wealthy? We are also very much interested in the international system: What types of foreign policies and diplomatic strategies reduce the likelihood of war? What is the role of international organizations (such as the UN or World Bank) and multinational corporations in shaping conflicts between nations? Finally, we are interested in ordinary citizens: Do citizens know enough to formulate rational opinions on public issues? Why are many citizens apathetic? What motivates citizens to support one candidate over another or to favor particular policies and philosophies? Each first-year
seminar will select a special topic of interest and use that topic to explore a subset of these questions in order to provide a challenging introduction to political science. In the course of doing so, each first-year seminar in political science will also introduce students to specialized materials (such as government documents), library resources, and appropriate electronic media. In addition, each seminar will emphasize the standards of evidence, logic, and critical thinking required to develop effective and persuasive reports and oral presentations. Students will write essay exams and one or more written reports on the relevant topic of their own choices. Class participation is required. The course fulfills both a first-year seminar and a general education or Bachelor of Arts social/behavioral science requirement. The course will be offered three times per year with a maximum of 20 seats per offering. In addition to the academic topic and issues of this course, students can expect to gain a general introduction to the University as an academic community and have the opportunity to explore their responsibilities as members of that community. Students will develop an understanding of the learning tools and resources available to them, including the opportunity to develop relationships with faculty and other students who share their academic interests.

**Changes Effective Spring 2021:**

- Recertification
- Description
- Change Number

**PLSC 135: The Politics of the Ecological Crisis (3 Credits) (BA) (GS)**

**Old Listing Effective Through Fall 2020:**

The political implications of the increasing scarcity of many of the world's resources. PL SC (S T S) 135 The Politics of the Ecological Crisis (3) (GS)(BA) This course meets the Bachelor of Arts degree requirements. &quot;The Politics of Scarcity&quot; examines some &quot;big&quot; questions about the prospects for humans in general and democracy in the United States in particular. Much of the reading assumes that our civilization faces the twin problems of increasingly serious shortages of resources and a growing ecological crisis that threatens the basis of life. Further, it argues that these &quot;twin crises&quot; feed upon each other, and that together they pose serious short and long run challenges to survival. Some readings attribute these problems to the dominant values that characterize modern Western society. The course does consider some dissents from this perspective, arguments that things will be just fine. However, it concentrates on problems and predictions of trouble. Thus, the class does not claim to present an evenly balanced assessment. Rather, it recognizes that most of what we learn, read, and see supports the status quo and assumes our civilization and energy-dependent way of life will continue. Consequently it makes sense to emphasize the less frequently argued position that we may be headed for disaster. The class aspires to appeal to students regardless of major or college — to scientists, engineers, students of the humanities, and even economists and political scientists. It fulfills the University-wide general education requirement in Social Science. Although it discusses the role of politics in general and the role of the American political system in particular in discussing the &quot;twin crises,&quot; it mostly grapples with fundamental questions of value that underlie and guide the play of power in our political system and how the massive changes now taking place globally both affect and are affected by politics.

**Cross Listing:** STS 135

**Changes Effective Spring 2021:**

- Recertification
- Change Number to 235
- Abbreviated Title
- Title
- Description

**PLSC 140: Contemporary Controversies in International Relations (3 Credits) (GS)**

**Old Listing Effective Through Fall 2020:**

Contemporary issues of international security presented rigorously using analytical tools of international relations and political science. PL SC 140 Contemporary Controversies in International Relations (3) (GS)PL SC 140 investigates international security in the post-Cold War world. It does so by focusing on critical, ongoing, international conflicts and problems. These include the rise of China, resurgence of Russia, and international terrorism. After a brief introduction to key theories and tools of International Relations and some historical context, we will focus on the division of the post-Cold War world into zones of peace (characterized by liberal, free market democracies) and turmoil (characterized by ethnonationalist, religious, and territorial conflict). The course will also cover a range of related security topics including terrorism, the proliferation of weapons of mass destruction, and instability in the developing world.

**Changes Effective Spring 2021:**

- Recertification
- Description

**PNG 405: Rock and Fluid Properties**

**Old Listing Effective Through Fall 2020:**

Reservoir rock properties, rock and fluid properties (interaction between rock and fluids), flow behavior in reservoir, and fluid properties. PNG 405 Rock and Fluid Properties (3) The objective of this course is to introduce students to basic reservoir rock and fluid properties. The course is divided into three sections: rock properties, rock and fluid properties (interaction between rock and fluids), and fluid properties. In the rock properties, Lithology of Reservoirs, Porosity and Permeability of Rocks, Darcy’s Law, and Distribution of Rock Properties are discussed. In Rock and Fluid Properties Section, Existence of Multi-phasers, Saturation, Wettability, Capillary Pressure, Effective and Relative Permeability, concepts are covered. Fluid properties topics include Phase Behavior of Single and Multi Component Systems, Compositional and Black-Oil models, Solution Gas-Oil Ratios, Formation Volume Factor, Compressibility, Density, Viscosity, and Interfacial Tension. This is also the first course that Petroleum and Natural Gas Engineering students take in the major. Therefore, an introduction to petroleum and natural gas engineering is also made. This course is a pre-requisite for most of the Petroleum and Natural Gas Engineering major courses. It is an elective course for majors such as Environmental Systems Engineering. It is offered every Fall semester.

**Prerequisites:** PHYS 211

**Changes Effective Spring 2021:**

- Description
- Prerequisites

**PNG 410: Applied Reservoir Engineering**

**Old Listing Effective Through Fall 2020:**

- Description
- Prerequisites
Analysis and prediction of reservoir performance by use of material balance and steady and nonsteady state flow equations.

Prerequisites: PNG 405, PNG 406, PHYS 211

Changes Effective Spring 2021:

- Description
- Prerequisites
- Add Concurrent

PNG 420: Applied Reservoir Analysis and Secondary Recovery (3 Credits: Maximum of 999 Credits)

Old Listing Effective Through Fall 2020:

Application of material balance/transient flow solutions to water influx problems; displacement theory as it applies to design/behavior of flooding. PNG 420 Applied Reservoir Analysis and Secondary Recovery (3)

This course addresses two major issues in petroleum engineering: water influx and water flooding. The displacement of oil or gas by water is a complicated physical process that has a great impact on recovery efficiencies. The first objective of the course is to merge the material balance method and transient flow solutions for the aquifer into one analysis tool for understanding and predicting water influx cases. Several analytical and numerical methods are presented including, linear and radial diffusion equation solutions, super position, Hurst simplified, Schilthuis and Hurst modified. The second objective of the course is to understand the fundamentals of displacement theory and practice. The extension of the Buckley and Leverett water flooding theory is presented for three-phase flow. Three-phase relative permeabilities are determined from experimental data. Several geometrical patterns are discussed in the course including: five spots, staggered line drive, direct line drive, four spots, seven spots, and nine spots. The efficiency of each pattern is determined. Strategies for selecting a pattern for special cases are presented. The behavior of each pattern with time, including oil recover, is an integral part of the course. The students use our computational facility throughout the course. They write material balance models and use large reservoir simulators for studying water influx cases.

Prerequisite: PNG 410; CMPSC 201 or CMPSC 202

Changes Effective Spring 2021:

- Prerequisites
- Description

PNG 425: Principles of Well Testing and Evaluation

Old Listing Effective Through Fall 2020:

Mathematical basis for pressure analysis. Theory and practice of pressure testing techniques.

Prerequisites: MATH 251, PNG 420

Changes Effective Spring 2021:

- Description
- Prerequisites

PNG 430: Reservoir Modeling

Old Listing Effective Through Fall 2020:

The numerical simulation of petroleum reservoir processes by the use of models; scaling criteria and network flow.

Prerequisites: MATH 251, PNG 410; CMPSC 201 or CMPSC 202

Changes Effective Spring 2021:

- Description
- Prerequisites

PNG 450: Drilling Engineering

Old Listing Effective Through Fall 2020:

Design and analysis of oil-field drilling operations and equipment. PNG 450 Drilling Engineering (3) This course addresses a critical issue in petroleum and natural gas engineering: of how to drill and complete oil and gas wells in an engineering sound, economical, and environmentally safe manner. Drilling technology has advanced greatly since the first commercial oil well in the U.S. was drilled in northwest of Pennsylvania in 1859. The true vertical depth of the well has grown from 69.5 feet from then to more than 15,000 ft, with the deepest at more than 40,000 feet. The horizontal length of a well has grown from theoretically zero to more than 10,000 feet, with the longest at 40,000 feet. The temperature and pressure of the formation that petroleum engineers need to drill through could easily reach 350°F and 20,000 psi or higher, and the formation and fracture gradient window becomes narrower, all making drilling and completion more challenging. In summary, it is becoming increasingly more challenging to drill wells. Thus, engineering design becomes more critical. The objectives of this course are to introduce the students science of drilling and completion. This includes learning the fundamentals of drilling fluids and drilling fluid design, and applying fluid mechanics and quantify drilling hydraulics for complex fluid flow through drilling string and annular spaces. The course will also discuss the concepts and quantify the formation pressure and fracture pressure gradients for different methods of drilling. A key task for students will be to learn the methods for characterization, selection and optimization of casing design, and optimized bit design, and finally the course will discuss how to design directional and horizontal wells to optimize production and recovery from mature fields and unconventional resources, such as coalbed methane, shale gas, and tight oil in Pennsylvania. This course is a prerequisite for petroleum and natural gas engineering major courses. It is an elective course for majors such as chemical engineering, mechanical engineering, civil engineering, etc. The knowledge, methods, and practical skills in this course could also be used in various other industries including geothermal HVAC, ground water drilling, mineral exploration, and scientific research.

Prerequisites: (EME 303 and EMCH 210) (EMCH 211, EMCH 213 for EMCH 210) Concurrent: PNG 450

Changes Effective Spring 2021:

- Description
- Prerequisites

PNG 451: Drilling Laboratory

Old Listing Effective Through Fall 2020:

Practice in well-control procedures. Measurement of drilling fluid properties. Practice in well-control procedures. Measurement of drilling fluid properties. PNG 451 Drilling Laboratory (1) This course is serves as the laboratory component for PNG 450 Students will apply the concepts and skills gained from lectures and discussions in PNG 450. The aim is for student to become familiar with drilling fluids and with how to quantify the fluid properties analytically. Students will also receive practical experience with drilling equipment, and will practice solving practical well-control problems in the laboratory. Students in this
course will gain experience using our state-of-the-art rig floor simulator and drilling fluid and cement laboratory, which are equipped with the advanced facilities currently used in the oil and gas industry.

Prerequisites: EME 303 and EMCH 210 ) ( EMCH 211, EMCH 213 for EMCH 210)

Concurrent: PNG 450

Changes Effective Spring 2021:

- Not Repeatable
- Description
- Prerequisites

PNG 490: Introduction to Petroleum Engineering Design (1 Credit)
Old Listing Effective Through Fall 2020:

Introduction to the concepts of engineering design as applied to petroleum and natural gas projects. P N G 490 Introduction to Petroleum Engineering Design (1) The objective of this course is to introduce to the students the principles of engineering design as applied to petroleum and natural gas projects. The course focuses on the analysis of physical data with respect to error and use of this data in design. Other topics to be visited include a definition of what is a project deliverable and establishment of timelines for their implementation. The salient points of the course are as follows: (1)This course is the first capstone engineering design course in the sequence of three courses. In this portion of the course students' principal goal is to characterize the reservoir. In this process necessary basic sciences and engineering skills are utilized. (2)In reservoir characterization, students typically collect and analyze the data available in the literature and other related data provided by the operators. (3)In making a preliminary assessment towards field development students consider factors involving economic, environmental, social, ethical, health and safety considerations. (4)In this course, students work in teams. In each team, team members assume responsibilities as petrophysicist, drilling engineer, geologist, geophysicist production engineer, reservoir engineer and implement the necessary technical skill to fulfill their obligations. (5)This project starts from the ground level and ends with a complete field development plan. Within the context of the project (reservoir characterization) students have the opportunity to use the necessary skills to identify and formulate and solve the engineering problems and challenges that are faced. (6)In selecting the lease area the potential impact of project on the social and physical environments is considered and all the ethical responsibilities are studied in depth. (7)During every phase of the project the impact of decisions are considered within the framework of global, economic, environmental and societal context. (8)In this course the main contemporary issue the need for unconventional energy resources is the driving force behind the project. (9) In every phase of the project students are exposed to contemporary methodologies and engineering tools including forecasting, scenario planning and reservoir simulation. Also, whenever applicable the necessary engineering software is also incorporated in the development of the project.

Prerequisite: ECON 102 or E B F 200; P N G 405;

Concurrent: EME 460

Changes Effective Spring 2021:

- Prerequisites
- Description

PNG 492: Petroleum Engineering Capstone Design
Old Listing Effective Through Fall 2020:

Integration of petroleum and natural gas engineering concepts to project design. P N G 492 Petroleum Engineering Capstone Design (1) Engineering design by definition is the integration of knowledge and skills acquired through experience, reading and formal instruction into a final product, the design. To that end, this course is the third course of a 3-course, 3-semester, sequence that will result in a comprehensive capstone-engineering project. As such, P N G 492 will utilize the knowledge gained from three semesters of formal instruction to the project design initiated in P N G 490 and continued on in P N G 491. Course material will include the application of spreadsheet programming to petroleum and natural gas project design and its use in project economic analysis and risk analysis. The class will be divided into teams and students will be evaluated on the basis of their contribution to the team effort. All reports and presentations will be presented to the class as a product of the team.

Prerequisites: PNG 491

Changes Effective Spring 2021:

- Description
- Prerequisites

PPEM 225: Mushroom Cultivation
Old Listing Effective Through Fall 2020:

Students will learn about commercial production of edible mushrooms and how to cultivate them on both a small and commercial scale. PPEM 225 Mushroom Cultivation (3) Pennsylvania’s growers account for nearly 2/3 of the US total mushroom production. The production of the button mushroom, Agaricus bisporus, is a technically challenging process that requires a thorough understanding of substrate preparation and pasteurization (Phase I and Phase II composting) to be successful. The class will follow an Agaricus bisporus crop, at the Mushroom Research Center on campus, for the 11 week cropping cycle, participating in all aspects of button mushroom production. The course will also cover specialty mushroom production (including shiitake, oyster, maitake, enoki), which can be achieved on a small scale with some basic training and understanding of the different nutritional and substrate preparation techniques. Because cultivation of many specialty mushrooms is easier than button mushroom production, we will cultivate shiitake mushrooms both on sawdust logs as well as traditional oak logs. The class will have the opportunity to cultivate at least one other specialty mushroom, such as the oyster or lion’s mane, in lab as well. We will schedule one Saturday field trip to visit several commercial mushroom farms in southeast Pennsylvania. Though this trip is not mandatory, it will be a good chance to view all aspects of commercial mushroom farming.

Perquisites: BIOL 110 or equivalent

Changes Effective Spring 2021:

- Remove Prerequisites

PPEM 300: Horticultural Crop Diseases (3 Credits) (GN)
Old Listing Effective Through Fall 2020:

The concepts of plant pathology are introduced to describe how plants, the environment, and biotic and abiotic plant pathogens interact over time to cause disease. Understanding these relationships can help to prevent disease problems or increase management and control options. Students learn how plant pathogens survive, reproduce, and spread.
The role that plant pathogen distribution and regulation have played in shaping history and their influence on our economics, trade, and the environment is discussed. Common and significant plant diseases are illustrated to explain their causes, diagnosis, management, and national and international importance. All information is presented in online modules and all assessments are submitted online. Students should be able to recognize common garden plants in the NE United States such as maples, oaks, roses, crabapples, lilacs, peony, pachysandra, etc. Internet access and a digital camera are required (phone cameras are usually fine).

Weekly assignments, quizzes, and labs are all submitted online. Several diagnosis exercises reinforce the practical aspects of identifying and controlling plant pathogens and the Plant Disease Assessment Report provides experience in plant disease site evaluation and management. Students customize many assignments to use their favorite plant materials and locations. The online modules supply course content but students apply the lessons in their own local area. Original student photographs are needed for diagnoses and the Plant Disease Assessment Report.

Plant diseases have significant influences on plant aesthetics, economics, edibility, and viability. They have had profound influences on world history, and roles in modern national and international trade and bio-security. Students will gain an appreciation of the impact that horticultural crop diseases can have on society and the environment, including how the global trade of horticultural crops has resulted in the spread of pathogens important to agricultural crops and native plants.

PREREQUISITE: 3 credits in a biological science

Changes Effective Spring 2021:

- Prerequisites
- Add Recommended Preparation

PPEM 430: Air Pollution Impacts to Terrestrial Ecosystems (3 Credits)

Old Listing Effective Through Fall 2020:

Overview of the direct and indirect effects of air pollutants on terrestrial plants and ecosystems. E R M (PPEM) 430 Air Pollution Impacts to Terrestrial Ecosystems (3) Pollutant sources, transport, meteorology, and temporal and spatial trends of pollution dispersion and deposition are introduced. An overview is presented of the direct and indirect effects of air pollutants on terrestrial ecosystems with an emphasis on plant life. The effects of ozone, sulfur dioxide, nitrogen oxides, particulate matter, halogens, and combined pollutants leading to acidic atmospheric depositions are presented. Emphasis is placed on air pollutants as plant pathogens leading to symptoms and eventual long-term accumulative effects to entire ecosystems. Methods of diagnostics, factors affecting plant response, ecosystem decline and resiliency, pest interactions, assessment of loss and cost/benefit analysis leading to abatement follows. Final parts of the course include perspectives of public awareness, development of National Ambient Air Quality Standards, compliance prevention of significant deterioration, and the Clean Air Act reforms of 1990.

Cross-Listed Courses: ERM 430

Prerequisite: BIOL 220W or FOR 308

Changes Effective Spring 2021:

- Abbreviated Title
- Description
- Prerequisites

PPEM 440: Environmental Microbiomes: Concepts and Analysis Tools (3 Credits)

Old Listing Effective Through Fall 2020:

The development of next-generation sequencing (NGS) technologies was initially spurred by the desire for a human genome sequence, but these tools are now essential to all areas of biology. The amount of data produced by NGS allows us to ask questions about processes that occur across genomes, communities, and even landscapes. In particular, NGS has revolutionized the study of environmental microbiology, allowing us to investigate the thousands of microbial species that co-occur in a given environment, even though most of these microorganisms have not been captured or observed in culture. The entire complement of microorganisms (and their genes) that occur in a particular environment is frequently referred to as the microbiome of that environment. The field of microbiome research is evolving rapidly, which means that there are many opportunities to contribute to exciting new discoveries. However, this fast pace of change has made it difficult to properly prepare students for microbiome-focused graduate work. In this course, you will learn about the development of NGS techniques, as well as recent applications of NGS to natural and agricultural soil systems, including how these tools can be used to understand both targeted and unintentional human-induced changes to microbiomes. You will also develop the ability to interpret microbiome-related literature and to work with NGS data using freely available software. In your second assignment, you will explore additional software not used in class, in order to learn how to learn to use unfamiliar bioinformatics tools. This course is intended for students with very little background in programming or bioinformatics, but with a strong understanding of microbiology, molecular biology, and/or ecology.

At the conclusion of this course, students will be able to: Interpret microbiome terminology and figures. Understand and present a summary of a microbiome-based journal article. Analyze microbiome-based high-throughput sequencing data using freely available software. Apply microbiome analysis tools to unknown data. Express their interpretation of microbiome data in oral, written, and graphical contexts.

Prerequisites: BIOL 220W, MICRB 201; Recommended Preparations: BIOL 463; MICRB 413

Changes Effective Spring 2021:

- Title
- Abbreviated Title
- Description

PSYCH 420: Advanced Social Psychology (3 Credits)

Old Listing Effective Through Fall 2020:

In depth study of selected research areas in human social behavior.

Prerequisite: PSYCH 100, 6 additional credits of PSYCH

Changes Effective Spring 2021:

- Enforced Prerequisite

PSYCH 422: Human Sexuality (3 Credits)

Old Listing Effective Through Fall 2020:
Changes Effective Spring 2021:

- Enforced Prerequisite

PSYCH 425: Psychology of Human Emotion (3 Credits) (BA)
Old Listing Effective Through Fall 2020:
Reviews, critiques, and applies major historical and contemporary psychological theories of emotion experience, understanding, and expression.
Prerequisite: PSYCH 100, 6 additional credits of PSYCH

Changes Effective Spring 2021:

- Enforced Prerequisite

PSYCH 427: L1 Acquisition (3 Credits) (BA)
Old Listing Effective Through Fall 2020:
How children learn their first language; psycholinguistic aspects of lexical, syntactic, semantic, and phonological development. LING 446 (PSYCH 427) L1 Acquisition (3) (BA) This course meets the Bachelor of Arts degree requirements. This course focuses on how children learn their first language from the theoretical perspectives of imitation theories, social construction theories, and innateness theories. In addition, the course covers the various stages of language acquisition including phonological (sound system), morphological (word meaning), syntactical (grammar) and semantic (meaning) development from birth to adulthood. Other related subfields covered in the course include the acquisition of pidgin and creole languages, bilingual and multilingual acquisition, and language acquisition and linguistic change.
Cross-Listing: LING 446
Prerequisite: LING 100 or PSYCH 2 or permission of program

Changes Effective Spring 2021:

- Enforced Prerequisite

PSYCH 432: Multicultural Psychology in America (3 Credits) (BA)
(US)
Old Listing Effective Through Fall 2020:
This course focuses on the central role of culture, race, and ethnicity in the human condition.
Prerequisite: PSYCH 100, 6 additional credits of PSYCH

Changes Effective Spring 2021:

- Enforced Prerequisite

PSYCH 434: Psychology of Gaming (3 Credits)
Old Listing Effective Through Fall 2020:
Upper level course examining the core psychological principles as they apply to the topic of games. GAME 434 / PSYCH 434 Psychology of Gaming (3) This course looks at how the field of psychology can be applied to understand and improve the world of games. This requires the application of theories and research based in experimental, cognitive and several other disciplines within psychology, including but not limited to cognitive, social, motivation & emotion, and experimental psychology. By applying different theories within these disciplines we can start to understand how humans interact with games and in turn how games have evolved as a result. This course addresses an active research area in psychology, of broad interest to students in Psychology and other disciplines. The course will fulfill a 400-level requirement for students in the PSYCH majors and minors as well as those in the GAME minor. Students typically will be evaluated by exams, research project, in-class activities, homework, and article discussions.
Prerequisites: 3 credits of psychology or 3 credits of gaming course

Cross-Listing Courses: GAME 434

Changes Effective Spring 2021:

- Prerequisite

PSYCH 438: Personality Theory (3 Credits)
Old Listing Effective Through Fall 2020:
Personality theories and their application to social and personality development and personality dynamics.
Prerequisite: PSYCH 100, 6 additional credits PSYCH

Changes Effective Spring 2021:

- Enforced Prerequisite

PSYCH 439: History and Systems of Psychology (3 Credits)
Old Listing Effective Through Fall 2020:
Historical antecedents to scientific psychology; development of contemporary psychological theories and research areas from the formal establishment of psychology.
Prerequisite: PSYCH 100, 6 additional credits of PSYCH

Changes Effective Spring 2021:
• Enforced Prerequisite

PSYCH 441: Health Psychology (3 Credits) (BA)
Old Listing Effective Through Fall 2020:
Overview of the field with an emphasis on how psychological research contributes to an understanding of health and behavior.
Prerequisite: PSYCH 100, 6 additional credits of PSYCH

Changes Effective Spring 2021:
• Enforced Prerequisite

PSYCH 442: Trauma and Resiliency (3 Credits)
Old Listing Effective Through Fall 2020:
This course will provide an overview of the current state of knowledge and research on traumatic stress, resiliency, and treatment.
Prerequisite: PSYCH 100 and one other PSYCH class

Changes Effective Spring 2021:
• Enforced Prerequisite

PSYCH 443: Treatment and Education in Developmental Disabilities (3 Credits)
Old Listing Effective Through Fall 2020:
Covers etiology, classification, intervention (treatment and education), ethical and legal issues related to individuals with developmental disabilities.
Prerequisite: PSYCH 100, 6 additional credits of PSYCH

Changes Effective Spring 2021:
• Enforced Prerequisite

PSYCH 444: Engineering Psychology (3 Credits) (BA)
Old Listing Effective Through Fall 2020:
Methods and results of experimental psychology pertinent to problems which involve man-machine relationships.
Prerequisite: PSYCH 100, 6 additional credits of GQ or PSYCH

Changes Effective Spring 2021:
• Enforced Prerequisite

PSYCH 456: Advanced Cognitive Psychology (3 Credits)
Old Listing Effective Through Fall 2020:
In depth study of complex mental processes: thinking, problem-solving, imagery, symbolic behavior, information-processing, attention, artificial intelligence, and language.
Prerequisite: PSYCH 100, 6 additional credits of PSYCH

Changes Effective Spring 2021:
• Enforced Prerequisite

PSYCH 458: Visual Cognition (3 Credits) (BA)
Old Listing Effective Through Fall 2020:
Overview of concepts and methods in cognitive visual-spatial processing.
Prerequisite: PSYCH 100, 6 additional credits of PSYCH

Changes Effective Spring 2021:
• Enforced Prerequisite

PSYCH 461: Advanced Conditioning and Learning (3 Credits)
Old Listing Effective Through Fall 2020:
An examination of basic learning processes that have been determined within the context of classical, instrumental, and operant learning situations.
Prerequisite: PSYCH 100, 6 additional credits of PSYCH

Changes Effective Spring 2021:
• Enforced Prerequisite

PSYCH 462: Physiological Psychology (3 Credits)
Old Listing Effective Through Fall 2020:
Study of the biological bases of behavior and experience, including the anatomy and physiology of the brain and nervous system.
Prerequisite: PSYCH 100, PSYCH 260 or 3 credits of BIOL

Changes Effective Spring 2021:
• Enforced Prerequisite

PSYCH 471: Psychology of Adjustment and Social Relationships (3 Credits)
Old Listing Effective Through Fall 2020:
Theory and application of psychological principles to problems in personal and social adjustment.
Prerequisite: PSYCH 100, 6 additional credits of PSYCH

Changes Effective Spring 2021:
• Enforced Prerequisite

PSYCH 472: Human Development, Health, & Education From A Global Perspective
Old Listing Effective Through Fall 2020:
Intended to address the University's global community objectives and provide scholarly background on India for Schreyer Honors students.
Prerequisites: PSYCH 100H
Cross-Listed Courses: SPSY 472

Changes Effective Spring 2021:
• Description
• Prerequisites

PSYCH 473: Behavior Modification (3 Credits)
Old Listing Effective Through Fall 2020:
Principles of advanced behavior modification techniques.
Prerequisite: PSYCH 100, 6 additional credits of PSYCH
Changes Effective Spring 2021:

• Enforced Prerequisite

**PSYCH 475: Psychology of Fear and Stress (3 Credits) (BA)**
Old Listing Effective Through Fall 2020:

Description and evaluation of major trends in research on stress and fear in humans and other animals.

Prerequisite: PSYCH 100, 3 credits of BIOL, statistics PSYCH 200 or STAT 200

Changes Effective Spring 2021:

• Enforced Prerequisite

**PSYCH 475: Psychology of Fear and Stress (3 Credits) (BA)**
Old Listing Effective Through Fall 2020:

Description and evaluation of major trends in research on stress and fear in humans and other animals.

Prerequisite: PSYCH 100, 3 credits of BIOL, statistics PSYCH 200 or STAT 200

Changes Effective Spring 2021:

• Enforced Prerequisite

**PSYCH 477: Mental Health Practicum with Children (3 Credits) (BA)**
Old Listing Effective Through Fall 2020:

Overview of interventions for children at risk for mental health disorders; emphasis on intervention strategies, program evaluation, and applied skills.

Prerequisite: PSYCH 100, permission of program

Changes Effective Spring 2021:

• Enforced Prerequisite

**PSYCH 484: Work Attitudes and Motivation (3 Credits) (BA)**
Old Listing Effective Through Fall 2020:

Survey of theory and research with respect to attitudes, morale, and motivation of employees and management.

Prerequisite: PSYCH 100, PSYCH 200 or STAT 200 or 6 credits of GQ

Changes Effective Spring 2021:

• Enforced Prerequisite

**PSYCH 485: Leadership in Work Settings (3 Credits) (BA)**
Old Listing Effective Through Fall 2020:

Review of research and application of behavior principles in the areas of management and supervision.

Prerequisite: PSYCH 100, PSYCH 281 or 3 credits MGMT

Changes Effective Spring 2021:

• Enforced Prerequisite

**PSYCH 485: Leadership in Work Settings (3 Credits) (BA)**
Old Listing Effective Through Fall 2020:

Review of research and application of behavior principles in the areas of management and supervision.

Prerequisite: PSYCH 100, PSYCH 281 or 3 credits MGMT

Changes Effective Spring 2021:

• Enforced Prerequisite

**PSYCH 490: Senior Seminar in Psychology (3 Credits) (BA)**
Old Listing Effective Through Fall 2020:

Capstone experience for senior psychology majors; review of current research literature; topics vary.

Prerequisite: PSYCH 301W, 6 credits 400-level PSY, senior Psychology major

Changes Effective Spring 2021:

• Enforced Prerequisite

**PSYCH 491: Honors Thesis (3 Credits) (HON)**
Old Listing Effective Through Fall 2020:

An opportunity to pursue an advanced research thesis or project to integrate studies within psychology.

Prerequisite: HONOR 301H, senior standing, and permission of the program

Changes Effective Spring 2021:

• Enforced Prerequisite

**PSYCH 493: Senior Thesis (3 Credits: Maximum of 6 Credits) (BA)**
Old Listing Effective Through Fall 2020:

Supervised senior thesis research in psychology.

Prerequisite: approval of a thesis adviser in the department, seventh-semester standing

Changes Effective Spring 2021:

• Enforced Prerequisite

**PSYCH 495: Internship (1-18 Credits)**
Old Listing Effective Through Fall 2020:

Supervised off-campus, nongroup instruction including field experiences, practica, or internships. Written and oral critique of activity required.

Prerequisite: prior approval of proposed assignment by instructor

Changes Effective Spring 2021:

• Enforced Prerequisite

**PT 282: Rehabilitation-2 (2 Credits)**
Old Listing Effective Through Fall 2020:

In this course, neuroanatomy and neurophysiology will be reviewed and principles of specific neuro-rehabilitation techniques, and neuromotor development will be explored. This course will address rehabilitation techniques for patients with selected conditions seen in physical therapy neurological and rehabilitation settings. Selected neurological conditions will be covered, including etiology, clinical presentation, medical management, and physical therapy interventions. Neurologic conditions and developmental delays associated with pediatric clients will also be included. By the completion of this course, students should be able to identify specific areas in the brain, spinal cord, and peripheral nervous system associated with neurological signs, symptoms, and conditions; perform and discuss the value and use of various data collection tools associated with neuro-rehabilitation; demonstrate safe and effective physical therapy interventions as applied to patients with neurological disorders; discuss and demonstrate basic physical therapy interventions for patients with vestibular dysfunction; discuss the basic developmental milestones associated with human growth and development; and demonstrate and discuss safe and effective handling and positioning principles used with pediatric patients. Gait deviations and interventions, wheelchair fitting and use, and specific physical therapy interventions for various diagnoses will be covered. Using extensive examples, exercises, and real life scenarios, this course teaches students skills to assess, treat and document functional outcomes in a clear and logical progression. Lecture, lab activities, and written assignments will be used to discuss clinical decisionmaking and
intervention strategies for related impairments. Enrollment is limited to students admitted to the 2PTA major.

Prerequisites: A grade of "C" or better in PT 281, PT 270W; OR PT 271W

Changes Effective Spring 2021:
- Credits

**RHS 300: Introduction to Rehabilitation and Human Services**
Old Listing Effective Through Fall 2020:

This course serves as an introduction to Rehabilitation and Human Services practice settings. The course reviews the human services profession, including introductory information about social problems within a socio-political context to show how culture and ideology influence experiences and perspectives. The foundation of the human services profession is explored by examining educational standards and professional requirements: its roots as a helping profession within the history of social welfare provision, its ethical standards, theoretical underpinnings, and the nature of the generalist practice model, with an emphasis on helping people with disabilities.

Recommended Preparations: 6 credits in psychology, sociology, human development and family studies and/or crime, law and justice

Changes Effective Spring 2021:
- Remove Recommended Preparation

**RHS 302: Client Assessment in Rehabilitation and Human Services**
Old Listing Effective Through Fall 2020:

Provides a practical understanding and skills to utilize assessment in the helping process.

Prerequisites: 3 credits in statistics

Changes Effective Spring 2021:
- Description
- Remove Prerequisites
- Add Concurrent

**RHS 303: Group Work in Rehabilitation Practice and Human Services**
Old Listing Effective Through Fall 2020:

An overview of essential elements and dynamics for conducting groups and various team-related activities will be the major focus.

Prerequisites: 6 credits in psychology, sociology, or human development

Changes Effective Spring 2021:
- Description
- Remove Prerequisites
- Add Recommended Preparation

**RHS 401: Community Mental Health Practice and Services (3 Credits)**
Old Listing Effective Through Fall 2020:

Community mental health roles, historical points, current trends, and ethical standards; funding and impact on service provision.

Prerequisite: 6 credits in psychology and/or sociology

Changes Effective Spring 2021:
- Description
- Prerequisites
- Add Recommended Preparation

**RHS 403: Medical Aspects of Disability (3 Credits)**
Old Listing Effective Through Fall 2020:

Common disabling illnesses, injuries, and congenital defects; their symptomatology, prognosis, and treatment; implications for personal, social, and vocational adjustment.

Prerequisite: 6 credits in psychology and/or sociology

Changes Effective Spring 2021:
- Description
- Prerequisites
- Add Recommended Preparation

**RHS 428: Rehabilitation Corrections (3 Credits)**
Old Listing Effective Through Fall 2020:

An overview of rehabilitation in different correctional settings focusing on history, classification, risk assessment, intervention strategies, and community reentry.

Prerequisite: RHS 300

Changes Effective Spring 2021:
- Description
- Prerequisites

**RHS 495A: Rehabilitation and Human Services Internship (15 Credits: Maximum of 15 Credits)**
Old Listing Effective Through Fall 2020:

Full-time practicum in rehabilitation and related human services agencies and institutions providing psychosocial, vocational, educational, and/or residential services to people with disabilities.

Prerequisite: students must have successfully completed all other required coursework for the major (grade of "C" or higher) as well as fulfilled general education requirements.

Changes Effective Spring 2021:
- Description
- Remove Prerequisites
- Add Recommended Preparation

**RLST 107: Introduction to Islam (3 Credits) (BA) (IL) (US) (GH)**
Old Listing Effective Through Fall 2020:

Community and message of the early movement; development of authoritative structures and traditions; proliferation of sects; theology and creeds; mysticism.

Changes Effective Spring 2021:
• Recertification
• Description

**RLST 116: Muslims in America**  
Old Listing Effective Through Fall 2020:

This course is a study of Muslims from multiple racial, cultural, and national perspectives; it explores what it means to be a Muslim in America. RL ST 116 Muslims in America (3) (GH;IL)(BA) This course meets the Bachelor of Arts degree requirements. This course is a study of Muslims in the United States. It examines the multiple racial, cultural, and national groups that comprise this diverse community; we will question what it means to be a Muslim in America. It traces the trajectory of this seventh century faith as a transplanted faith in the New World. The course interrogates Islam in America starting with the historical record of the surviving Muslims that came to the shores of the Americas as African slaves and their enduring efforts to remain Muslims. Next, we examine African American Islam in its myriad formations. The influx of immigrants in the 1960s from the Arab Muslim world, Africa and Asia, including Central Asia became the second historical chronicle of Islam in America. This inquiry examines the narratives of each wave of Islam as a cultural and religious force in the development of Muslim identity in America. The course will examine how Muslim populations during each of these divergent waves confronted American pluralism, diversity and democracy. The course examines the transformation of the Islamic tradition from its origins in the Arabian peninsula to the shores of North America, including questions of authority, the growing salience of American Muslim women's conception of gender jihad, the struggle of Muslim trans gender community to gain acceptance, institution building, and the efforts to develop an American Muslim identity. The course will also examine the musical genre of rap music with special reference to the second generation of Muslim. We will also examine the role of Islam in American prisons. The course will examine how the Islamic tradition has been adapted to the American cultural milieu and how Muslim culture is also influencing America. The course will examine how Islam and Muslim populations have been conceptualized in America before and after 9/11.

Changes Effective Spring 2021:

• Abbreviated Title
• Description
• Cross-listed Course

**SC 200: Science in Our World: Certainty and Controversy (3 Credits) (GN)**  
Old Listing Effective Through Fall 2020:

A science appreciation course, aimed at making non-scientists more informed consumers of science. SC 200 Science in Our World: Certainty and Controversy (3) (GN) Science is frequently in the news. That's because it affects our everyday lives, shapes our view of the world and our place in it, and will have a profound impact on our future. This course teaches an appreciation of science and scientific thinking. It is aimed at making non-scientists more informed consumers of science by improving their ability to distinguish good science from bad science, and science from non-science. The course assumes no background knowledge. It is not for scientists. Teaching is delivered by case studies of controversies within science and/or the public domain, some of which are resolved, some of which are not. The first section of the course illustrates general principles by studying arguments now largely resolved, but which still resonate, such as child health and IQ, smoking, and why the peacock has such a ridiculous tail. The second section focuses on unresolved scientific controversies which might include climate change, personalized genetic medicine, passive smoking, nanotechnology, the scientific evaluation of the healing power of prayer, or deer management in Pennsylvania. The third section evaluates unresolved scientific issues in the contemporary media: why it is in the news, what are the scientists involved actually doing and arguing about, and how is the media handling the science? This will be likely focused on real time analysis of media reaction to a scientific paper published by PSU faculty during the course. The fourth section will discuss paradigm shifts which have occurred during the students’ lifetimes, particularly those involving our view of ourselves and our universe, and end by speculating on the paradigm shifts that could occur in the next twenty years. The course will draw on experts from within and outside of PSU. Throughout, the focus is on the nature of the debates, looking at how scientists evaluate problems, and why that can generate controversy within science and beyond science – but at the same time, generate knowledge which profoundly affects our well being and our understanding of ourselves.

Changes Effective Spring 2021:

• General Education Recertification
• Abbreviated Title
• Abbreviated Title
• Description

**SOC 3: Introductory Social Psychology (3 Credits) (BA) (GS)**  
Old Listing Effective Through Fall 2020:

The impact of the social environment on perception, attitudes, and behavior. SOC 003 Introductory Social Psychology (3) (GS)(BA) This course meets the Bachelor of Arts degree requirements. Social psychology is a discipline that bridges sociology and psychology. Sociology focuses on large-scale social trends while psychology emphasizes the individual organism and it’s functioning. Social psychologists borrow perspectives and methods from both sociology and psychology. The major thrust, however, is on the influence of the social group areas such as socialization, social influence, conformity, group decision-making, interpersonal relationships, and social power. This course provides an overview of the major ideas and research streams that characterize modern social psychology. Eight major goals guide the form and content of this course: (1) Survey existing theory and research in contemporary social psychology, (2) Enhance students’ understanding of how social scientists conduct research, (3) Provide insight into the influence of social settings on human behavior, (4) Relate social psychology to other areas of social and behavioral science, (5) Help students to understand the interface between theory and research in social psychology, (6) Demonstrate the nature and outcomes of different cultural and sub-cultural processes, (7) Relate course material to contemporary personal and social problems, and (8) Provide opportunities for students to sharpen their critical thinking about human behavior. In general, this course is designed to enhance students’ understanding of themselves, other individuals, and the world in which they live. For example, after taking the course, students will have a better understanding of why people sometimes help others in trouble and sometimes ignore them, what kinds of situations promote conformity to authority, what factors result in anger and violence, why intergroup conflict is so pervasive, and how attitudes are acquired. Assessment is based on a combination of objective tests, a written group research project, individual papers, or a series of short research projects, depending on the instructor. All courses have at least one graded writing assignment. Group projects involve research on social influence. For example, students may use the Internet to study how political or religious groups attract supporters. Individual papers sometimes involve a critical book review. Alternatively, individual papers may be based on short
Current social problems such as economic, racial, and gender inequalities; social deviance and crime; population, environmental, energy, and health problems. SOC 005 Social Problems (3) (GS) This course meets the Bachelor of Arts degree requirements. This course is designed to introduce students to the main societal issues facing humanity at the present time and in the foreseeable future. Although the course examines a number of social issues in the United States (such as crime and poverty), the course generally takes an international and intercultural perspective. The primary social issues that affect individuals and their children today are global, rather than national, in scope. For this reason, globalization is a recurring theme in the course. Discussion and questions are encouraged in all sections. Assessment is based partly on objective and short-answer tests taken in class, including a final examination. All sections also include writing assignments that involve either library or Internet research. For example, in one commonly used assignment, students write a paper describing and analyzing a serious social problem in some country other than the United States, such as Ireland, Egypt, New Zealand, Ethiopia, Argentina, or Indonesia. An alternative writing assignment requires that students investigate and describe a local problem in Centre County. Another variation requires students to research the views of other students and groups on campus and compose a letter to the Penn State university president about an issue or problem on campus involving student behavior. SOC 005 provides excellent preparation for most upper–level sociology courses. Because this course introduces students to social problems that will confront their generation in the near future, it also is relevant to other majors and disciplines, such as political science, economics, and health and human development. This course meets a General Education requirement in the Social and Behavioral Sciences.

Changes Effective Spring 2021:

- Recertification
- Description

SOC 23: Population and Policy Issues (3 Credits) (BA) (GS)
Old Listing Effective Through Fall 2020:

Local, national, and international population trends; basic techniques of demographic analysis; population problems; implications for public planning and policy. SOC 023 Population and Policy Issues (3) (GS) (BA) This course meets the Bachelor of Arts degree requirements. Demographic changes are some of the most important factors in understanding the future of specific professions, our nation, and the world. This course introduces students to the discipline of demography, including an overview of demographic issues, theories of population, and major findings from demographic research. Focusing on the state, national, and global level, students will learn how the discipline of demography and how population structure and age are related to social institutions and public policy issues. Students will receive hands-on experience with the data and methods used by professional demographers and health and urban planners. Thus, this course should provide students with 1) a global perspective on population changes, 2) knowledge of demography research and theory, 3) analytical skills for the application of demography to public policy, 4) an awareness of how the diversity of a population (e.g., age structure, race, ethnicity, sex, and culture) is related to public policy, and 5) the active learning of demographic techniques. The instructors encourage discussion and questions in all sections. Assessment is based on objective tests taken in class, writing assignments, and student research projects called population analysis exercises. The analysis exercises allow students to use the data and methods of professional demographers. Some sections will also hold in-class debates and will require the performance of in-class assignments. This course meets a General Education requirement in Social and Behavioral Sciences.

Changes Effective Spring 2021:

- Recertification
- Description

SOC 83: First-Year Seminar in Sociology (3 Credits) (BA) (FYS) (GS)
Old Listing Effective Through Fall 2020:

Critical approaches to issues in the structure of society. SOC 083S First-Year Seminar in Sociology (3) (GS;FYS)BA) This course meets the Bachelor of Arts degree requirements. Each section of this course will be limited to 20 students who will be instructed by an experienced faculty member. Each section will focus on a well-defined body of scholarship that addresses a relatively specific topic while at the same time provide an opportunity for surveying broadly existing knowledge in the discipline. The specific content of the course will vary from offering to offering, and depending on the interests of the instructor, will introduce students to a sociological perspective on particular social issues. For example, one section examines racism and sexism as axes of privilege and oppression. Other sections may deal with major social institutions, such as the family or religion, or with fundamental social processes (e.g., demographic, social, and psychological). Finally, some sections may have a heavier policy emphasis—examining responses to social issues—while others might take a comparative or international approach. Each section will emphasize the development of discussion, writing, and analytical skills and will give students the opportunity to work individually and in small groups. Students can expect to receive a general introduction to the University as an academic community and to explore their responsibilities as members of that community. They will also become familiar with the learning tools and resources available to them, and they will be able to establish relationships with faculty and other students who share their academic interests. This course fulfills a general education or Bachelor of Arts requirement in the social/behavioral sciences.

Changes Effective Spring 2021:

- Recertification
- Description

SOC 119: Race and Ethnic Relations (4 Credits) (US) (GS) (BA)
Old Listing Effective Through Fall 2020:

Historical patterns and current status of racial and ethnic groups; inequality, competition, and conflict; social movements; government policy. SOC 119 Race and Ethnic Relations (4) (GS;US)(BA) This course
meets the Bachelor of Arts degree requirements. This course has three objectives. First, the course will help you to think critically about issues related to race and ethnicity in American society. These issues include the meaning of race and ethnicity; the extent of racial and ethnic inequality in the U.S.; the nature of racism, discrimination, and racial stereotyping; the pros and cons of affirmative action; the development of racial identity; differences between assimilation, amalgamation, and multiculturalism; and social and individual change with respect to race relations. The second objective is to foster a dialogue between you and other students about racist and ethnocentric attitudes and actions. The third objective is to encourage you to explore your own racial and ethnic identity and to understand how this identity reflects and shapes your life experiences. The course is offered in both a large and a small enrollment format. In large enrollment courses, you not only attend lectures, but also participate in weekly discussion groups run by teaching assistants. These discussion groups typically have between 10 and 15 students. Your course grade is based on a combination of objective examinations, participation in group discussions, and short writing assignments. One example of a written assignment involves weekly journals. Each of your journal entries (typed, and one or two pages in length) will focus on personal reactions to course material and answers to questions posed by the instructor. The course also requires out-of-class attendance at two campus events related to race or ethnicity, such as films, speakers, or workshops. For each event, a one-page written summary and personal reaction is required. Teaching assistants provide feedback on writing. Small (or moderate) sections of the course usually operate without separate discussion sections. In these courses, however, instructors set aside a substantial amount of class time for discussion of course material, equivalent to about one class session per week. During discussions, the class may remain together or divide into smaller discussion groups. After addressing a topic, you may be asked to submit a short written reaction to the issues raised in the discussion. Assessment is based partly on objective examinations. In addition, the course requires a library research project in which you explore in greater detail a controversial topic covered in class. These papers require the use of multiple sources (books, journal articles), excluding the textbooks for the course. The instructor provides written feedback, prior to the end of the semester, on your papers. This course meets a general education requirement in the social and behavioral sciences as well as a general education requirement in intercultural and international competence.

Changes Effective Spring 2021:
- General Education Recertification
- Add IL Attribute
- Add GH Attribute
- Abbreviated Title
- Long Title
- Credits
- Description

SOC 300: Preceptorship in Sociology (1-4 Credits: Maximum of 8 Credits) (BA)
Old Listing Effective Through Fall 2020:

Supervised experience as a teaching assistant under the supervision of an approved faculty member.

Prerequisite: 3 credits in course work related to the subject of the course

Changes Effective Spring 2021:
- Prerequisite

SOILS 402: Soil Nutrient Behavior and Management (3 Credits)
Old Listing Effective Through Fall 2020:

Chemical and biological behavior of soil nutrients; management for plant availability and fate in the environment. Laboratory emphasizes soil testing and soil-plant relationships. SOILS 402 Soil Nutrient Behavior and Management (3) Soil Nutrient Behavior and Management is a senior/graduate level course that covers the chemical and biological processes that determine the behavior of essential plant nutrients in soils. As this understanding of basic nutrient behavior is developed in the course, it is applied directly to explain the basis for management of nutrients for optimum plant availability. This same nutrient behavior is linked to the fate of nutrients either applied as sources of plant nutrition or through disposal of nutrient containing materials on soils, which is a major environmental issue. Management practices necessary to minimize environmental impacts from nutrients are also covered. From this background students will be able to understand nutrient behavior and management recommendations and adapt management to a variety of soil-plant systems and situations both for plant growth and environmental protection. Real world examples of developing and adapting management systems are used to illustrate this process. The laboratory exposes the student to common soil testing procedures, methods for studying soil nutrient-plant interactions, and examples of practical application of management practices in the field. Evaluation will be based on 3 exams, laboratory reports, homework assignments.

Prerequisites: CHEM 112, SOILS 101

Changes Effective Spring 2021:
- Abbreviated Title
- Description
- Prerequisite

SOC 403: Advanced Social Psychology (3 Credits) (BA)
Old Listing Effective Through Fall 2020:

Analysis of the major theoretical approaches and research findings of contemporary social psychology.

Prerequisite: SOC 3

Changes Effective Spring 2021:
- Prerequisite

SOC 404: Social Influence and Small Groups (3 Credits) (BA)
Old Listing Effective Through Fall 2020:

The study of social influence, leadership and status, and social cohesion and commitment processes in small groups.

Prerequisite: SOC 3 or PSYCH 420

Changes Effective Spring 2021:
- Prerequisite

SOC 406: Sociology of Deviance (3 Credits) (BA)
Old Listing Effective Through Fall 2020:

Theory and research concerning deviant behaviors and lifestyles viewed as significant departures from a group's normative expectations. SOC (CRIMJ/CRIM) 406 Sociology of Deviance (3) (BA) This course meets
the Bachelor of Arts degree requirements. Sociology of Deviance focuses on the theory and research in social construction of social norms, the violation of norms, and social reaction to the violation of norms. The course focuses on the role of social structure and power in the definition of deviance, on structural, cultural, and social psychological processes involved in deviant behavior, and the dynamics of social reaction to deviance. The course includes some content focusing on criminal deviance, but also emphasizes non-criminal deviance, as well as the role of social movements and social change in constructing and contesting deviance definitions. CRIMJ/SOC/CRIM 012 and CRIM/CRIMJ 250W are prerequisites. This course may be counted toward the credits required for the B.A. and B.S. in Crime, Law, and Justice. It would fulfill one of the 400-level requirements in the &quot;Crime&quot; component of the major. The course may also be counted toward credits required for the B.A. and B.S. in Sociology for students with the Deviance and Criminology specialization.

Prerequisite: SOC 12, SOC 13, or SOC 5, or permission of program

Cross Listing: CRIMJ 406, CRIM 406

Changes Effective Spring 2021:

• Prerequisite

SOC 413: Advanced Criminological Theory
Old Listing Effective Through Fall 2020:

This course provides an in-depth look at theories of crime and examines influential empirical studies designed to these theories. CRIMJ 413/CRIM/SOC 413 Advanced Criminological Theory (3) Advanced criminological theory is intended to extend and deepen students’ knowledge of core ideas in criminology. The course has four main emphases: 1) learning major schools of thought in criminology, 2) learning about the uses and construction of theory, 3) learning about approaches to integrating criminological theories, and 4) exploring how criminological concerns are grounded in and interrelated with core issues in sociology. The course is offered once a year with 50 seats per offering. CRIMJ/SOC/CRIM 012 is a prerequisite. Students will be evaluated on research or analytical papers, written assignments on course readings, and/or in-class essay-style exams. This course may be counted toward the credits required for the B.A. and B.S. in Crime, Law, and Justice. It would fulfill one of the 400-level requirements in the major. The course may also be counted toward credits required for the B.A. and B.S. in Sociology for students with a Deviance and Criminology specialization.

Cross-Listed Courses: CRIM 413 CRIMJ 413

Prerequisite: CRIMJ 12, CRIMJ 250W

Changes Effective Spring 2021:

• Prerequisites

SOILS 418: Nutrient Management in Agricultural Systems (3 Credits)
Old Listing Effective Through Fall 2020:

Comprehensive review of nutrient flow in animal agricultural systems, environmental regulations, and environmental stewardship practices. AGECO 418 / ANSC 418 / SOILS 418 Nutrient Management in Agricultural Systems is a senior level course that applies the fundamentals of animal, plant and soil sciences to the issues and solutions in the area where livestock production intersects with water and air quality. Modern regionalization and concentration of animal production systems comes with environmental implications due to a net influx of nutrients to livestock farms. While some nutrients leave the farm in the form of animal products, 60 to 70% of the nutrients are excreted and applied to nearby crop land. If not properly managed these nutrients represent a risk to environmental quality. Students in this cross-listed course gain both scientific and practical understanding of sound nutrient management principals and strategies. The course considers big picture concepts such as nutrient cycling as well as farm-level implementations such as Nutrient Management Planning.

Prerequisite: BIOL 110; BIOL 11; BIOL 12; BISC 3

Cross-Listed Courses: AGECO 418 ANSC 418

Changes Effective Spring 2021:

• Abbreviated Title
• Description
• Prerequisite

SOC 425: Social Conflict (3 Credits)
Old Listing Effective Through Fall 2020:

An analysis of the variables affecting intergroup and international conflict and cooperation.

Prerequisite: general behavioral science, general psychology, or general sociology

Changes Effective Spring 2021:

• Prerequisite

SOC 435: Perspectives on Aging (3 Credits) (BA)
Old Listing Effective Through Fall 2020:

An analysis of the demographic, social, and cultural factors affecting the aged population in American society.

Prerequisite: HDFS 312; 6 credits in sociology

Cross Listing: HDFS 434

Changes Effective Spring 2021:

• Prerequisite

SOC 448: Environmental Sociology (3 Credits)
Old Listing Effective Through Fall 2020:

Examination of the relationship between the physical environment and society.

Prerequisite: 60 credits, at least 9 of which are in the social sciences, graduate status, or permission of the program

Changes Effective Spring 2021:

• Prerequisite

SOC 451: Health, Disease & Society (3 Credits) (GS)
Old Listing Effective Through Fall 2020:

This course provides an introduction to the concepts, measurement and study of inequality across spatial scales and in diverse contexts. SOC 451 Health, Disease & Society (3) (GS) Health is not simply a matter of biology, but involves a number of factors that are social, cultural, political,
geographic, and economic in nature. This course will focus on the critical role social factors play in determining or influencing the health of individuals, groups, and the larger society. The emphasis in the course is on the social patterning of health and disease with focusing on variation by age, gender, race/ethnicity, disability status, socioeconomic status (income, education, occupation) and neighborhood/community. There will be selected coverage of the &ldquo;sociology of medicine&rdquo; with some discussion of medical power and knowledge, the organizational structure of health care, and the experience of illness and such issues such as stigma.

Prerequisite: 3 credits in sociology or the social and behavioral sciences and 5th semester standing

Changes Effective Spring 2021:

• Prerequisite

SOC 452: Spatial Inequality (3 Credits)
Old Listing Effective Through Fall 2020:

This course provides an introduction to concepts, measurement and study of spatial inequality in the US and across the globe. SOC 452 Spatial Inequality (3) is a lecture and lab-based course that provides an introduction to the concepts, measurement and study of inequality across spatial scales from international and national through to sub-national and local scales, and to study spatial inequality in diverse contexts (urban and rural; historical and contemporary). This will cover diverse substantive topics such as racial segregation, housing and labor markets, exposure to risks (e.g., pollution, crime, NIMBY facilities) and access to resources (e.g., supermarkets, schools, and health care). The lab component introduces undergraduates to geographic information system software and basic spatial analysis. The lecture component of the course has four main sections. In Section 1 the focus is on fundamental questions such as: Why inequality? How to measure inequality? What are the key dimensions of inequality? This section will be wrapped up by an overview of the causes and consequences of inequality. In Section 2 the focus is on inequality between nations and inequality within nations (i.e., non-US). Section 3 will focus on the United States and specifically examining different levels or &ldquo;territories&rdquo; of inequality; neighborhood-level to state-level differences. This section focuses on urban spatial inequality and issues such as spatial segregation, access to services and exposure to risks. Section 3 concludes with discussions of rural inequalities focusing on access to health services. Section 4 focuses on 21st century challenges regarding rapid urbanization in the developing world and revisits themes related to &ldquo;Global&rdquo; inequality. The lab components of the course will parallel lectures and provide opportunities for practical learning. Specifically the labs are designed to expose students in sociology and across the social sciences to the use of geospatial data, geographic information systems and basic spatial analysis tools providing them with skills that help them to accurately summarize and report data on spatial inequalities. Students will learn how to find, critique, and use data appropriately to measure and map inequality. They will be introduced to spatial analytical concepts and learn how to assemble geospatial databases. They will learn skills associated with basic exploratory spatial data analysis and understand concepts such as scale, spatial heterogeneity, and spatial dependence.

Prerequisite: 3 credits in sociology or the social and behavioral sciences

Changes Effective Spring 2021:

• Prerequisite

SOC 456: Gender, Occupations, and Professions (3 Credits) (BA)
Old Listing Effective Through Fall 2020:

The role of gender in shaping contemporary North American patterns of employment, occupational roles, and statuses.

Prerequisite: WMNST 100 or 3 credits in Sociology

Cross Listing: WMNST 456

Changes Effective Spring 2021:

• Prerequisite

SOC 467: Law and Society (3 Credits) (BA)
Old Listing Effective Through Fall 2020:

Law and society studies the social origins of law and legal systems; occupational careers, and decision-making of legal officials. SOC (CRIMJ/ CRIM) 467 Law and Society (3) (BA) This course meets the Bachelor of Arts degree requirements. Law and society teaches students’ knowledge of key concepts and core ideas about the role of law in society. The course will cover the basics of key legal philosophies, major social science theories of law and society, research in law and society, the structure of the legal profession, and vital contemporary issues involving the role of law in society. CRIM/CRIMJ 113 and CRIM/CRIMJ 250W are prerequisites. The evaluations methods will include written assignments on course readings, and essay-style exams. Law and Society may be counted toward the credits required for the B.A. and B.S. in Crime, Law and Justice. It would fulfill one of the 400-level requirements in the &quot;Law&quot; component of the major. The course may also be counted toward credits required for the B.A. and B.S. in Sociology for students with the Deviance and Criminology specialization.

Prerequisite: CRIMJ 100 or CRIMJ 113 or permission of program

Cross Listing: CRIMJ 467, CRIM 467

Changes Effective Spring 2021:

• Prerequisite

SPAN 253W: Introduction to Hispanic Literature (3 Credits) (BA) (WAC)
Old Listing Effective Through Fall 2020:

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. All students will write three compositions during the semester, which will be written twice incorporating in the final draft suggestions made by their peer editors and by their instructor. The writing of the second version will be preceded by a conference with the instructor in which s/he will make comments and suggestions to the students about how to avoid the same errors made in the first draft. The themes for all papers must be chosen in consultation with the professor.

Prerequisite: SPAN 100 and SPAN 110

Changes Effective Spring 2021:

• Enforced Prerequisite
SPAN 326: Reading the Border/Lands (3 Credits) (US) (GH)
Old Listing Effective Through Fall 2020:

This course examines representations of the U.S.-Mexico border in relation to the actual geographic space. SPAN 326 Reading the Border/Lands (3) (GH;US) This class will center on discussions of the U.S.-Mexico borderlands in cultural theory and practice. &ldquo;Borderlands&rdquo; is understood as a transcultural space filled with physical, cultural, economic, political, and mythical elements. The aim is to view how different artists from the Borderlands, both northern Mexican and Chicano, mediate their borderlands reality. That is to say, the goal of the class is to examine the different &ldquo;imaginative geographies&rdquo; in the borderlands. We examine a wide-ranging mix of cultural texts that includes prose, poetry, essays, and performance art, as well as film and video art. We explore how writers have historically rethought notions of citizenship, identity, and culture to create more fluid spaces of representation in cultural contact zones. We will in particular, pay close attention to the relationship between national geography and the shaping of regional identities and popular cultures &mdash; between the maps that nations draw and the cultural forms that cut across them.

Changes Effective Spring 2021:

• Recertification
• Title
• Description
• Cross-Listing

SRA 111: Introduction to Security and Risk Analysis (3 Credits)
(GS)
Old Listing Effective Through Fall 2020:

This introductory course spans areas of security, risk, and analysis covering contexts in government agencies and business organizations. SRA 111 Introduction to Security and Risk Analysis (3) Introduction to Security and Risk Analysis is a preliminary course with a broad focus, spanning the areas of security, risk and analysis. In addition to familiarizing the student with basic technical terminology, it will also touch upon social and legal issues, risk analysis and mitigation, crime intelligence and forensics, and information warfare and assurance. This course will motivate students to understand the requirements for security in any government agency or business organization through the use of case studies. Included in this segment are cases related to cyberterrorism, bioterrorism, and critical infrastructure protection. Some concepts to be covered in the area of information security are: confidentiality, integrity, availability, and non-repudiation. Various methods of safeguarding these security concerns will be discussed, such as: single- and multi-factor authentication, encryption, digital signatures, prevention of denial of service attacks, and so forth. This course also covers social and legal issues related to security, in particular identity theft and social engineering. Topics in this section include identity theft, spam, spyware, and adware. This course also covers the principles and the approaches to risk analysis. Here students study vulnerability analysis, crime and intelligence analysis, forensics, techniques for risk assessment and risk mitigation. The course will prepare students for more in-depth courses such as SRA 211, SRA 221 and SRA 311.

Changes Effective Spring 2021:

• Recertification
• Abbreviated Title
• Description

SRA 468: Visual Analytics for Security Intelligence (3 Credits)
Old Listing Effective Through Fall 2020:

Introduce visual analytic techniques for security informatics and intelligence. It covers analytical techniques on visualizing threats, risk, and vulnerability. SRA 468 Visual Analytics for Security Intelligence (3) This course surveys techniques for visualizing and analyzing security information and for communicating and using information about threats, risk and vulnerability to decision-makers. It will motivate students by the needs for better intelligence in a broad range of homeland security applications. Through case studies and problem-based learning, students will develop understanding of important concepts and issues, such as data source and data quality, associations and integration of incidence, hazards, and risk factors, and the difficulties of analyzing and communicating knowledge. Various visual analytical methods for homeland security intelligence will be discussed, such as: (1) mapping and visualizing patterns of crime and incidence, (2) identifying targets and agents of terrorist attacks, (3) spatial analysis of social, economic and environmental risk indicators, and (4) prediction of threat and risk. It also pays special attention to the interpretation of analytical results for actions. Geographical information systems and associated spatial analytical tools will be used to exemplify the kinds of information environment available to intelligence community. The course will prepare students to become immediate workforce for security-related industries and government agencies.

Prerequisite: SRA 111

Changes Effective Spring 2021:

• Abbreviated Title
• Title
• Description

STAT 200: Elementary Statistics (4 Credits) (BA) (GQ)
Old Listing Effective Through Fall 2020:

Descriptive statistics, frequency distributions, probability, binomial and normal distributions, statistical inference, linear regression, and correlation. STAT 200 Elementary Statistics (4) (GQ)(BA) This course meets the Bachelor of Arts degree requirements. STAT 200 is a standard first course in statistics. Students who have successfully completed this course will understand basic concepts of probability and statistical inference, including common graphical and numerical data summaries; notions of sampling from a population of interest, including the sampling distribution of a statistic; construction and interpretation of confidence intervals, test statistics, and p-values; and connections between probabilistic concepts like the normal distribution and statistical inference. They will recognize various types of data, appropriate statistical methods to analyze them, and assumptions that underlie these methods. They will also gain extensive experience in the use of statistical software to analyze data and the interpretation the output of this software.

Enforced Prerequisite at Enrollment: Placement into MATH 21 or higher

Changes Effective Spring 2021:

• Recertification
• Description

STAT 240: Introduction to Biometry (3 Credits) (BA) (GQ)
Old Listing Effective Through Fall 2020:

Using this Bulletin
Statistical analysis and interpretation of data in the biological sciences; probability; distributions; statistical inference for one- and two-sample problems. STAT 250 Introduction to Biostatistics (3) (GQ)(BA) This course meets the Bachelor of Arts degree requirements. STAT 250 is a standard first course in statistics, with an emphasis on applications and statistical techniques of particular relevance to the biological sciences. Students who have successfully completed this course will understand basic concepts of probability and statistical inference, including common graphical and numerical data summaries; notions of sampling from a population of interest, including the sampling distribution of a statistic; construction and interpretation of confidence intervals, test statistics, and p-values; and connections between probabilistic concepts such as normal distributions and statistical inference. They will recognize various types of data, appropriate statistical methods to analyze them, and assumptions that underlie these methods.

Old Listing Effective Through Fall 2020:

STAT 463: Applied Time Series Analysis

Changes Effective Spring 2021:

- Recertification

STAT 414: Introduction to Probability Theory (3 Credits)

Old Listing Effective Through Fall 2020:

STAT 414 / MATH 414 is an introduction to the theory of probability for students in statistics, mathematics, engineering, computer science, and related fields. The course presents students with calculus-based probability concepts and those concepts can be used to describe the uncertainties present in real applications. Topics include probability spaces, discrete and continuous random variables, transformations, expectations, generating functions, conditional distributions, law of large numbers, central limit theorems. Most students are recommended to sequentially take MATH 230 or MATH 231 prior to STAT414 / MATH 414, although the alignment of the topics in each class permit concurrent enrollment. Students may take only one course from STAT 414 / MATH 414 and STAT 418 / MATH 418.

Prerequisite: MATH 230 or Concurrent: MATH 232 or (MATH 231 and RM 214)

Cross Listing: MATH 414

Changes Effective Spring 2021:

- Description

STAT 416: Stochastic Modeling

Old Listing Effective Through Fall 2020:

Review of distribution models, probability generating functions, transforms, convolutions, Markov chains, equilibrium distributions, Poisson process, birth and death processes, estimation.

Cross-Listed Courses: MATH 416

Prerequisites: Enforced Prerequisite at Enrollment: (STAT 318 or MATH 318 or STAT 414 or MATH 414) and MATH 230

Changes Effective Spring 2021:

- Enforced Prerequisites

STAT 463: Applied Time Series Analysis

Old Listing Effective Through Fall 2020:

Identification of models for empirical data collected over time; use of models in forecasting. STAT 463 Applied Time Series Analysis (3) This course covers many major topics in time series analysis. Students will learn some theory behind various time series models and apply this theory to multiple examples. An introduction to time series and exploratory data analysis will be followed by a lengthy study of several important models, including autoregressive, moving average, autoregressive moving average (ARMA), autoregression integrated moving average (ARIMA), and seasonal models. For each model methods for parameter estimation, forecasting, and model diagnostics will be covered. Additional topics will include spectral techniques for periodic time series, including power spectra and the Fourier transform, and one or more miscellaneous topics chosen by the instructor, such as forecasting methods, transfer function models, multivariate time series methods, Kalman filtering, and signal extraction and forecasting. The use of statistical software will be a central component of this course, as will the proper interpretation of computer output. Students enrolling for this course are assumed to have taken a semester-long course on regression.

Prerequisites: Enforced Prerequisite at Enrollment: STAT 462 and (STAT 318 or MATH 318 or STAT 414 or MATH 414)

Changes Effective Spring 2021:

- Enforced Prerequisites

STS 233: Ethics and the Design of Technology (3 Credits) (BA) (GH)

Old Listing Effective Through Fall 2020:

Ethics and individual and group decision-making in the design of technology including design projects and specific attention to institutional ethics. PHIL (S T S) 233 Ethics and The Design of Technology (3) (GH)(BA) This course meets the Bachelor of Arts degree requirements. Technology has been around nearly as long as humans have been around. Humans have always created artifacts and artificial environments to aid us in our survival and to help fulfill our needs and desires. Moreover, today technology is all pervasive, transforming and conditioning our social and political relations, our cultural understanding of ourselves, and our relationship with other animals and the natural environment. Yet not much thought has been expended upon the meaning of technology, particularly in its moral dimensions. This course takes several steps to correct this deficiency. Because technologies can have far reaching effects well beyond the domain of their immediate application, the role of designers is crucial in deciding whether we take an intelligent or unintelligent approach to technology. All technologies exist to serve one human need or another. Designers make important choices concerning the creation, development, and deployment of many if not most technological innovations. Consequently, the task of the designer is an ethical one. Our goal is twofold: First, we will try to broaden our moral imaginations by taking into account the wider ranging effects that technologies have in order to reveal the moral significance of design choices. Second, we will examine the process of design itself, particularly in the way that the design process is similar to ethical reasoning in general. It is hoped that by accomplishing these two tasks, we will be empowered as designers, customers, citizens, and future employers to make choices that better fulfill the moral task of technological innovation. Two means will be used to achieve our course goals. Much of the time will be spent thinking about and discussing the various impacts that particular technologies have upon the social, cultural, and political lives of human beings and upon the natural environment. To facilitate thoughtful discussion, we will read a number of authors, writing short papers in preparation for critical discussion in class. In this way we will be better prepared to discuss and think about the issues at hand by
having had the chance to organize our thoughts in advance. The second means is aimed at putting our ideas into practice by working in teams on several design projects. These design projects will require the integration of readings, discussion, and research and their synthesis to solve a design problem. Student teams will work cooperatively on these projects and make oral progress reports as well as final written and oral reports.

Cross-Listed Courses: PHIL 233

Changes Effective Spring 2021:

• Course Number
• Add General Education Recertification
• Description

SUST 200: Foundations of Leadership in Sustainability (3 Credits)
(GS)
Old Listing Effective Through Fall 2020:
Science, ethics, and leadership in social, environmental, and economic sustainability.

Changes Effective Spring 2021:

• General Education Recertification
• Abbreviated Title
• Description

SWENG 431: Software Verification, Validation, and Testing (3 Credits)
Old Listing Effective Through Fall 2020:
Introduction to methods of software verification, validation, and testing; mathematical foundations of testing, reliability models; statistical testing. SWENG 431 Software Verification, Validation, and Testing (3) Provides a background necessary for verification, validation, and testing of software systems. Verification addresses the question: “are we building the product right?” In other words, does the product meet the engineering specifications? Validation addresses whether the right product is being built and if it meets the design requirements. The testing aspect of the course addresses many of the methods available to test software systems. The levels of testing explored are 1) unit level (each module is tested independently), 2) integration testing (where the modules are integrated together and tested as a complete system), and 3) acceptance testing (the testing requirements of the users). Following this, specific test methodologies are addressed. By the end of this course the student should also be able to develop an appropriate test plan.

Enforced Prerequisite at Enrollment: SWENG 411 or STAT 301

Changes Effective Spring 2021:

• Prerequisites

THEA 1S: First-Year Seminar: Theatre Production Practices
Old Listing Effective Through Fall 2020:
An orientation to the School of Theatre production practices, resources, faculty, and practicum. THEA 001S First-Year Seminar: Theatre Production Practices (1)(BA) This course meets the Bachelor of Arts degree requirements. THEA 001S will serve as the First-Year Seminar for all undergraduate majors in the School of Theatre. In all School of Theatre degree programs, backstage production is one of the primary curricular and experiential areas held in common. It is in this area that most theatre students gain their first practical experience in producing theatre on our stages. This course will provide the necessary training and experience for all students to safely practice in the production of live theatre in our spaces. This course will orient first-year students to faculty, facilities, and practices of production utilized in the School of Theatre season. Students will be introduced to the faculty and their areas of expertise. They will be oriented to the spaces and equipment in our theatres and taught safe operation of the equipment. They will learn the practical and professional expectations placed on students participating in a School of Theatre production. Learning will take place both in lecture/demonstration format and through the practical experience of working on a School of Theatre production. Students will be evaluated by: 1. Backstage practices and safety will be evaluated through knowledge based quizzes and/or skill demonstrations as appropriate to each subject. 2. Professionalism evaluated through attendance, reliability and skill growth as observed during the execution of practicum assignments.

Prerequisites: Admission into Theatre program

Changes Effective Spring 2021:

• Remove Prerequisites

THEA 102: Fundamentals of Acting (3 Credits) (BA) (GA)
Old Listing Effective Through Fall 2020:
Introduction to the art and craft of acting for non-theatre majors. THEA 102 Fundamentals of Acting (3) (BA) (GA) This course meets the Bachelor of Arts degree requirements. THEA 102 aims to introduce the student to basic principles of the art and craft of acting, focusing on HOW and WHY actors do what they do in preparation of and for a performance less than on the attainment of performance skills themselves. Students will become acquainted with acting processes, theatre terminology, script analysis, improvisation, and other fundamentals to give them a more inclusive sense of the totality of the actor’s work as crafts-person and artist. In so doing, the student actors must tap their own powers of concentration, observation, creativity, and imagination. A major focus in the course is the development of the ability to analyze one’s own work and the work of peers in the class. Problem-solving in solo, paired, and/or large group contexts is a daily requirement in class. THEA 102 is NOT an acting course designed to develop fine actors; it is a course ABOUT acting. Thus, the course objectives are these: 1. To introduce the concept of acting as a process and craft. 2. To develop an understanding of acting skills, script and character analysis, and theatre/acting terminology. 3. To heighten powers of observation, focus, invention, imagination, and the ability to accurately and positively analyze and critique peer’s work. 4. To experience the commitment and discipline that acting requires. 5. To learn how best to score, interpret, and use the script as the fundamental source or criterion for truthful behavior on stage. Educational strategies: to accomplish the above objectives, a variety of strategies will be employed, including lectures, discussions, readings from the text, instructor critiques of student work(s), experiential activities that require full student commitment and participation, presentation of assignments after significant rehearsal outside of class, and other preparations and teaching strategies as necessary and appropriate.

Changes Effective Spring 2021:

• Recertification
• Description

THEA 105: Introduction to Theatre (3 Credits) (BA) (GA)
Old Listing Effective Through Fall 2020:
An introduction and overview of the history, craft, and art of the theatre to foster an informed appreciation of theatrical events. This course is an alternate to THEA 100. THEA 105 Introduction to Theatre (3) (GA) (BA) This course meets the Bachelor of Arts degree requirements. This course will introduce students to the art and craft of theatrical production. Students will learn about plays, playwrights, major eras and styles of theatrical production, the analysis of scripts, genres of dramatic literature, and the personnel involved in the production of plays.

Changes Effective Spring 2021:

- Add General Education Recertification
- Description

THEA 113: Musical Theatre Theory I (3 Credits) (BA)
Old Listing Effective Through Fall 2020:

Studies in the fundamentals of music notation and sight-singing. THEA 113 Musical Theatre Theory I (3) (BA) This course meets the Bachelor of Arts degree requirements. THEA 113 is designed to provide the beginning musical theatre student with the fundamentals of music theory and diatonic harmony as well as the analytical skills with which to approach and appreciate the structure of songs and musical theatre scores. It is focused primarily on the musical theatre literature to enable the beginning student to learn and appreciate more efficiently the literature that will be central to the performance classes in the major. The class places a rigorous emphasis on pitch and rhythmic identification to develop a high degree of musicianship in the beginning student, both to provide a solid basis for the classes to come and to make the performer more competitive in the musical theatre industry. It is designed to be entry-level in preparation for THEA 114 (Musical Theatre Form and Analysis) and the upper-level theory classes (THEA 212 and THEA 214). The course presupposes no previous musical training or experience. For those with some previous musical theory education, the course may function successfully as a refresher before the more rigorous analysis courses to follow. It satisfies a significant need in that it focuses on the specific theoretical knowledge the musical theatre student needs to know to become competitive in a professional career.

Prerequisite: admission into Musical Theatre Option

Changes Effective Spring 2021:

- Remove Prerequisites

THEA 114: Music Theatre: Form and Analysis (3 Credits) (BA)
Old Listing Effective Through Fall 2020:

A survey of music theatre as an art form.

Prerequisites: admission into Musical Theatre Option

Changes Effective Spring 2021:

- Remove Prerequisites

THEA 115: B.F.A. Acting Foundations (2 Credits)
Old Listing Effective Through Fall 2020:

Fundamental aspects of training the actor’s body, voice, mental focus, and imagination. THEA 115 B.F.A. Acting Foundations (2) THEA 115 is an introduction to the awakening and enhancement of beginning students’ physical, vocal, mental, and imaginative instrument in preparation for the demanding work to follow in later acting, voice/speech, and movement studios. The course will introduce physical conditioning and breathing exercises specifically for actors, introduce exercises to enhance mental focus/concentration, and lead students through a series of exercises designed to stimulate and enhance the actor’s imagination and trust in the world of fantasy. Students will be exposed to a variety of techniques from which they may, over time, develop their own individual physical/mental training discipline. They will be encouraged to accurately assess their own physical/vocal/mental self-image, to develop a plan (with the instructor) to minimize intrusive mannerisms and to maximize positive traits and work habits. Grading will be based on each student’s commitment to the training regimen, application of past lessons in present assignments, quality of daily work, and the ability to accurately perform the exercises taught.

Prerequisite: admission to B.F.A. in Musical Theatre

Changes Effective Spring 2021:

- Remove Concurrent

THEA 116: Musical Theatre Theory II (2 Credits: Maximum of 4 Credits)
Old Listing Effective Through Fall 2020:

THEA 116 develops continues music theory for musical theatre majors and augments theory with practical piano skills. THEA 115 is an introduction to the awakening and enhancement of beginning students’ physical, vocal, mental, and imaginative instrument in preparation for the demanding work to follow in later acting, voice/speech, and movement studios. The course will introduce physical conditioning and breathing exercises specifically for actors, introduce exercises to enhance mental focus/concentration, and lead students through a series of exercises designed to stimulate and enhance the actor’s imagination and trust in the world of fantasy. Students will be exposed to a variety of techniques from which they may, over time, develop their own individual physical/mental training discipline. They will be encouraged to accurately assess their own physical/vocal/mental self-image, to develop a plan (with the instructor) to minimize intrusive mannerisms and to maximize positive traits and work habits.

Prerequisite: THEA 113

Concurrent: A ED 103, ED 135, MU ED 186, THEA 193

Changes Effective Spring 2021:

- Remove Concurrent

THEA 120: Acting I (3 Credits) (BA)
Old Listing Effective Through Fall 2020:

Fundamental skills and training in acting. Emphasis on physical/vocal awareness and the nature of dramatic communication. Theatre majors only.

Prerequisite: THEA 100 or THEA 105

Changes Effective Spring 2021:

- Prerequisites

THEA 189: Theatre Production Practicum (1 Credit) (GA)
Old Listing Effective Through Fall 2020:

Supervised experience in theatre by crew participation in University theatre productions. For non-theatre students only. THEA 189 Theatre Production Practicum (1 per semester/maximum of 6) (GA) (BA) This
course meets the Bachelor of Arts degree requirements. THEA 189 provides hands-on experience in the production areas of the theatre including scenery, costumes, electrics and backstage crew. Students will be assigned to various crews during the semester to support the production of scenery, costumes, and lighting theatre shows. The students will be under the direction of faculty, staff, and graduate students (at University Park) who will provide guidance and information in a practical manner. Students will gain practical knowledge in scenic, property and costume construction techniques, painting techniques, and lighting technology. Students will develop skills associated with various tools and equipment used to build properties, costumes, and scenery. In order to accomplish these objectives, students are assigned to a mentor/crew leader at each class meeting who may demonstrate new techniques or skills and then oversee the students as they apply these skills to a current production need. This method of instruction allows students to progress at a pace that is comfortable and permits one-on-one instruction as needed. The course is offered each semester at University Park and taught concurrently with THEA 289 and 489, so ten sections are offered for enrollment. These sections correspond to THEA 289 and 489 sections.

Changes Effective Spring 2021:

- Recertification
- Abbreviated Title
- Title
- Credits
- Description

THEA 201W: Script Analysis for Design

Old Listing Effective Through Fall 2020:

An introduction to script analysis for theatre designers and technicians. Specific techniques for the analysis of dramatic work and integrating design into the storytelling process.

Prerequisites: THEA 152

Changes Effective Spring 2021:

- Title
- Abbreviated Title
- Description
- Prerequisites

THEA 202: Beginning Scene Study

Old Listing Effective Through Fall 2020:

Introduction to the fundamentals of scene study through readings, improvisations, exercises and scene work. THEA 202 Beginning Scene Study (3) A continuation of work started in THEA 102, this course is designed for theatre minors who wish to further advance their understanding of the art of acting. Advanced scene work, exercises, improvisations, and text analysis are explored, along with peer evaluations and instructor feedback on both processes and performances.

Prerequisites: THEA 102 and enrollment in the Theatre Minor

Changes Effective Spring 2021:

- Prerequisites

THEA 209: Hip Hop Theatre

Old Listing Effective Through Fall 2020:

Hip Hop Theatre defines and explores Hip Hop as an art form. The student will explore Hip Hop culture through Hip Hop Theatre aesthetics: Emceeing, Dejaying, Beat boxing, graffiti art, and dance. Hip Hop Theatre is designed for students with an interest in Hip Hop Theatre/culture. This class introduces students to Hip Hop Theatre through Hip Hop aesthetics: Emceeing, Dejaying, Beat boxing, graffiti art, and dance. In addition, this class includes lecture sessions and discussions about Hip Hop culture Theatre as a global, multi-ethnic, grassroots youth culture committed to social justice and self-expression through specific modes of performance. This course seeks to introduce students to a culturally significant art form, enhance theatrical discourse, and provide practical opportunities for students to apply skills learned in class via collaborative creations, text, and performance. This course is directly related to dance, theatre, African American history and other arts based and humanities based courses. Students will be evaluated on their attendance, participation in class, willingness to learn, and the effort put forth in class.

Prerequisites: Admission to the B.F.A. in Acting or permission of Instructor

Changes Effective Spring 2021:

- Remove Prerequisites

THEA 212: Musical Theatre Theory III (3 Credits: Maximum of 3 Credits) (BA)

Old Listing Effective Through Fall 2020:

Intermediate studies in diatonic harmony, analysis, sight-singing and dictation. THEA 212 Musical Theatre Theory II (3) (BA) This course meets the Bachelor of Arts degree requirements. THEA 212 is designed to provide the intermediate musical theatre student with the mastery of harmonic and melodic analysis with which to approach and appreciate the structure of songs and musical theatre scores. It is designed to enable the intermediate student to sight-read more efficiently the literature that is central to the performance classes in the major, and to develop basic accompaniment and transposition skills that will become indispensable to the professional career. A continued emphasis on pitch and rhythmic identification will enable the intermediate student to maintain a high degree of musicianship in the performance classes required in the major and will make the performer more competitive in the musical theatre industry. THEA 113, the entry-level theory course and THEA 114, Music Theatre Form and Analysis are prerequisites to THEA 212, which is designed as the third course of the theory-form-and-analysis sequence. The course satisfies a significant need in that it focuses on the specific theoretical knowledge the musical theatre student requires to become competitive in a professional career.

Prerequisites: THEA 113, THEA 114, THEA 116, and admission into Musical Theatre Option

Changes Effective Spring 2021:

- Prerequisites

THEA 221: Acting III (3 Credits) (BA)

Old Listing Effective Through Fall 2020:

A continuation of Thea. 220. For theatre majors only.
Prerequisite: THEA 130 or THEA 131 and School of Theatre approval

Changes Effective Spring 2021:

• Prerequisites

THEA 223: Musical Theatre Performance I (2 Credits) (BA)
Old Listing Effective Through Fall 2020:

Studio training in the unique performance skills, repertoire and business of professional music theatre. THEA 223 Musical Theatre Performance I (2) (BA) This course meets the Bachelor of Arts degree requirements. The purpose of this class is to introduce sophomore BFA musical theatre students to the art of performing the solo song based on the book musical. While utilizing the performer's skills in acting, singing and dance/movement, the student will learn how to communicate clearly and compellingly 1. who his/her character is 2. to whom the character is singing 3. why the character is singing these particular words to this particular music at this particular time. The student must understand his/her environment, relationships, obstacles, tactics, and stakes in order to accomplish this task. This is the class that begins to synthesize the student's performance training for the special demands of musical theatre. Most of the work will concentrate on solo performance, building the student's power and confidence and beginning to explore both their individual uniqueness and their crucial relationship to their audience. Students must prepare two contrasting musical theatre pieces from "book" musicals preferably from "The Golden Age" (1920-1960s). These songs must be chosen in collaboration with musical theatre faculty and the student. Students must obtain copies of the music and lyrics for their songs and the book. A thorough knowledge of the book is as important as a thorough knowledge of the music and lyrics in order to make informed performance choices. Students are required to keep a journal. Written exercises about passive, active, stage directions, and character analysis as well as in-class exercises on these topics will be part of the class assignments.

Prerequisite: THEA 114, THEA 115, THEA 116, THEA 212, admission into Musical Theatre option

Changes Effective Spring 2021:

• Prerequisites

THEA 224: Musical Theatre Performance II (2 Credits) (BA)
Old Listing Effective Through Fall 2020:

Studio training in the unique performance skills, repertoire and business of professional music theatre. THEA 224 Musical Theatre Performance II (2) (BA) This course meets the Bachelor of Arts degree requirements. This course will cover three primary areas of study: musical theatre scene work, the study of the major repertoire in musical theatre from 1965-1990 (excluding Sondheim and Webber), and performance power training. Scenes that contain songs require special techniques of the actor-singer. Using the preparation and presentation of four such scenes, the musical theatre student will begin to develop successful performance strategies for musical theatre scene work. Through the use of in-class reports the musical theatre student will continue to gain understanding and appreciate the rich musical theatre literature of the late 1960s and the 1990s. Primarily, the course will cover the works and lives of Bock and Harnick, Jerry Herman, Kander and Ebb, Julie Styne, Jones and Schmidt, and Maltby and Shire. Through exercises, studies, and improvisation designed to sharpen the student's use of energy, focus, structuring skills, imagining, stylizing, and coordinating, the musical theatre student will obtain a significant increase in his/her performance power. The musical theatre student will prepare three duet scenes with song and an ensemble scene with song during the semester. Students will have two opportunities to present each duet scene. THEA 224 is a continuation of Musical Theatre Performance I. These studios represent the core of the musical theatre training program.

Prerequisite: THEA 223, admission into Musical Theatre Option

Changes Effective Spring 2021:

• Prerequisites

THEA 225A: B.F.A. Acting Studio I (2 Credits)
Old Listing Effective Through Fall 2020:

Exercises to develop truthful listening and responding as a foundation for acting studio scene study. Listening and responding in an unadorned, truthful way is the lynch-pin of the actor's work. In THEA 225A, students will begin with exercises designed to foster and increase the depth of truthful behavior on stage. In addition, this coursework includes exercises to increase awareness of the sensory world around us and its effect on the actor's imagination, availability to emotion, and mental focus. Contentless scene work leads the student through the basics of behavior on stage: playing for a purpose (goal), encountering obstacles, and finding the necessary tactics to behave appropriately in the imaginary circumstances. The final stage of the semester applies the skills acquired to a full scene from a play.

Prerequisites: THEA 115

Changes Effective Spring 2021:

• Change Prerequisites
• Add Concurrents

THEA 225B: B.F.A. Movement Studio I
Old Listing Effective Through Fall 2020:

Introduction to techniques to condition the actor and improve physical awareness and self-use. Listening and responding in an unadorned, truthful way is the lynch-pin of the actor's work. In THEA 225A, students will begin with exercises designed to foster and increase the depth of truthful behavior on stage. In addition, this coursework includes exercises to increase awareness of the sensory world around us and its effect on the actor's imagination, availability to emotion, and mental focus. Contentless scene work leads the student through the basics of behavior on stage: playing for a purpose (goal), encountering obstacles, and finding the necessary tactics to behave appropriately in the imaginary circumstances. The final stage of the semester applies the skills acquired to a full scene from a play.

Prerequisites: THEA 115

Changes Effective Spring 2021:

• Prerequisite
• Concurrent

THEA 225C: B.F.A. Voice/Speech Studio I (2 Credits)
Old Listing Effective Through Fall 2020:

Introduction to actor voice and speech training. THEA 225C is the first in a sequence of voice and speech courses for the actor. This first semester installment will focus on awareness and conditioning activities related to breath, posture, resonance and articulation. Prose and poetry readings
will be used for application activities. Students will experience activities that will heighten their physical awareness of vocalizing. Most activities will involve a re-learning of how they speak, bringing to their conscious awareness the processes of voice/speech which were initially learned through early childhood nurturing. Class events will include awareness of breath patterns and the means to release inhibitive behaviors related to spinal posture, head and neck alignment, and musculature along the breath/vocal tract. Students will also gain awareness of how breath relates to their expressive/emotional system. Class activities will also include physical awareness of the consonant and vowels sounds and their phonetic transcriptions. Each event will strive to improve actors’ intelligibility and increase musicality of speech. Through application assignments with word lists, sentences, poetry and prose, students will increase language sensitivity. This semester will also address voice quality issues directly and how they relate to the above. Specific events will focus on vibratory awareness in primary resonators and how to apply this awareness in all vocal life. Issues of vocal health, projection and emotional demands will be addressed.

Prerequisite: THEA 115

Changes Effective Spring 2021:
- Remove Prerequisites
- Add Concurrents

THEA 261: Introduction to Costume Construction Techniques (3 Credits)
Old Listing Effective Through Fall 2020:

Intermediate study of the methods, materials, equipment, concepts and processes involved in the construction of costumes for the theatre. THEA 261 Introduction to Costume Construction Techniques (3) This course will advance the knowledge of students in the methods, materials, equipment, concepts and processes involved in the construction of costumes for the theatre. The emphasis of this course will be on the specialized processes that result in the production of theatrical costumes. Formal course material in the form of lecture/demonstrations will address the specialized approach to the construction and tailoring of theatrical costumes for men’s and women’s wear. Examination of the historic context of the clothing technique, as well as the contemporary application of such techniques for theatrical use will also be addressed. In addition to lectures and demonstrations, students will be expected to participate in hands-on laboratory activities that will reinforce and inform the classroom theory. These activities will give students an opportunity to apply the principles they learn in the lecture component.

Prerequisites: THEA 130

Changes Effective Spring 2021:
- Change Prerequisites

THEA 324: Movement for Actors I
Old Listing Effective Through Fall 2020:

Techniques and skills in physical expression, awareness, control, and stage movement.

Prerequisites: THEA 120 or THEA 115

Changes Effective Spring 2021:
- Prerequisites

THEA 326: Music Theatre Performance Workshop (1 Credit: Maximum of 3 Credits) (BA)
Old Listing Effective Through Fall 2020:

Performance studies in cabaret, revue, and club environments.

Prerequisite: DANCE 234, THEA 224, audition, enrollment in Musical Theatre Option

Changes Effective Spring 2021:
- Prerequisites

THEA 400: Advanced Theatre Projects
Old Listing Effective Through Fall 2020:

Individual and group-directed study of in-depth projects involving reading, discussion, performance, and critical analysis by faculty.

Prerequisites: seventh semester standing or higher or 12 credits in theatre or related areas

Changes Effective Spring 2021:
- Prerequisites

THEA 401: Theatre History I: Ancient to 1700
Old Listing Effective Through Fall 2020:

Survey of drama and theatre from primitive rites through the Renaissance.

Changes Effective Spring 2021:
- Prerequisites

THEA 402: Theatre History II: From 1700 to Present
Old Listing Effective Through Fall 2020:

Survey of European drama and theatre from the eighteenth century through the modern period. THEA 402 Theatre History II: From 1700 to Present (3) A survey of drama and theatre from the seventeenth century through the modern period. The course is a sequential second half of the history of world theatre. Beginning with the post-Shakespearean era, students study major theatre movements in play writing, acting, theatre architecture and design. Some eras include the English Restoration and Georgian periods, the French Neoclassical period, German Romanticism, and the rise of the Beijing Opera. In addition, emerging post-colonial theatres of Africa and Asia will be explored. For each major era or movement, a play by one of the acknowledged masters of the form will be read and discussed in class. Students will write brief responses to their assigned readings, as well as experience a variety of assessment techniques.

Prerequisites: THEA 401

Changes Effective Spring 2021:
- Prerequisites

THEA 405W: Theatre History: American Theatre
Old Listing Effective Through Fall 2020:

Survey of American drama and theatre from the colonial period to the present. THEA 405 Theatre History - American Theatre is a course that introduces students to the rich history of American theatre from the colonial era to today. Each week plays and supporting materials become
the focus of conversations about the intersections of race, gender, class, religion, and art. Early plays from the colonial and post-colonial years reveal the peculiar love/hate relationship between colonists and theatre. After the Revolutionary War plays become the rallying cry as the new nation attempts to forge an identity separate from and equal to Europe. In the decades that follow theatre provides a voice to previously silent Americans: women, former slaves, immigrants, and non-Christians. The course culminates in the present with readings of the three most recent Pulitzer Prize winning plays and discussion of their impact. This is a Writing-Intensive course.

Prerequisites: THEA 100

Changes Effective Spring 2021:

- Number
- Prerequisites

THEA 407W: Women and Theatre
Old Listing Effective Through Fall 2020:

A study of theatre practice and dramatic literature as informed by issues of gender, race, and ethnic background. THEA (WMNST) 407 Women and Theatre (3) (US)(BA) This course meets the Bachelor of Arts degree requirements. Theatre 407 approaches the study of theatre/performance as a valuable site for the exploration of race, class, and gender as social constructs. The focus will be on 20th century developments of women and theater. Feminist theory and theatrical practice will be a focus of the course and will reflect conflicts and differences present within feminism.

Prerequisites: THEA 100 OR THEA 105

Changes Effective Spring 2021:

- Prerequisites

THEA 408W: History of American Musical Theatre
Old Listing Effective Through Fall 2020:

A survey of the history of American musical theatre presented in a social, cultural, and aesthetic prospective.

Changes Effective Spring 2021:

- Prerequisites

THEA 410: Play Analysis
Old Listing Effective Through Fall 2020:

Advanced skills in textual analysis of plays and screenplays.

Prerequisites: THEA 100 or THEA 105

Changes Effective Spring 2021:

- Prerequisites

THEA 411: Dramaturgy Practicum (1-3 Credits: Maximum of 12 Credits)
Old Listing Effective Through Fall 2020:

Dramaturgy Practicum is a variable credit course (1-3) that trains theatre students in the practices of dramaturgy for production. Students may be paired with a particular School of Theatre production or project as an in-rehearsal dramaturg. Others will be assigned to dramaturgy teams or will complete particular dramaturgy tasks. These can include keeping group-sourced or single-authored blogs; posting to social media; taking and sharing photos and videos of the design process; interviewing artists in production; writing program notes; making lobby installations; hosting talkbacks with performers, audiences, and designers. Students might instead be assigned to a research or archiving project with the School of Theatre in order to learn theatre archiving skills. The 3-credit option is only open to students who have taken THEA 211 – Dramaturgy. These students will take on a major project, most typically the role of production dramaturg for a School of Theatre production or other major project. For the 1-credit option, students will either work on a dramaturgy team, or else they will focus on one kind of dramaturgy practice for several productions, such as production photography, social media posting, talkbacks, program notes, or outreach events.

Recommended Preparations: THEA 211

Changes Effective Spring 2021:

- Add Prerequisites
- Remove Recommended Preparation

THEA 412: African American Theatres
Old Listing Effective Through Fall 2020:

Exploration of the development of African American theatre from its roots in Africa through the diaspora, to the present time. THEA 412 / AFAM 412 African American Theatre (3) (US;IL) (BA) This course meets the Bachelor of Arts degree requirements. In this course, we will explore the development of African American theatre from its roots in Africa and Europe, through the diaspora, to the present time. We will learn something of the rich diversity of African American people and their contribution to the world's creative mainstream. We will become acquainted with both historical and contemporary artists who created and continue to create this unique American art form. The goals of the course are: 1) to develop familiarity with African American theatre and the socio-historic context in which it was created 2) to develop an understanding of the relationship of African American theatre to mainstream American theatre 3) to acquire an appreciation of the schools, styles, and techniques of African American theatre We will do this by reading and engaging plays in the context of the period in which they were created, viewing films of plays, and attending relevant productions where possible.

Prerequisites: THEA 100 or THEA 105

Changes Effective Spring 2021:

- Prerequisites

THEA 420: Scene Study I (3 Credits: Maximum of 9 Credits) (BA)
Old Listing Effective Through Fall 2020:

Advanced monologue and scene study techniques. Principal focus on realism. THEA 420 Advanced Scene Study is a course in which students are allowed to explore and deepen their understanding of the art and craft of acting. The course is repeatable for credit and taught by a variety of instructors. This allows students to experience the processes of different pedagogical methodologies. Regardless of the instructor, the shared emphases include: scene work in a variety of styles (from classical verse plays to cutting edge contemporary material) tailored to the needs of the individual student; movement toward increased technical proficiency; deepening awareness that “acting is living truthfully under imaginary circumstances,” however similar or different those circumstances may be to the actor’s personal life; and, growing self-sufficiency through self-directed scenes and individual rehearsal discipline. The environment
of the classroom/rehearsal space is both safe and critical, as students begin to accept that risk is integral to successful acting. The student is also engaged in giving constructive criticism to their peers, learning to be honest, detailed, and nurturing in the process. This critical process requires students to give unconditional support to their peers, support that is geared toward mutual improvement and emotional/physical safety.

Prerequisite: THEA 221 or THEA 427A and approval by program

Changes Effective Spring 2021:

- Prerequisites

THEA 423: Musical Theatre Performance III (2 Credits) (BA)
Old Listing Effective Through Fall 2020:

Studio training in the unique performance skills, repertoire and business of professional musical theatre. THEA 423 Musical Theatre Performance III (2) (BA) This course meets the Bachelor of Arts degree requirements. In depth preparation and performance of scenes from the works of Sondheim and Webber. Also, exploration of the adjustments needed to perform successfully in non-traditional performance venues. The third in a musical theatre performance studio sequence, THEA 423 applies performance technique and methodology studied in previous studio classes to the works of contemporary composers, particularly Stephen Sondheim and Andrew Lloyd Weber. The course also explores the adjustment to performance needed when working in non-traditional stage spaces such as ballrooms, cruise ships, and industrials. THEA 423 is a continuation of Musical Theatre Performance II. These studios represent the core of the musical theatre training program. Grading will be based on the quality of the musical theatre student's studio work, report, and demonstrated respect for the professional studio environment.

Prerequisite: THEA 224, seventh-semester standing in the Musical Theatre Option

Changes Effective Spring 2021:

- Prerequisites

THEA 425A: B.F.A. Acting Studio II (2 Credits)
Old Listing Effective Through Fall 2020:

Scene Study THEA 425A B.F.A. Acting Studio II (2) THEA 425A is a laboratory or practicum course requiring active student presentation of work in progress for critiques by the instructor and input from peers. Working in pairs, students will be assigned a five-minute scene from modern American realism. Students must read the play from which the assigned scene is taken, do the necessary historical/analytical homework, develop a character biography and a scene score, and present the result of their work in the initial "on-the-feet" working sessions for faculty critique and peer input. Taking away responses from each working session, the students are expected to rehearse outside of class to address any issues raised in the previous working session and to ready the scene for the next viewing. In THEA 427A, the instructor will serve, not as a director, but as an acting coach, asking probing questions and using his or her own energy to exhort, guide, and discipline the students. It is expected that faculty intervention will decrease and student self-reliance will increase with each passing studio.

Prerequisite: THEA 115, THEA 225A

Concurrent: THEA 425C

Changes Effective Spring 2021:

- Prerequisites

THEA 425C: B.F.A. Voice/Speech Studio II (2 Credits)
Old Listing Effective Through Fall 2020:

Advanced voice and speech training for BFA Musical Theatre students. THEA 425C B.F.A. Voice/Speech Studio II (2) In THEA 425C, B.F.A. Musical Theatre students will continue to develop and expand their vocal instrument. Basics of vocal production will be repeated and developed with a greater focus on the individual actor's application of his/her voice in the performance of various texts. The first ten weeks will recall the basics of the past two semesters of voice/speech work and continue to expand the actors' capabilities. Extended work in the area of breath support and release, resonance and vocal range, and speech/articulation will all be explored with appropriate texts. In the last five weeks of the semester, work will focus on text in the performance setting. A short program of text performances will be devised and presented in the last week of class.

Prerequisite: THEA 225C

Concurrent: THEA 425A

Changes Effective Spring 2021:

- Changed Prerequisites
- Removed Concurrent

THEA 427A: B.F.A. Acting Studio III (2 Credits)
Old Listing Effective Through Fall 2020:

Continuation of THEA 425A THEA 427A B.F.A. Acting Studio III (2) THEA 427A is an extension of THEA 425A, a laboratory or practicum course requiring active student presentation of work in progress for critiques by the instructor and input from peers. Working in pairs, students will be assigned a five-minute scene from modern American realism. Students must read the play from which the assigned scene is taken, do the necessary historical/analytical homework, develop a character biography and a scene score, and present the result of their work in the initial "on-the-feet" working sessions for faculty critique and peer input. Taking away responses from each working session, the students are expected to rehearse outside of class to address any issues raised in the previous working session and to ready the scene for the next viewing. In THEA 427A, the instructor will serve, not as a director, but as an acting coach, asking probing questions and using his or her own energy to exhort, guide, and discipline the students. It is expected that faculty intervention will decrease and student self-reliance will increase with each passing studio.

Prerequisite: THEA 425A

Concurrent: THEA 427C

Changes Effective Spring 2021:

- Changed Prerequisites
- Removed Concurrent

THEA 427C: B.F.A. Voice/Speech Studio III (2 Credits)
Old Listing Effective Through Fall 2020:

Stage Dialect Studies THEA 427C B.F.A. Voice/Speech Studio IV (2) THEA 427C focuses on the acquisition of stage dialects and accents. For each dialect the student becomes aware of the resonance, phonetic, inflection,
and rhythm changes necessary to perform dramatic text with an accent or dialect. Vocal agility, phonetic recall and the ability to integrate the altered vocal behavior to the demands of acting are the primary goals. Each dialect unit will have an introductory instruction, a review session, and a presentation of a reading of a dialect monologue. The final project will be the performance of two dialect monologues. Students will be evaluated upon preparedness, work ethic, focus, openness to change, growth, degree of self-reliant recall, and creative application of new skills. This studio performance class offers opportunity for assessment from the instructor in each class session. Periodic assignments will be made to assess self-reliant application of the work.

Prerequisites: THEA 425C

Concurrents: THEA 427A

Changes Effective Spring 2021:
- Changed Prerequisites
- Removed Concurrent

THEA 429: Theatre Performance Practicum
Old Listing Effective Through Fall 2020:
Supervised experience in rehearsal and performance of significant roles.

Prerequisites: admission by audition only

Changes Effective Spring 2021:
- Prerequisites

THEA 434: Introduction to Directing
Old Listing Effective Through Fall 2020:
Introduction to principles and procedures of play direction.

Prerequisites: THEA 114 or THEA 410; THEA 170, or THEA 180

Changes Effective Spring 2021:
- Prerequisites

THEA 436: Directorial Processes (3 Credits) (BA)
Old Listing Effective Through Fall 2020:
Preparing a play for production including the scoring of the script, developing ground plan, casting, and staging projects in American realism.

Prerequisite: THEA 434 and approval of instructor prior to registration

Changes Effective Spring 2021:
- Prerequisites

THEA 437: Artistic Staff for Production
Old Listing Effective Through Fall 2020:
To provide students with experience in choreography, dramaturgy, combat, staging, voice/speech, musical direction, assisting in direction, for major productions.

Prerequisites: approval of the proposed assignment by the instructor prior to registration

Changes Effective Spring 2021:
- Prerequisites

THEA 440: Principles of Playwriting
Old Listing Effective Through Fall 2020:
Structure, dramatic effect, characterization, and dialogue; the writing, reading, and criticism of original one-act plays. THEA 440 Principles of Playwriting (3 per semester/maximum of 6) (BA) This course meets the Bachelor of Arts degree requirements. THEA 440 is a course in which students are allowed to explore, deepen, and exercise their understanding of the craft of playwriting. This course is repeatable and taught by one instructor. This course utilizes diverse critical commentary, craft-based texts, and plays that elaborate and illustrate the core writing techniques of structure, dramatic effect, characterization, and dialogue. The writing requirement of the class concentrates on the construction of several ten-minute plays, which are shared in the class as works-in-progress. The students engage with giving and getting constructive criticism inside a safe and nurturing space, and the students work towards articulating and exercising the technical aspects of writing in a clear, concise, and effective manner.

Prerequisites: THEA 110

Changes Effective Spring 2021:
- Prerequisites

THEA 451: Drafting, Drawing, and Painting for the Theatre (1 Credit) (BA)
Old Listing Effective Through Fall 2020:
Drafting, freehand drawing including perspective methods and property development, rendering techniques, and painters' elevations.

Prerequisite: THEA 251, THEA 252 and prior approval of instructor; first-year MFA theatre candidacy

Changes Effective Spring 2021:
- Prerequisites

THEA 453: Advanced Scene Painting (1-3 Credits: Maximum of 12 Credits) (BA)
Old Listing Effective Through Fall 2020:
Practicum study in painting techniques currently in professional use. Exploration of tools, available paints, and texturing materials.

Prerequisite: THEA 253

Changes Effective Spring 2021:
- Prerequisites

THEA 454: Period Research for the Theatre (3 Credits) (BA)
Old Listing Effective Through Fall 2020:
History of decor, styles, and movements in art and architecture.

Prerequisite: BFA theatre arts candidacy or permission of instructor

Changes Effective Spring 2021:
- Prerequisites

THEA 459: Theatre Portfolio & Business Practices (2 Credits) (BA)
Old Listing Effective Through Fall 2020:
Life as a professional theatre designer. Contracts, taxes, record-keeping, resumes, portfolios, interviewing, job hunting, and legal considerations. THEA 459 Theatre Portfolio & Business Practices (2) (BA) This course meets the Bachelor of Arts degree requirements. This course is designed to prepare the student of design for life as a professional theatre designer. There are many challenges to working in the business of design, arising primarily from the fact that most theatre designers are self-employed. It’s not enough to be a talented designer; one must also be a savvy business person. Contracts, taxes, recordkeeping, resumes, portfolios, interviewing, job hunting, and legal considerations will all be addressed, as they relate to life as a freelance designer. Special attention will be paid to the assembly of a professional portfolio, which is the centerpiece of any designers’ work.

Prerequisite: B.F.A. Theatre candidacy

Changes Effective Spring 2021:

- Prerequisites

THEA 460: Advanced Topics in Costume Design (3 Credits: Maximum of 6 Credits) (BA)
Old Listing Effective Through Fall 2020:

Developing and executing a design concept in a variety of the performing arts. THEA 460 Advanced Topics in Costume Design (3 per semester/maximum of 6) (BA) This course meets the Bachelor of Arts degree requirements. THEA 460 places emphasis on the use of text analysis and extensive historical research to make artistic choices as a costume designer in a production of a classical play, opera, or dance. Plays of this sort are of a size and scope not often found in contemporary material, which places exceptional demands on a designer. This course investigates the manner in which the theatrical imagination can be liberated to fulfill the particular requirements of classic theatre, opera, and dance. The course will require several large-scale projects that reinforce the costume design process in a variety of the performing arts. Each area of work within a project is separately graded. These projects will contain written segment components such as a design statement or character analysis, an oral presentation or explanation of the designer’s choices and process, and (where applicable) a demonstration of the fully realized costume renderings. The student is expected to master the process that takes a costume designer from reading a script (or listening to a piece of music) to the creation of a design concept to the visual presentation of renderings from which clothing can be constructed. Particular emphasis is placed on developing the oral presentation skills necessary to communicate with the director and other theatre artists.

Prerequisites: THEA 260, THEA 464

Changes Effective Spring 2021:

- Prerequisites

THEA 464: History of Fashion (3 Credits) (BA)
Old Listing Effective Through Fall 2020:

Survey of dress from Egyptian period to contemporary fashion.

Prerequisite: THEA 100 or THEA 105

Changes Effective Spring 2021:

- Prerequisites

THEA 465: History of Fashion II (3 Credits) (BA)
Old Listing Effective Through Fall 2020:

Survey of dress from 1800 to contemporary fashion. THEA 465 History of Fashion II (3) (BA) This course meets the Bachelor of Arts degree requirements. The course is the second part of the history of fashion that is an elective for graduate theatre students, is required for the B.F.A. Costume Design emphasis, and is an elective for the undergraduate theatre minor. The goal of the course is to identify and examine movements and trends in clothing and fashion from 1800 to the present. Each period is studied by using primary sources, slide presentations, and actual garments to illustrate the relationship between clothing and broad social, historical and artistic developments. Emphasis will be placed on plays that serve as particularly good examples of a period or style of fashion covered in the course. Grading will be based on periodic quizzes covering topics from class lectures, slide presentations, and textbook readings. There will be one oral presentation, a written comprehensive final exam, and assigned graphic presentations or "redrawings" of clothing pieces. To complete these "redrawings" the student will find a primary source or a photographic reproduction of a primary source and "redraw" the garment. For example, a student may find a painting, a sculpture, or photo of a garment (usually on a figure) that represents the period being discussed in class. The student would then "redraw" or copy that image, not trace, for the purposes of identifying the clothing pieces that are shown in the original. The "redrawings" are graded not on the student’s ability to draw but rather on the content, detail, and thoroughness of the pencil sketch.

Prerequisites: THEA 100 OR THEA 105

Changes Effective Spring 2021:

- Prerequisites

THEA 472: Lighting Technology (3 Credits)
Old Listing Effective Through Fall 2020:

An introduction to the basics of electricity, dimmer protocols, lightboard programming, lighting paperwork, and master electrician & assistant lighting design practices. THEA 472 Lighting Technology (3) THEA 472 is an introduction to the basics of electricity, dimmer protocols, lightboard programming, lighting paperwork, and master electrician & assistant lighting design practices. This course will help prepare theatre designers to understand the inner workings of all of the equipment, working practices and safety requirements that are involved with the business of lighting design. This course will also provide students with many of the skills needed to get their foot in the door and get started in the business. Special attention will be paid to safety, stressing the need for safe working practices and environments over the need to get the show up no matter what. Students will learn how all of the advanced technology that is being introduced to the world of lighting functions and how these new technologies are all integrated into a functional system. Students will serve as master electricians and/or assistant lighting designers as part of the hands-on production aspect of the class, with ample time devoted to process discussions and post-show critiques of the work. Small-group problem solving and system troubleshooting will be discussed in depth and applied to real production situations.

Prerequisites: THEA 131

Concurrent Courses: THEA 132

Changes Effective Spring 2021:
THEA 476: Lighting Technology for Production (1 Credit: Maximum of 6 Credits)
Old Listing Effective Through Fall 2020:

THEA 476 is a 1-credit course fulfilling, in part, the requirements of the Theatre BFA Design & Technology Major. Students who are assigned to School of Theatre productions in the Lighting area as an Assistant Master Electrician, Master Electrician, Moving Light Programmer, or Lighting Systems Engineer, in support of the Lighting Design, are eligible to register. The course will be delivered as an independent study with the School's Lighting Design faculty, building on the skills learned in classes and previous productions.

Prerequisites: School of Theatre BFA Majors only

Changes Effective Spring 2021:

• Prerequisites

THEA 477: Lighting Design for Production (1 Credit: Maximum of 6 Credits) (BA)
Old Listing Effective Through Fall 2020:

Design and execution of design projects.

Prerequisite: approval of proposed project by instructor prior to registration

Changes Effective Spring 2021:

• Prerequisites

THEA 481: Stage and Production Management (3 Credits) (BA)
Old Listing Effective Through Fall 2020:

Production planning, scheduling, assignment of personnel, rehearsal procedures, and budgeting.

Prerequisite: THEA 170, THEA 180

Changes Effective Spring 2021:

• Prerequisites

THEA 489: Theatre Production Practicum
Old Listing Effective Through Fall 2020:

Supervised experience in production techniques. For theatre majors only.

Prerequisites: THEA 160, or THEA 180

Changes Effective Spring 2021:

• Prerequisites

THEA 490: London Study Tour (3 Credits) (H)
Old Listing Effective Through Fall 2020:

An intensive academic and cultural experience in the theatre capital of the English-speaking world. THEA 490H London Study Tour (3) Theatre-going forms the heart of the LST and of its academic identity. London is the outstanding theatre city of the English-speaking world, offering consistently superb choices in classic plays, contemporary and avant-garde theatre, musical theatre, opera and dance. Students will see a minimum of seven theatre and dance performances: some will be purchased in advance by the instructor, and others will be selected by participants from a wide range of choices. As a complement to the theatre core, the LST’s faculty leaders will provide students with an orientation to London and its history, culture, and sights.

Prerequisite: program approval

Changes Effective Spring 2021:

• Remove Prerequisites

THEA 495: Internship Practicum (1-6 Credits: Maximum of 12 Credits) (BA)
Old Listing Effective Through Fall 2020:

Professional field experience in theatre performance, production, and management assignments.

Prerequisite: approval of internship by instructor prior to registration

Changes Effective Spring 2021:

• Prerequisites

THEA 499: Foreign Studies–Theatre Arts (1-12 Credits: Maximum of 12 Credits) (IL)
Old Listing Effective Through Fall 2020:

Courses offered in foreign countries by individual or group instruction.

Prerequisite: approval by department

Changes Effective Spring 2021:

• Prerequisites

TURF 307: Golf Course Irrigation and Drainage (3 Credits)
Old Listing Effective Through Fall 2020:

TURF 307 Golf Course Irrigation and Drainage (3) TURF 307 is a course developed to instruct students, interested in working in the turfgrass management profession. Note: PLANT 217 may not be substituted for TURF 307 for prescribed course credit. The majority of the course is devoted to irrigation topics with a strong concentration on turfgrass irrigation applications, while the remainder concerns surface and subsurface drainage. The course covers the following topics: The influence of weather on irrigation management; sprinkler characteristics, selection; management of piping and control systems; maximizing irrigation efficiency by using turfgrass evapotranspiration, soil characteristics, and expectations of venue; fundamental hydraulics, irrigation layout and piping sizing; pump characteristics and system winterization; surface and subsurface drainage systems. The course also includes short field trips to various local industry-related facilities for educational evaluation.

Prerequisites: MATH 21, and SOILS 101

Changes Effective Spring 2021:

• Abbreviated Title

• Description

• Prerequisite

• Add Recommended Preparation
TURF 425: Turfgrass Cultural Systems (3 Credits)
Old Listing Effective Through Fall 2020:

This course will inform students about turfgrass maintenance practices and how their interrelationships can be utilized to develop management systems. TURF 425 will prepare students for the practical application of agronomic principles and concepts in the green industry. Students will develop management and problem solving skills. The course will be a platform for students to learn about the integration of different turfgrass maintenance practices into sound management strategies that lead to the production of high quality turfgrass areas. Specifically, the course will include concepts about golf turfgrass, sports turfgrass and home lawn care. There will be a focus on both the aesthetic quality and functionality of these turfgrass sites and the interrelationship of the concepts.

Prerequisite: SOILS 101, TURF 235

Changes Effective Spring 2021:
• Description
• Prerequisite

TURF 434: Turfgrass Edaphology (3 Credits)
Old Listing Effective Through Fall 2020:

Characterization of soil physical properties for the establishment and maintenance of sports turf; includes root-zone construction. TURF 434 Turfgrass Edaphology (3) TURF 434 is offered to students that are entering their final year of the turfgrass science major. This course builds on introductory turfgrass and soil courses. In this course you will learn to interpret soil physical results using the United States Golf Associated specifications for greens construction. You will learn how to evaluate and manipulate the physical properties of a soil in order to provide a quality turfgrass stand under varying conditions. You will use new information as well as physical and quantitative tools provided to aid in soil management decisions. You will defend your decisions to other students in group-exercises conducted on a computer bulletin board. You will also submit your decision making process and defend your decisions in writing, in the form of business proposals. This class has a series of labs, some of which run over several weeks. You will use class material and the physical and quantitative tools learned in the labs to inform your decision-making processes. Your grade will be based on exams, lab reports, and practicums. The practicums and the labs are interrelated. The practicums, which are mini-case studies of actual turfgrass situations and problems, require you to apply techniques and information learned in the physical lab periods. The practicums are graded on initial draft, final draft, and your critique of other student’s solution to a problem. TURF 434 is an advanced course in soil physical properties.

PREREQUISITE: SOILS 101, TURF 235

Changes Effective Spring 2021:
• Description
• Prerequisite
• Add Recommended Preparation

TURF 435: Turfgrass Nutrition (4 Credits)
Old Listing Effective Through Fall 2020:

Study of turfgrass nutrition and growth; emphasizing constructed and mineral soil fertility, nutrient uptake and function, and fertilizer use efficiency. TURF 435 Turfgrass Nutrition (4) Turfgrass Nutrition is a study in the nutrition and growth of turfgrass plants. Upon completion of this course, students will be able to distinguish the function and requirements of nutrients in the turfgrasses; describe how soil physical and soil chemical properties/conditions affect nutrient availability; select soil amendments to remedy soil chemical limitations; identify the best fertilizers and application methods to satisfy site-specific nutritional requirements; prepare nutrient management plans by appraising edaphic and environmental conditions and current cultural management and use; and will have discovered how best to sample soil, tissue, and water; submit samples, choose appropriate specialty tests, and interpret reports. TURF 435 compliments Turfgrass Edaphology, by examining soil chemical (rather than physical) properties as turfgrass growth parameters and addressing ameliorative measures in concept and operation. Students are introduced to the many classes of specialty fertilizers used in turfgrass management and their specific attributes are revealed through laboratory and field exercises. Students are evaluated through written testing of plant growth and nutrition concepts, interpretation of soil analysis, recommendations of fertilizer type and rate, and nutrient fate and management. TURF 435 has a substantial laboratory component.

Prerequisite: SOILS 101, TURF 235

Changes Effective Spring 2021:
• Description
• Prerequisite

TURF 436: Case Studies in Turfgrass Management (3 Credits) (WF)
Old Listing Effective Through Fall 2020:

Case study and discussion considering integrated management of selected turfgrass sites; emphasis on problem analysis, principle application, and decision making. TURF 436 Case Studies in Turfgrass Management (3) Case Studies in Turfgrass Management is a three credit, writing intensive course for students in the final year of the Turfgrass Science major. The goal of this capstone course is to provide students with an understanding of processes involved in solving turfgrass and soil problems at the managerial level. Using several real-life scenarios provided by the instructor, students will learn to gather facts associated with a problem, analyze the problem, formulate a set of options for solving the problem, implement a plan of action, and evaluate the results of the action. Once these processes are assimilated, students will form teams and select challenging turf and soil problems, analyze them, formulate options for solving the problems, select the most feasible solutions, and evaluate outcomes. Teams will submit reports and develop presentations for class. Teams will also be charged with questioning presenting teams and evaluating team members. Students will be evaluated through exams, reports, presentations, and class participation.

Prerequisites: TURF 238 and TURF 425

Changes Effective Spring 2021:
• Description
• Prerequisite

WFED 105: Integrated Curriculum Implementation (3 Credits)
Old Listing Effective Through Fall 2020:
Occupational analysis for instructional planning; emphasis on instructional methods to deliver a competency-based program in an integrated learning environment.

Prerequisite: EDPSY 014

Changes Effective Spring 2021:

- Remove Prerequisites

WMNST 137: Women and Religion (3 Credits) (BA) (IL) (US) (GH)
Old Listing Effective Through Fall 2020:

Jewish and Christian religious views on womanhood; thought and lives of important religious women; and feminist understandings of these. RLST 137 / JST 137 / WMNST 137 Women and Religion (3) (GH;US;IL) Women and Religion examines the historical and contemporary role of women in society and in religion, how those roles are shaped by religious doctrines around leadership, ritual, language, and the valuation of women's experience and history, and the diversity of women's voices speaking to these issues. An historical inquiry begins with a review of early goddess-based religion and an examination of gender roles promoted in selected creation narratives, including those from Genesis. Additional biblical and non-canonical texts are studied for their various characterizations of woman, the influence of marital status, and her place in the public and private spheres. Historical debates about women consider what roles women played in leadership structures, in religious ceremonies and in the creation of a theological tradition as well as the places women created for themselves outside "official" institutional churches or the formalities of worship. We study prominent women in biblical history, the early church, the medieval past, and in modern American history. What are their stories and what noteworthy contributions did they make in the history of religion? What do we know of their lives and thought? Furthermore, the course addresses contemporary issues of importance to women and how those issues are resolved from the multiple perspectives within Judaism and Christianity. Such issues may include dating, marriage, family and divorce; spousal and gender relations; reproductive rights; homosexuality; sexual violence toward women; work outside the home; and religious leadership and inclusion. Finally, the course examines women's diverse understandings of the ways of being religious. Women are not a homogeneous group and are responding in a multitude of ways to the decisions they face about staying within or working outside established institutions. We consider their choices, from redefining and recreating new traditions and rituals, both within and outside formal worship settings, to returning to goddess worship and other innovations inspired by the most recent feminist movement. All topics are discussed in light of the different beliefs and understandings across the movements within Judaism as well as within Roman Catholicism and the many Protestant denominations. In addition, the diversity of scholarly interpretation is emphasized, including that offered by feminist theologians and the breadth of women's experience arising from factors of race, ethnicity, sexual orientation, and class and educational background.

Prerequisite: third-semester standing

Cross Listing: RLST 137, JST 137

Changes Effective Spring 2021:

- Abbreviated Title
- Title
- Description

WMNST 166: History of Sexuality (3 Credits) (US) (GH)
Old Listing Effective Through Fall 2020:

Discusses the ideas, practices, and identities surrounding sexuality over several centuries in a variety of contexts, focusing primarily on the US. HIST (WMNST) 166 History of Sexuality (3) (GH;US) This is a 100-level course on the history of sexuality, spanning several centuries and a wide range of contexts. The study of sexuality offers a particularly good lens for developing students' analytical ability to think historically about something that is often considered both "natural" and "modern." Topics will include the role of religion, medicine, law, and politics in controlling and shaping sexuality; change and controversy over birth control, abortion, and gender roles; the connections between prescriptive literature and lived experience; the origins and meanings and racial violence in the context of ideas about sexuality; the role of marriage in defining sex, race, and respectability; and the experiences and conflicts that have shaped the emergence of modern lesbian and gay identities. By closely and critically examining one aspect of human thought and experience, the course will teach students to evaluate large questions about sources, methods, and analysis that historians face, including: How do we recover stories of "private" life? From societies and eras different from our own? How does our own understanding of what sexuality complicate our historical exploration? What are the connections between gender identity and sexual practices? What can we learn about gender and sexuality, repression and resistance, deviance and acceptance, identity and community from studying the lesbian and gay past? How has racism been employed to justify particular reproductive and sexual practices, as well as to limit claims to sexual respectability? To what extent is the study of sexuality inherently a study of gender, sex roles, and feminism? While focused primarily on the United States, the course will offer students opportunities to examine these questions in other contexts, including India, the Middle East, and Latin America. It will be especially attentive throughout to the varieties of sexual practices and identities across different races, classes, ethnicities, and religious groups.

Prerequisite: one introductory level course in History or Women's Studies

Cross Listing: HIST 166

Changes Effective Spring 2021:

- Recertification
- Description

WMNST 280: Women and Judaism (3 Credits) (BA) (IL) (GH)
Old Listing Effective Through Fall 2020:

Explores the Jewish views of women that have influenced the roles of women within both the religion and Western culture. J ST (WMNST;RLST) 280 Women and Judaism (3) (GH;IL;BA) This course meets the Bachelor of Arts degree requirements. Women and Judaism will introduce students to the roles and views of women as seen in the Jewish tradition. Because Judaism is not monolithic, these views will vary even within time periods and even among rabbis. The goal of this course, therefore, is not for students to leave the class with one idea of what a Jewish woman is or one idea of what issues are at stake for women in Judaism. Rather, the goal is for students to understand the complex relationship women have to this religion. This course will also explore the views of Jewish women and the issues that concern them in contemporary society. Objectives include the following: students will begin to understand the stereotypes
that influence how Western society views Jewish women, and as a result, how they have come to view themselves. They will be asked to examine the many important roles that Jewish women have played both in their religion and the society at large. They will be asked to examine how the Jewish tradition both helped and hindered women to play these roles. They will see how Jewish women contributed to the development of their own religion and to the larger culture in which they live. They will develop a deeper appreciation for the complexity of the relationship between women and religion. Topics include images of Jewish women in the Bible and the media, women and Jewish views of sexuality, Jewish ethics, Judaism and feminism, and women and Jewish theology. Students will be evaluated by examination, writing ability (several short papers or one larger paper), and group presentations.

Cross Listing: JST 280, RLST 280

Changes Effective Spring 2021:
- Recertification
- Abbreviated Title
- Title
- Description
- Prerequisite
- Cross-Listing

Course Changes: Effective Summer 2021

AFAM 103: Racism and Sexism

Old Listing Effective Through Spring 2021:

This survey course examines racism and sexism as cultural, political and economic processes that shape contemporary social life in the United States. It provides an historical overview of the roots of modern racism and sexism and will explore these structural inequalities continue to matter in a “post-racial” and “post-feminist” era. Students will engage a broad range of texts that discuss these forms of inequality as intersecting, mutually constituted forms of marginalization. Students will develop a deeper understanding of how race, gender, sexuality, and class conditions identity formation; racism as a structural process that shapes and limits the life chances of non-white communities; and the long tradition of resistance that women and communities of color have developed to combat these social inequalities. The course is divided into two sections. The first introduces a range of terms: race, gender, class, sexual politics, intersectionality and neoliberalism. The second half considers various case studies: mass incarceration, toxic waste, (un)natural disasters, reproductive justice, and Islamophobia in the war on terror. Students will leave with both an understanding of key theoretical terms in the study of racism and sexism and be able to apply these concepts to contemporary social issues.

Cross-Listed Courses: SOC 103 WMNST 103

Changes Effective Summer 2021:
- No Proposed Changes

AMST 105: American Popular Culture and Folklife

Old Listing Effective Through Spring 2021:

Survey of popular culture, folklife, and ethnicity, synthesizing material from such areas as literature, media, entertainment, print, music, and film. AMST 105 / ENGL 105 American Popular Culture and Folklife (3) (GH;US) (BA) This course meets the Bachelor of Arts degree requirements. AMST 105 / ENGL 105 covers a broad scope of materials, which may range from early to contemporary American folk and popular cultures. While selected topics for reading and discussion often vary from class to class, all courses focus on a critical examination of a variety of popular and fold cultures in order to produce an enriched understanding of America and its inhabitants. To meet this goal, popular and folk cultures will be examined from a variety of perspectives, including literature, history, politics, film, race, gender, class, and geography. Course requirements frequently include: essay exams, papers, journal entries, vigorous class discussion, and course talk participation. Technology is often incorporated into the class well, this course (or AMST 100) is a requirement for the American Studies major and minor, and offers students valuable experience in critical thinking, analysis, and writing. Non-American Studies majors and minors may use this course to fulfill a general education or Bachelor of Arts/Humanities credit. AMST 105 / ENGL 105 serves as a broad introduction to American popular and folk cultures as well as interpretive strategies relevant to the study of cultures and individuals. The course, as a result, provides preparation for more advanced courses in American studies, American literature, and American history.

Cross-Listed Courses: ENGL 105

Changes Effective Summer 2021:
- General Education Recertification
- Description

ARCH 121: Visual Communications I

Old Listing Effective Through Spring 2021:

Development of two and three-dimensional graphic communications skills and techniques required for the practice of architecture. ARCH 121 Visual Communications I (2) The course is designed to introduce two and three-dimensional graphic communication skills. Assignments will develop the student’s understanding and skills associated with the hand-drawing techniques used in the practice of architecture. Exercises provide exposure to the variety of representational techniques available to architects for the visual communication of design ideas and design documentation. Visual Communications I is organized as an interactive studio environment which combines lectures and demonstrations with individual instruction. The basic concepts and theories of documenting, representing, and presenting architecture will be introduced through a series of lectures, seminars, and examples. In studio, skills will be developed through project workshops. Instruction includes working sessions, individual desk reviews, technique demonstrations and group discussions. Students will learn the fundamentals of architectural drawing by hand, introductory-level descriptive geometry, orthographic projection, paraline and perspective drawings. These skills and principles are imparted primarily through studio-based assigned projects.

Changes Effective Summer 2021:
- Concurrent Course

ARCH 131: Basic Design Studio I

Old Listing Effective Through Spring 2021:

An introduction to the basic concepts, methods, and skills of architectural design in a project-based, active learning, studio environment. ARCH 131 Basic Design Studio I (4) This course is an introduction to the basic concepts, methods, and skills of architectural design. As a “studio” it is a project-based, active learning course where the development and evaluation of the work is driven by a critical dialogue with the instructor and one’s classmates. This course is the first in a series of design studios that serve as the central thread throughout the curricula of the
Architecture program. In ARCH 131, students gain knowledge about the discipline of design, develop skills of design and communication, and foster a capacity for judgment - the ability to make appropriate choices and decisions regarding design questions. As a laboratory, the design studio provides the opportunity to apply and explore the knowledge and experience gained in other courses. ARCH 131 is an intensive course that encourages creativity and industry on the part of the students. Its design projects are open-ended; there are no single "right answers." It demands energy, creativity, the willingness to take risks, and introspection. Each student is expected to be open to a diverse range of ideas, values and solutions. The student is invited to view the studio experience as an opportunity to explore, discover, and invent. The studio is divided into separate sections, each led by one studio instructor. All sections are assigned a series of common projects and exercises; however, each section instructor will establish particular and unique assignments, and criteria for each project. This introduces students to the rich variety of possibilities in architectural communication and design. The primary form of evaluation and grading for this class is the "review and critique" during which students present their work to the class and then receive comments and recommendations for improvement. When assessing the student work, the instructors will consider the students performance in the following areas: 1. Conceptual Strength: The intentions and ideas that inspire the work. 2. Design Development: The energy, effort, and growth demonstrated throughout the course of the project. 3. Product: The tangible quality of the final product as a demonstration of the student’s level of craftsmanship and mastery of the skills introduced in class. 4. Student Preparedness: At desk critiques, pin-ups, and reviews. 5. Student Participation: Students are expected to actively participate and be constructively engaged in class discussions, critiques, and reviews.

Prerequisite: or concurrent ARCH 121

Changes Effective Summer 2021:

• Remove Prerequisites
• Concurrent

ARCH 132: Basic Design Studio II
Old Listing Effective Through Spring 2021:

Continuation of ARCH 131 which further explores basic concepts, methods, and skills of architectural design with an emphasis on craftsmanship. ARCH 132 Basic Design Studio II (4) This course is a continuation of ARCH 131 and shares the same goals, methods, and means of evaluation. However, it builds upon the foundation of fundamental knowledge and skills delivered in the previous course and demands that the students expand their ability to tackle more difficult and complex problems of architectural design. The focus of this course is on "craftsmanship" and the methods and techniques of "making and building." Students are expected to thoroughly consider the implications of materials, construction, and detailing as they relate to their overall design intentions. ARCH 132 is an intensive course that encourages creativity and industry on the part of the students. Its design projects are open-ended; there are no single "right answers." It demands energy, creativity, the willingness to take risks, and introspection. Each student is expected to be open to a diverse range of ideas, values and solutions. The student is invited to view the studio experience as an opportunity to explore, discover, and invent. The studio is divided into separate sections, each led by one studio instructor. Each section instructor will establish particular and unique assignments, and criteria for each project. This introduces students to the rich variety of possibilities in architectural communication and design. When assessing the student work, the instructors will consider the students performance in the

following areas: 1. Conceptual Strength: The intentions and ideas that inspire the work. 2. Design Development: The energy, effort, and growth demonstrated throughout the course of the project. 3. Product: The tangible quality of the final product as a demonstration of the student’s level of craftsmanship and mastery of the skills introduced in class. 4. Student Preparedness: At desk critiques, pin-ups, and reviews. 5. Student Participation: Students are expected to actively participate and be constructively engaged in class discussions, critiques, and reviews.

Prerequisite: Students must earn a C or better in: ARCH 131S and ARCH 121; Concurrent: ARCH 122

Changes Effective Summer 2021:

• Prerequisites

ARCH 203: Materials and Building Construction I
Old Listing Effective Through Spring 2021:

Instruction in the design and construction of buildings utilizing wood and steel. ARCH 203 Materials and Building Construction I (3) This course serves as an introduction to common architectural building materials and associated methods of construction. It is the first part of a two-semester sequence to be followed by ARCH 204 in the spring semester. Lectures, readings, and in-class discussions introduce students to the historical development and conventional use of architectural materials and construction technologies, while select hands-on projects offer students experience in materials application and use. The class covers a wide variety of building methodologies that includes developed and developing cultures, building systems that are technologically sophisticated, as well as traditions considered primitive/vernacular. The primary objective of the course is to make BARCH students familiar with the materials and methods employed in making architecture, so that the results of that familiarity begin to inform the student’s studio work/production. In addition to materials and construction methods, the course will also touch on issues related to craft/craftsmanship, sustainable practices and ethical use of resources, and the significant role that evolving technologies play in the process and economy of building-making.

Prerequisite: Students must earn a C or better in: A E 210; Concurrent: ARCH 231, and A E 421

Changes Effective Summer 2021:

• Prerequisites

ARCH 204: Materials and Building Construction II
Old Listing Effective Through Spring 2021:

This course will continue the presentations of ARCH 203, with a focus on concrete and masonry materials. ARCH 204 Materials and Building Construction II (3) The course is the second part of a two-semester sequence, following ARCH 203. ARCH 204 is an introductory course in building materials and construction. It is intended for BARCH majors and is designed to prepare students for the professional practice of architecture. The learning objectives for the course can be divided into two categories: 1. developing a sense of materials and construction methods as the media for architecture, and then learning to use these media in creative and appropriate ways; 2. developing basic knowledge of the conventions of current building materials and construction techniques. Particular emphasis is placed on the use of drawings and models to accurately depict construction systems, assemblies and details. The course combines lectures and field trips with design projects,
hands-on construction experiences, required readings, drawing and modeling.

Prerequisite: Students must earn a C or better in: ARCH 203; Concurrent: ARCH 232, and A E 422

Changes Effective Summer 2021:

• Prerequisites

ARCH 451: Architectural Professional Practice
Old Listing Effective Through Spring 2021:

A study of architectural practice in today’s society: education, registration, office practice, codes, standards, construction industry, contracts, and legal documents. ARCH 451 Architectural Professional Practice (3) ARCH 451 is a required course in the BARCH curriculum. It is intended to prepare students for the professional practice of architecture. The course explores the historical influences and current trends that shape the relationship between the architect, client and builder in contemporary society. This course provides an overview of the changing roles of the architect through history as well as a detailed examination of the architectural profession in today’s rapidly changing world. ARCH 451 reviews internship, architectural licensing procedures and requirements, professional development (life-long learning), architectural practice including office organizational structures, the architect’s administrative role, construction cost control, professional organizations, the architect’s professional, legal and ethical responsibilities (including life-safety and accessibility), leadership in the profession and the community as well as alternative architectural / design related careers.

Concurrent: ARCH 491

Changes Effective Summer 2021:

• Concurrent Courses

ARCH 491: Architectural Design Studio
Old Listing Effective Through Spring 2021:

Problems in architectural planning and design; and/or programming, implementation methodologies and applications for various environmental design scales. ARCH 491 Architectural Design VII-Thesis (6) It is the goal of this program that, upon completion of the fifth year, each student will have the ability to pursue an architectural idea in a rigorous, in-depth manner and be able to express the knowledge of and implication of that idea through the completion and presentation of a "thoroughly considered building design project." It is the intent of the fifth-year component of the Bachelor of Architecture program to foster the spirit of in-depth design inquiry and research, and to build upon and reiterate design awareness, skills, and methods introduced in previous years; and to introduce, discover and develop new ones. To these ends the primary educational vehicle is the use of a propositional thesis as a way of directing the study toward the linking of theory and building in a meaningful manner.

Prerequisite: Students must earn a C or better in: ARCH 431, ARCH 499A, and ARCH 311W; Concurrent: ARCH 451

Changes Effective Summer 2021:

• Prerequisites

ARCH 499A: Rome Study-Architectural Design
Old Listing Effective Through Spring 2021:

Individual or group instruction conducted in Rome, Italy. ARCH 499A Foreign Study - Architectural Design VI (6) The semester abroad design work will focus on the difficult problem of creating new construction in the presence of an historic structure. This is an inevitable problem in the city of Rome where one can hardly avoid confronting historic or monumental buildings. However, as every place is preceded by a history, either natural, political or material, these issues are important outside of this context, the course aims to help students define critical strategies that will serve them beyond their semester abroad. Fifteen weeks is a short time to experience a place as complex and interesting as Rome, Italy. For many students, it may be a chance of a lifetime to live in and study a place as challenging and full of opportunity as this. Students are expected to approach the semester with even more seriousness then they would a semester at home. A semester in this program is not a mere travel experience but an academic exploration of a foreign and historic environment Every activity of this studio is designed to these ends. Therefore, we have selected a very direct and limited building program, a site in the historic center, and exercises that require students to spend time in the field as well as in the studio.

Prerequisite: Students must earn a C or better in: ARCH 332 and A E 424; Concurrent: ARCH 499B ARCH 499C

Changes Effective Summer 2021:

• Prerequisites

ARCH 499B: Architectural Analysis
Old Listing Effective Through Spring 2021:

ARCH 499B Architectural Analysis (3) (IL)Architecture is amplified and embodied in cities. Since most architecture is set in cities and the city is itself an architecture, it becomes necessary for us to evaluate the relationships that affect the making of buildings for cities and the organization of buildings into a meaningful whole. This course will explore the two meanings of the term "the architecture of cities". It will propose questions leading to an analytical de-composition of the situation of cities in general and Rome in particular. The course is loosely divided into three sections. The first, Historical Overview, presents the evolution of early settlements focusing on the significance of built form. The second, Revolutions and Modernity, demonstrates the qualitative shift in emphasis that settlements undergo from the Enlightenment, through the Industrial Revolution, to the Information Revolution. The third section, the Current Debate, will present some contemporary issues and techniques proposed for the resolution of apparent problems of city architecture. Since this course is given in a unique setting, it takes full advantage of Rome, its history and its problems, to highlight the universal design elements that are part of an analytical understanding, but also of a synthetic design understanding of cities. This course is theory based and, as such, will provoke thinking, a taking apart mentally, more than a making of architecture. The studio design problem, also set in this city, is the operative dimension of thoughts generated here. In this class, students are expected to articulate thought and some clear graphic analysis concerning architecture. These thoughts, if manipulated with discipline and commitment, will become a source of illumination for design activity. Learning Objectives: * To learn the meaning of cities in Western culture * To understand the significance of foundation and other rites concerning building the human environment. * To understand the meaning of urban architecture * To understand the reasons for the form of streets, buildings and open spaces in Western cities * To achieve the analytical skills necessary to take apart the component systems and material elements of architecture
which the art of ceramics functions. As a general appreciation offering, exercises to facilitate a greater awareness of the cultural context in presentations, studio visits and museum critiques will augment studio majors. As a studio offering, emphasis is placed on hands-on activities, ART 080 is intended as a general survey of the art of ceramics for non-(GA)(BA) This course meets the Bachelor of Arts degree requirements.

**Old Listing Effective Through Spring 2021:**

- Enforced Prerequisites

**ARCH 499C: Urban Studies**

**Old Listing Effective Through Spring 2021:**

ARCH 499C Urban Special Topics (3) (IL) The course is a presentation of the history of Rome through the medium of its maps. The well-documented cartographic history of the city is presented along with the morphological changes that are evident in the city today. The material of Rome's physical development is presented in two distinct ways. The first involves slide presentations of Roman maps and engraving images organized by specific routes (vie consolari and others) into and out of the city. The second is by on-site walks through the same routes with the instructor. The approximately twelve routes involve a lecture presentation usually given on Tuesdays, followed by an on-site walk usually given on Thursday. Students are then assigned their own route map of the same study area to generate over the weekend. These are graded and discussed in the following sessions. Framework: * Introduction: The definition of the Urbs through maps * 14th-15th century: Limbourg, Taddeo di Bartolo * 16th century: Bufalini, Duperac * Renaissance planning and the expanding city * 17th century: Maggi, Falda * 18th century: Nolli * 19th century. Catasto Piano * 20th century: Lanciani, Sanjust Themes: * 14th-15th century: Derivation of the iconic map from Mappaemundi and city images in art * 16th century: Images of preSistine in-city and extension planning vs. Sixtus V’s city outside the city * 17th century: Illustrating the Baroque point developments: Urban theater * 18th century: The new orientation and precision measurement of the Age of Reason. Nolli and Piranesi: the contemporary vs. the archaeological city * 19th century: Stasis and expansion: Nolli retreats and the master Plans for the new Capital city * 20th century: Recapitulation and expansion: Lanciani’s new Forma Urbis and images of the boundless city Learning Objectives: * To learn the history of the development of one of the most important cities in the world. * To learn the importance of mapping an wayfinding in the understanding of architecture. * To learn the reading of traces of the past morphological development of a city. * To understand how cities are built, change, and grow over time.

Prerequisite: Students must earn a C or better in: ART H201 and ART H202; Concurrent: ARCH 431Aor ARCH 432A and ARCH 499C

**Changes Effective Summer 2021:**

- Enforced Prerequisites

**ART 80: Introduction to Ceramics**

**Old Listing Effective Through Spring 2021:**

Introduction to the concepts and techniques fundamental to the making of pottery and ceramic sculpture. ART 80 Introduction to Ceramics (3) (GA)(BA) This course meets the Bachelor of Arts degree requirements. ART 80 is intended as a general survey of the art of ceramics for non-majors. As a studio offering, emphasis is placed on hands-on activities, which promote visual literacy and sensitivity to the various conventions in ceramics. Students are given the opportunity to briefly explore many of the traditional approaches to ceramics including those that are used in hand building, wheel throwing, glazing, and kiln firing. As well, slide presentations, studio visits and museum critiques will augment studio exercises to facilitate a greater awareness of the cultural context in which the art of ceramics functions. As a general appreciation offering, emphasis is placed on active learning processes that involve students in basic studio materials and techniques. Since the School of Visual Arts now requires a portfolio review for visual arts majors to enroll in studio courses, ART 80 provides an opportunity for non-art majors to do studio work in conjunction with an exploration of art concepts.

**Changes Effective Summer 2021:**

- Enforced Prerequisites

**BBH 411W: Research and Applications in Biobehavioral Health**

**Old Listing Effective Through Spring 2021:**

Research methods, multi-level analyses, and applications in biobehavioral health. BB H 411W Research and Applications in Biobehavioral Health (3) This is an upper-division course on research and applications in Biobehavioral Health and is the designated writing intensive (W) course for the major. The primary goals of this course are to provide the student the ability to effectively. 1) find, organize, integrate, and critique existing knowledge and research in biobehavioral health; 2) generate and analyze new data related to a specific domain though the conduct of original research; 3) interpret, evaluate, and communicate—to both scientific and lay audiences—the results of the original research; and 4) integrate these findings—with due concern for strengths and limitations of the research—back into the body of knowledge on the biobehavioral health topic. In this course the instructor will first introduce the student into a body of knowledge related to a domain involving health and health-related behaviors. Example domains may include areas such as, stress and health, drug/alcohol addictions and health, hormonal impacts on health, smoking cessation programs, obesity and health, sexual behaviors and health, etc. Students will go through the steps involved in original research (e.g., Introduction, Methods and Procedures, Results, Discussion, Summary, Abstract, Bibliography) and written assignments will be involved for each step. Depending on the instructor, the original research may involve laboratory work, collection of survey data, analyses of publically available data, or existing data sets based on faculty’s research program. Students will learn how to use available tools to descriptively summarize and analyze data using computer-assisted software. This is a required course in the Biobehavioral Health major. The course is designed to give skills to acquire, integrate, and critique health-related information and to communicate to professional and non-professional audiences. The course is appropriate for students intending to obtain positions in health promotion and disease prevention and to students seeking to advance to post-baccalaureate graduate and professional programs in medicine, public health, health policy and planning, and other health-related careers.

Prerequisites: BBH 101 and BBH 310 and STAT 200

**Changes Effective Summer 2021:**

- Enforced Prerequisites

**BE 487: Watershed Modeling for Water Quality Design**

**Old Listing Effective Through Spring 2021:**

Application of common watershed models used to investigate design alternatives for flow and quality effects. B E 487 Watershed Modeling for Water Quality Design (3) This course will explore the use of several commonly-available watershed simulation models for investigating water quality (WQ) and water quantity issues. The models will serve as a base from which students can investigate the effects of different...
management design scenarios on watershed system responses. Spring Creek Watershed in Centre County, and subwatersheds within Spring Creek, will serve as case study watersheds to be investigated for all modeling applications. The ArcView Generalized Watershed Loading Function (AVGWLFW) model will be used as an initial exploration of modeling for the entire watershed and to show the hydrologic and WQ responses for various subwatersheds (agriculturally dominated vs. urban dominated). The StormWater Management Model (SWMM) model will be used to explore more in-depth modeling for an urban watershed, with the Fox Hollow Watershed serving as the primary case study. Extensive flow and WQ monitoring data are available and will serve to assist in parameterizing and calibrating the model. The Soil Water Assessment Tool (SWAT) model will be used to explore flow and constituent response from a more agriculturally-dominated Cedar Run watershed, also located within Spring Creek. The potential impact of urban low impact design (LID) practices and agricultural best management practices (BMPs) will be investigated for urban and rural watersheds, respectively.

Prerequisite: B E 307 or C E 461

Changes Effective Summer 2021:

- Title
- Abbreviated Title
- Description

**CAS 138T: Rhetoric and Civic Life II**

**Old Listing Effective Through Spring 2021:**

This course builds rhetorical skills in oral, written, visual, and digital contexts and introduces deliberation and advocacy in civic and disciplinary spheres. **CAS (ENGL) 138T Rhetoric and Civic Life II (3)** (GWS)ENGL/CAS 138T, Rhetoric and Civic Life II, expands knowledge and aptitudes built in ENGL/CAS 137H by asking students to use rhetorical skills and principles to develop strategies for persuasion and advocacy in the context of civic issues. The course continues the multimodal emphasis—the focus on oral, written, visual, and digital communication—used in 137H and adds new components as well. Students will develop a repertoire of communication skills through hands-on practice at composing and delivering speeches and essays, and they will work with digital media to create multimedia texts, podcasts, and websites. Students will reflect on these different modes as themselves rhetorical choices. The course’s civic and ethical components take center stage as students learn how to deliberate important public issues thoughtfully and with civility and respect. They will learn the difference between persuasion and advocacy and develop strategies for both in the context of pertinent local, national, and global issues. They will participate in a public deliberation forum on topics they generate and vote on. The forum will be organized to allow small deliberative action groups as well as large forum-style meetings. The course focuses on ethics in many contexts, e.g., community action and public deliberation; ethics of persuasion; ethical controversies in the disciplines. Students will be encouraged to explore percolating disciplinary interests and to share knowledge in online disciplinary communities. Students will work throughout the semester to design and build a final electronic portfolio that represents their academic work with an eye to their imagined professional futures. The portfolio assignment is designed to permit assessment of learning outcomes and encourage students to move toward qualifying for the College of the Liberal Arts Excellence in Communication Certificate (http://laus.la.psu.edu/current-students/paterno-fellows-program/excellence-in-communication-certificate), a mechanism which helps students hone their communication abilities throughout their Penn State careers by creating and perfecting an online portfolio.

Cross-Listed Courses: ENGL 138T

Prerequisite: ENGL 137H or CAS 137H

Changes Effective Summer 2021:

- Description

**CAS 422: Contemporary African American Communication**

**Old Listing Effective Through Spring 2021:**

A focused study on the continuities between African and African American culture and communication. **CAS 422 / AFAM 422 Contemporary African American Communication (3) (US)(BA)** This course meets the Bachelor of Arts degree requirements. At least once a year, this multidisciplinary course is designed to serve both Speech Communication and African and African American Studies. It is concerned with the relationship between a people’s culture and world view and their systems of rhetoric/communication. It also provides a focus on the continuities between African and African American culture and communication. Specifically, it offers an approach to ascertaining the salient features of African and African American communication for community development. Special emphasis is given to the development and rhetoric of the Civil Rights Movement. The course utilizes videos, guest lectures, tapes of speeches, etc. to clarify objectives and stimulate classroom discussion. Students will be evaluated on two exams, one oral report, a final paper and class participation. Even though students need 400-level courses for their major and minor, this course is not required for Speech Communication majors. However, it does meet the Intercultural and International Competency requirement because it focuses on the communication of African Americans and how that communication has affected all Americans. The course will accommodate ten students in Speech Communication and ten students in African and African American Studies to ensure active discussion of issues.

Cross-Listed Courses: AFAM 422

Prerequisite: CAS 100

Changes Effective Summer 2021:

- Prerequisites

**CAS 455: Gender Roles in Communication**

**Old Listing Effective Through Spring 2021:**

Explores the literature on gender research in the discipline of human communication. **CAS (WMNST) 455 Gender Roles in Communication (3) (US)** This 400-level course is a theory and application course which also satisfies an intercultural requirement. CAS/WMNST 455 strives to ensure that students understand female and male differences and similarities in communication patterns, perceptions of the opposite sex, and expectations and stereotypes regarding the opposite sex. Many researchers find that gender communication is ‘cross cultural’ i.e., that women and men come from two different cultures, and therefore misunderstanding of each others’ intent and expectations may frequently occur. This course examines how distinctions in meaning and interpersonal dynamics may create these two differing cultures, and promotes understanding and possibilities for adaptation. It also investigates when and if changing communication styles is desirable, and in which settings. A goal of the course is to help students to solve puzzles toward understanding those we work with and relate to, as
well as to apply their knowledge to their own lives and contexts. The course content and format reflects these goals. CAS/WMNST 455 begins with theoretical information, later applying it to situations of interest to most -- relationships, language use differences (verbal and nonverbal), media messages, and workplace issues. Lecture incorporates considerable discussion and exploration of gender issues, and most topics are followed by activities, which illustrate how theories work in real life. This course is useful for any students seeking an intercultural course. It is recommended to Communications Arts and Sciences and Women's Studies majors and minors due to emphasis on communication theory and gender issues. Business, counseling, psychology, sociology, education and any social science majors may fulfill a US requirement through 455.

Cross-Listed Courses: WMNST 455

Prerequisite: CAS 202

Changes Effective Summer 2021:

• Prerequisites

CI 280: Introduction to Teaching English Language Learners
Old Listing Effective Through Spring 2021:

Introduction to language, culture, instruction, assessment, and professionalism as they relate to teaching English Language Learners in U.S. schools. CI 280 focuses on the development of foundational knowledge to successfully assist English language learners in U.S. school contexts. The basic premise of the course is that teachers play an important role in creating a positive classroom learning environment and bringing school success for English language learners. This course is designed to develop essential dispositions, skills, and knowledge for teacher education students to fulfill their important role. Course objectives are to understand culture, language, learning contexts, and pedagogy. Culture focuses on a) sociocultural characteristics of English language learners, b) how English language learners’ cultural communication and learning styles affect the learning process, c) how English language learners’ cultural values affect their academic achievement and language development, d) negative effect of cultural bias in instruction, materials and assessments, and e) the importance of developing cross-cultural competence in interactions with colleagues, administrators, school and community specialists, students and their families.

Prerequisite: EDPSY 10; EDPSY 14; EDTHP 115

Changes Effective Summer 2021:

• Description
• Remove Prerequisites

CI 295A: Introductory Field Experience for Teacher Preparation
Old Listing Effective Through Spring 2021:

CI 295A Introductory Field Experience for Early Childhood Education (1-3) CI 295A is designed to enable students interested in early childhood education as a potential major and career to gain experience observing and assisting in a variety of school and community settings. Students will be engaged in observing as well as tutoring individual children and small groups of children in pre-kindergarten settings as well as in kindergarten through fourth grade settings. As students have not yet been exposed to methods of instructional planning and delivery, their tutoring of individuals and small groups will be carried out under the direct supervision of a professional teacher. Through their observation and participation in these educational settings, students will develop an awareness of observation as a tool for understanding and analyzing educational environments, teaching and learning. They will develop an understanding of the nature of participant observation as well as a variety of frameworks and strategies that can be used for observation as well as the skills necessary to communicate observations professionally and ethically. Engaging in extended observations in educational settings provides students with an opportunity to enrich and deepen their understanding of a variety of educational concepts that they will encounter in prerequisite or concurrent courses including child development, English language learning and development, principles of human learning, individual differences in human ability including special needs students, cultural diversity, and contemporary issues in education and their impact on childhood educational settings. Finally, CI 295A will provide an opportunity for students to examine childhood education as a future career. They will be introduced to notions of teaching in general as a career as well as to specialized aspects of teaching in both pre-kindergarten and elementary school settings. Students will examine their own biographies as learners and the implications of their biographies for the development of a teacher identity and the potential suitability of childhood education as a career. Students will also be engaged in examining a variety of codes for professional and ethical conduct for educators. Through examining, critiquing and synthesizing these various articulations of professionalism, students will begin the development of a personalized code of ethical, and professional conduct.

Prerequisite: second semester standing; Concurrent: HD FS229 or CI 280 or EDPSY 014 or EDTHP 115 or SPLED 400

Changes Effective Summer 2021:

• Description
• Prerequisites
• Recommended Preparation

CI 295B: Introductory Field Experience in Middle Level Education
Old Listing Effective Through Spring 2021:

CI 295B Introductory Field Experience for Middle Level Education (1-3) CI 295B is designed to enable students interested in middle level education (Grades 4 to 8) as a potential major and career to gain experience observing and assisting in a variety of school settings. Students will be engaged in observing as well as tutoring individual children and small groups of children in middle level educational settings. As students have not yet been exposed to methods of instructional planning and delivery, their tutoring of individuals and small groups will be carried out under the direct supervision of a professional teacher. Through their observation and participation in these educational settings, students will develop an awareness of observation as a tool for understanding and analyzing educational environments, teaching and learning. They will develop an understanding of the nature of participant observation as well as a variety of frameworks and strategies that can be used for observation as well as the skills necessary to communicate observations professionally and ethically. Engaging in extended observations in educational settings provides students with an opportunity to enrich and deepen their understanding of a variety of educational concepts that they will encounter in prerequisite or concurrent courses including child development, English language learning and development, principles of human learning, individual differences in human ability including special needs students, cultural diversity, and contemporary issues in education and their impact on middle level educational settings. Finally, CI 295B will provide an opportunity for students to examine middle level education as a future career. They will be introduced to notions of teaching in general
as a career as well as to specialized aspects of teaching in both pre-
kindergarten and elementary school settings. Students will examine their
own biographies as learners and the implications of their biographies
for the development of a teacher identity and the potential suitability
of middle level education as a career. Students will also be engaged in
examining a variety of codes for professional and ethical conduct for
educators. Through examining, critiquing and synthesizing these various
articulations of professionalism, students will begin the development of a
personalized code of ethical, and professional conduct.

Prerequisite: second semester standing, HD FS229 or equivalent

Changes Effective Summer 2021:

• Prerequisites

CI 400: Introduction to Research Literature
Old Listing Effective Through Spring 2021:
Introduction to research literature and methodology; stress on
interpretation, sources, and research reporting.

Prerequisite: student teaching or teaching experience

Changes Effective Summer 2021:

• Prerequisites

CI 405: Strategies in Classroom Management
Old Listing Effective Through Spring 2021:
Managing and coping with disruptive student behavior in instructional
settings so that they support the teaching/learning process. EDLD
405 / CI 405 Strategies in Classroom Management (3)This course
has been designed to engage students in in-depth examination of the
process of creating and sustaining a classroom learning community
that fosters and enables success for all children. Emphasis is placed on
understanding a variety of theoretical models of classroom management
as well as observing and studying individual children to develop a better
understanding of their needs. The result should be the development of
a coherent set of beliefs concerning the creation of classroom learning
environments that support learners and meet their individual needs.

Prerequisite: teaching experience or supervised practicum experience

Changes Effective Summer 2021:

• Concurrent Courses

CI 495: Internship
Old Listing Effective Through Spring 2021:
Supervised off-campus, nongroup instruction including field experiences,
practica, or internships. Written and oral critique of activity required.

Prerequisite: prior approval of proposed assignment by instructor

Changes Effective Summer 2021:

• Prerequisites

CI 495A: Clinical Application of Instruction - PK-4
Old Listing Effective Through Spring 2021:
CI 495A Clinical Application of Instruction—Early Childhood Education
(3) The emphases in CI 495A are on meeting professional expectations
of teaching professionals and planning and teaching lessons.

Teacher candidates are placed in classrooms in the Central Region of
Pennsylvania, which is an area within a 70-mile radius of State College.
A university supervisor observes candidates on a weekly basis during
this field experience. In addition to the on-going field experience, teacher
candidates enrolled in CI 495A meet in weekly seminars. During seminars,
candidates are engaged in discussions addressing lesson planning,
differentiation of instruction, classroom management techniques, and
teacher professionalism. CI 495A is a part of a block of courses in a PSU
teacher education program that is unified by a basic set of principles and
a field experience component.

Prerequisite: CI 295, EDPSY014, EDTHP115. Official clearances
required. See: http://www.ed.psu.edu/preservice/clearance.htm;
Concurrent: regular professional methods courses in area of certification

Changes Effective Summer 2021:

• Description
• Enforced Prerequisites
• Recommended Preparation

CI 495B: Clinical Application of Instruction - Middle Level Education
Old Listing Effective Through Spring 2021:
CI 495B Clinical Application of Instruction—Elementary and Kindergarten
Education (3) CI 495B for Middle Level Education is a full-time teaching
practicum. It provides an opportunity for teacher candidates to integrate
concepts, theories, and ideas from their coursework. Specifically, CI 495B
engages candidates in examining 1) what it means to be a professional
and establish professional relationships with colleagues, students, and
families, 2) how to use various tools (e.g., observation, writing, reflection,
teaching, case studies, etc.) that are available to them in learning to be
a teacher, 3) how to make connections across the various courses and
experiences they are taking during the semester, and 4) how effectively
they are developing their knowledge and skills as a beginning teacher and
what sources of evidence they should use in judging their effectiveness.
Teacher candidates in CI 495B are expected to achieve desired outcomes
in four domains: 1) planning and preparing for student learning, 2)
teacher, 3) inquiry and analysis of teaching and learning, and 4) fulfilling
professional responsibilities. CI 495B is a part of a block of courses in a
PSU teacher education program that is unified by a basic set of principles
and a field experience component.

Prerequisite: CI 295, EDPSY014, EDPY115. Official clearances required.
See: http://www.ed.psu.edu/preservice/clearance.htm;
Concurrent: MTHED420, SCIED458, SS ED430W

Changes Effective Summer 2021:

• Prerequisites
• Recommended Preparations

CI 495D: Practicum in Student Teaching--Childhood and Early
Adolescent Education
Old Listing Effective Through Spring 2021:
Full-time classroom instruction in early childhood and elementary
education. Students supervised by University personnel and practicing
teachers. No concurrent courses other than CI 495F permitted.

Prerequisite: CI 495A or CI 495B; a grade of C or higher in all specified
and professional courses. Official clearances required. See: http://
www.ed.psu.edu/preservice/clearance.htm
**Changes Effective Summer 2021:**

- Description
- Prerequisites
- Corequisites
- Recommended Preparations

**CI 495F: Professional Development Practicum**  
Old Listing Effective Through Spring 2021:

Instruction concurrent with student teaching practicum. Students focus on the solution of instructional problems identified at the practicum site.

Prerequisite: Official clearances required. See: http://www.ed.psu.edu/preservice/clearance.htm; Concurrent: CI 495D

**Changes Effective Summer 2021:**

- Prerequisite
- Corequisite
- Recommended Preparations

**CMPSC 200: Programming for Engineers with MATLAB**  
Old Listing Effective Through Spring 2021:

Development and implementation of algorithms in a procedure-oriented language, with emphasis on numerical methods for engineering problems. A student may receive credit for only one of the following courses: CMPSC 101, 102, 200, 201, or 202. CMPSC 200 CMPSC 200 Programming for Engineers with MATLAB (3) CMPSC 200 is a service course offered to engineering and science majors. The course teaches basic programming concepts including: algorithm development, data types, number representation, control structures, functions, plotting and basic numerical analysis techniques. The course enables students to develop computer programs in MATLAB to solve simple engineering problems. The basic numerical analysis techniques covered in the course include matrix operations, systems of equations, solving equations, roots, curve fitting, interpolation, numerical integration and ordinary differential equations. Students analyze physics-based and engineering problems; develop algorithms to solve the problems; implement the algorithms in the MATLAB programming environment; and produce informative output in both numerical and graphical form. The general programming concepts learned in the course are commonly found in most programming language environments. The problem-solving skills learned in the course can be utilized in upper-level engineering and science courses. The lecture portion of the course gives students the conceptual and syntactical background needed for the successful completion of practical programming assignments during the laboratory portion of the course. The laboratory instruction involves hands-on programming by individual students or student teams assisted by a teaching assistant and/or instructor. Evaluation methods may include examinations, in-class labs, and programming projects. The course is generally held in a STEC room where each student has access to a computer. The course will be offered during the Spring semester.

Prerequisite: MATH 140; Concurrent: MATH 141

**Changes Effective Summer 2021:**

- Description
- Prerequisites
- Concurrent
- Recommended Preparations

**CMPSC 467: Factorization and Primality Testing**  
Old Listing Effective Through Spring 2021:

Prime sieves, factoring, computer numeration systems, congruences, multiplicative functions, primitive roots, cryptography, quadratic residues. Students who have passed MATH 465 may not schedule this course.

Cross-Listed Courses: MATH 467

Prerequisites: Enforced Prerequisite at Enrollment: MATH 311W

**Changes Effective Summer 2021:**

- Enforced Prerequisites

**ECE 451: Instruction in Early Childhood Education Derived from Development Theories**  
Old Listing Effective Through Spring 2021:

Curriculum and instruction for early childhood education; program practice with pluralistic theoretical foundations for early childhood education. E C E 451 Instruction in Early Childhood Education Derived from Development Theories (3) As one of the introductory courses to early childhood education for undergraduate students, this class presents a foundational base of the early childhood education field, including the study of children/childhood, current practices, various roles of practitioners, environments for learning, and approaches to teaching. This course provides an historical overview of influential thinkers and the roots of early childhood education, multidisciplinary perspectives of the development of the young child (for example, perspectives on children/childhood from anthropology, behaviorism, developmental psychology, neuroscience, postmodernism and post-structuralism, psychoanalysis, etc.), and resources for planning curriculum and instruction.

Prerequisite: HD FS229 or HD FS428 or HD FS429

**Changes Effective Summer 2021:**

- Description
- Prerequisites
- Concurrents

**ECE 453: parent Involvement in Home, Center, and Classroom Instruction**  
Old Listing Effective Through Spring 2021:

Parent involvement, programs, and methodologies that strengthen bonds between home and community for educators of children.

Prerequisite: 6 credits in education

**Changes Effective Summer 2021:**

- Description
- Prerequisites
- Recommended Preparations

**ECE 479: The Young Child's Play as Educative Processes**  
Old Listing Effective Through Spring 2021:

Young child's play as educative processes and uses of materials in curricular settings are examined. E C E 479 The Young Child's Play as Educative Processes (3) This course covers concepts and uses of play in education based on theory, research, and teacher experience. Philosophical bases are explored in defining and articulating educational play and its learning and developmental benefits. Teacher roles and
methods of curricular networking to academic content areas as well as assessment and documentation strategies and the role of technology and teacher advocacy are examined. Classroom applications related to the pedagogy of play and outdoor play and recess are included for preschool and primary grades.

Prerequisite: E E 451; HD FS229 or HD FS429 or PSYCH415.

Concurrent: E E 451

Changes Effective Summer 2021:
  • Description
  • Prerequisites

EDUC 322: Adolescent Literature and Developmental Reading
Old Listing Effective Through Spring 2021:

Adolescent literature materials, reading principles, and practices suitable for an English class. EDUC 322 Adolescent Literature and Developmental Reading (3) This course is designed to prepare candidates with the objectives, content, methods and knowledge necessary to teach adolescent literature in today’s secondary language arts classrooms in middle and high schools. Candidates will gain understandings of adolescent literature in contemporary sociocultural life and how it can be used to develop critical literacy perspectives, reading strategies, and communication that is developmentally appropriate for 21st century literacy. Particular emphasis will be placed on instructional methods to comprehend, interpret, evaluate, integrate prior experience, and apply a range of texts (print, non-print, digital, and multimodal) in authentic contexts; developing and struggling adolescent readers will be highlighted. Course readings include research-based, adolescent literacy publications as well as a selection of adolescent literature. Adolescent literature selections include social and cultural issues relevant to adolescent development and diverse student populations. Candidates will compose and discuss critical responses to readings, participate in and contribute to the design of literature circles to discuss adolescent literature selections, and develop research-based lesson plans consistent with Commonwealth of Pennsylvania Common Core standards (PACC) and NCATE/IRA Standards for the English Language Arts. This course adheres to professional and content area standards and practices from: National Council of Teachers of English (NCTE), the National Writing Project (NWP), International Reading Association (IRA), and National Center for Literacy Education (NCLE).

Prerequisite: admission into Secondary English Certification Program or Elementary Education 4-8 Language Arts/English Option

Changes Effective Summer 2021:
  • Prerequisites

EE 200: Design Tools
Old Listing Effective Through Spring 2021:

A working knowledge of electrical engineering design tools and hardware realization of electrical engineering systems. E E 200 Design Tools (3) E E 200 provides students with a working set of design tools that are required to complete subsequent courses in the electrical engineering design curriculum. This course directly builds upon circuit analysis/design concepts in the required introductory courses in electrical circuits, digital systems and computer programming. Specific topics covered in this course include automated instrument control, hardware realization using field programmable devices, hardware realization using embedded microcontroller systems, circuit simulation and printed circuit board layout. Student performance is evaluated using exams, homework assignments, and projects. Concepts introduced in lecture are reinforced with hands-on experience provided by laboratory projects.

Prerequisite: E E 210, CMPEN270 or CMPEN271 and CMPEN275, CMPSC201 or CMPSC121; Prerequisite or concurrent E E 310

Changes Effective Summer 2021:
  • Prerequisites

EE 300W: Design Process
Old Listing Effective Through Spring 2021:

Introduction to the electrical engineering design process, project teaming and management, and technical communication. E E 300W Design Process (3) E E 300W course will introduce students to the electrical engineering design process, project teaming, and project management in preparation for conducting a senior design project. In the lab, students will get practice managing a project from predefinition to completion within constraints of customer needs, technical parameters and budgets. The principles of systems engineering will be introduced. The student-engineer will gain professional skills (in areas such as technical communication, teaming, conflict resolution and life-long learning) important for a successful career in a wide range of engineering environments. There will also be discussion of engineering ethics and the responsibilities of the engineer in the emerging global marketplace. A series of lectures by outside speakers will provide perspectives on life as an engineer.

Prerequisite: E E 20 Concurrent: ENGL 202C

Changes Effective Summer 2021:
  • Prerequisites

EE 320: Introduction to Electro-Optical Engineering
Old Listing Effective Through Spring 2021:

An introduction covering several fundamental areas of modern optics, optical PROCESSES, AND DEVICES.

Prerequisites: EE 330

Changes Effective Summer 2021:
  • Prerequisites

EE 340: Introduction to Nanoelectronics
Old Listing Effective Through Spring 2021:

Introduction to the physics and technology of nanoelectronic devices. E E 340 Introduction to Nanoelectronics (4) This is a required course for junior-level electrical engineering students. The first part of the course provides an introduction to the key aspects of electronic materials, quantum mechanics, and solid state physics needed to understand nanoelectronic devices. The second part is devoted to the fundamental theory of carrier transport including ballistic transport, drift, diffusion, and recombination/generation. The third part of the course applies the fundamentals to describe the operation of several basic semiconductor devices: p-n junctions, metal-semiconductor junctions, and metal oxide semiconductor field effect transistors (MOSFETs), and provides an introduction to fabrication methods used to create these devices. This portion of the course also highlights contemporary concepts in thin film electronics, optoelectronic devices, and solar energy conversion. The course includes several in-class demonstrations and
also webbased remote device measurement laboratories. One of the in-
class demonstrations uses a Breeze interface to link a field emission
scanning electron microscope session to the classroom. The students
can see and communicate with the microscope operator to visualize real
nanoelectronic materials and devices at different levels of magnification.
The remote device measurement laboratories use web-based labview
software to collect device characteristics from silicon p-n junctions and
MOSFETs fabricated in the senior level device technology class. The
students are given microscope images of the devices and an assignment
to analyze the device performance. This allows the students to compare
ideal text book performance to non-ideal device response.

Prerequisite: PHYS 214, E E 210

Changes Effective Summer 2021:
• Prerequisites

EE 350: Continuous-Time Linear Systems
Old Listing Effective Through Spring 2021:

Introduction to continuous-time linear system theory: differential
equation models, sinusoidal steady-state analysis, convolution, Laplace
transform and Fourier analysis.

Prerequisite: E E 210, MATH 220, MATH 250

Changes Effective Summer 2021:
• Prerequisites

EE 351: Discrete-Time Linear Systems
Old Listing Effective Through Spring 2021:

Introduction to discrete-time signal processing: sampling, linear time-
invariant systems, discrete-time Fourier transform and discrete Fourier
transform, Z transform.

Prerequisite: EE 350

Changes Effective Summer 2021:
• Prerequisites

EE 353: Signals and Systems: Continuous and Discrete-Time
Old Listing Effective Through Spring 2021:

Fourier series and Fourier transform; discrete-time signals and systems
and their Fourier analysis; sampling; z-transform. E E 353Signals and
Systems: Continuous and Discrete Time (3) is a core course taken by
all computer engineering students that provides exposure to a variety
of topics in linear systems. The material in this course is needed for
further study in image processing and data communications, both of
which are major areas of specialization within the computer engineering
curriculum. This course is divided into three main sections - continuous-
time linear system analysis, sampling and reconstruction, and discrete-
time (digital) linear system analysis. Although the material covered in
the first and last sections is similar, fundamental differences between
continuous- and discrete-time exist. One of the goals of this course is to
make the student aware of these differences. The first part of the course
discusses continuous-time linear system analysis. It begins with basic
time-domain mathematical descriptions of various signals and systems.
The bulk of the analysis, however, is in frequency domain approaches
such as the Fourier Series and the Fourier Transform. Applications
such as modulation and multiplexing are understood much easier using
frequency-domain analysis approaches. The middle part of the course
deals with the bridge between continuous- and discrete-time, namely
signal sampling and reconstruction. Theoretical and practical approaches
to sampling/reconstruction are covered. Finally the Nyquist sampling
theorem, which is the key to all digital signals, is developed. At this point,
students are ready to study discrete-time systems. The final part of this
course revisits system analysis, although now discrete-time (or digital)
systems are considered. As in the continuous-time case, both time-
domain and frequency-domain approaches to the analysis problem are
discussed. The course ends with select topics in the z-transform, which is
the digital counterpart to the Laplace transform.

Prerequisite: E E 210; CMPSC201 or CMPSC121; MATH 250

Changes Effective Summer 2021:
• Prerequisites

EE 362: Communication Networks
Old Listing Effective Through Spring 2021:

Data transmission, encoding, link control techniques; communication
network architecture, design; computer communication system
architecture, protocols. CMPEN 362CMPEN (E E) 362 Communication
Networks (3)CMPEN (E E) 362 is an elective course in both the electrical
and computer engineering curricula which provides an overview of
the broad field of data and computer communications. First, a general
model of the communication task is presented, including the layered
concept by which each layer provides services for the layer above.
First, the lowest (physical) layer is studied. This involves signal design,
Fourier analysis representations, bandwidth concepts, transmission
impairments and communication media properties. Then the next
higher (link) layer is considered which involves organizing bits into
frames, data link and error control methods (including frame sequence
numbering and error detection principles). Multiplexing to share a link
is studied, including frequency division multiplexing, dedicated time
division multiplexing, and statistical time multiplexing. At the network
layer level, there are two categories: broadcast (usually local area) and
switching networks. Broadcast and local area network studies include
bus, tree and star topologies, Ethernet, optical fiber bus networks,
ring networks, and medium access control protocols. Switching and
routing concepts for networks are explained, including both circuit and
packet switching, datagrams and virtual circuits. Properties of frame
relay and asynchronous transfer mode (ATM) networks are described.
Internetworking frame structures, routing and protocols are studied. Also,
bride routing for local networks is described. At the still higher transport
(network end-to-end control) layer, transport protocols, including TCP/EP,
are described.

Cross-Listed Courses: CMPEN 362

Prerequisite: CMPEN270 or CMPEN271; Concurrent: STAT 301 or STAT
318 or STAT 401 or STAT 414 or STAT 418

Changes Effective Summer 2021:
• Prerequisites

EE 420: Electro-optics: Principles and Devices
Old Listing Effective Through Spring 2021:

Spatially linear system and transform; diffraction theory, partial
coherece theory, optical image detection, storage and display,
holography.
Prerequisite: E E 320

Changes Effective Summer 2021:

• Prerequisites

**EE 422: Optical Engineering Laboratory**

Old Listing Effective Through Spring 2021:

Hands-on experience covering areas of optical transforms, electro-optics devices, signal processing, fiber optics transmission, and holography.

Prerequisite: E E 320

Changes Effective Summer 2021:

• Prerequisites

**EE 424: Principles and Applications of Lasers**

Old Listing Effective Through Spring 2021:

Principles of lasers—generation, propagation, detection and modulation; applications in fiber optics communication, remote sensing, holography, optical switching and processing.

Prerequisite: E E 330 , E SC 400H , or PHYS 400

Changes Effective Summer 2021:

• Prerequisites

**EE 430: Principles of Electromagnetic Fields**

Old Listing Effective Through Spring 2021:

Laws of electrodynamics, boundary value problems, relativistic effects, waves in dielectrics and ferrites, diffraction and equivalence theorems.

Prerequisite: E E 330

Changes Effective Summer 2021:

• Description
• Prerequisites

**EE 438: Antenna Engineering**

Old Listing Effective Through Spring 2021:

Radiation from small antennas, linear antenna characteristics, arrays of antennas, impedance concepts and measurements, multifrequency antennas, and aperture antennas. E E 438 Antenna Engineering (3) E E 438 is an electrical engineering technical elective course intended for students with a specialization in electromagnetics. This course presents antenna engineering concepts including in-depth studies of various antennas and arrays and computer modeling of antennas for analysis and design. The course has three lectures each week as well as an additional period for demonstrations and discussions of outside lab and computer projects. This course requires E E 330, the undergraduate electromagnetics course, as a prerequisite. E E 438 begins with a review of electromagnetics which leads into an introduction of antennas. A lecture is given which shows how the evolution of a guided wave on a transmission line eventually leads into a device that can act as a wave launcher or antenna. A series of lectures are then given introducing the various classes and types of antennas. Performance parameters such as input impedance, radiation patterns, directivity, gain, polarization, and efficiency are then discussed. Examples and pictures of many antennas and their respective patterns are shown as part of these lectures. Next, extensive lectures are given which describe definitions and antenna parameters in detail. Much time is spent on how to visualize radiation patterns and beamwidth. Derivations are carried out for directivity and gain adhering to IEEE standard definitions. Theorems are discussed on the subject of reciprocity and how it can be related to practical measurements of patterns. Another lecture deals with the subject of antenna polarization and cross-polarization. Link analysis is discussed for communication systems and real-world examples are given for its use. The second half of the course involves extensive study of various types of antennas including center-fed dipoles, monopoles, loops, phased arrays, broadband antennas, Yagi antennas, traveling wave antennas, frequency antennas, and aperture antennas. Throughout the course, students are introduced to and utilize an advanced antenna computer modeling software package for carrying out assigned projects and use in homework problems. They are also assigned a group design project during the last third of the course where extensive use of the software package is required. Each group gives an oral presentation of the project and the results during the last week of class and turns in a final report.

Prerequisite: E E 330

Changes Effective Summer 2021:

• Prerequisites

**EE 454: Fundamentals of Computer Vision**

Old Listing Effective Through Spring 2021:

Introduction to topics such as image formation, segmentation, feature extraction, matching, shape recovery, object recognition, and dynamic scene analysis. CMPEN 454 CMPEN 454 Fundamentals of Computer Vision (3) CMPEN 454 is an introduction to computer vision. The goal of computer vision is to make computers understand and interpret visual information. Computer vision systems bring together imaging devices, computers, and sophisticated algorithms for solving problems in areas such as industrial inspection, medicine, document analysis, autonomous navigation, and remote sensing. The course involves both pedagogical written assignments and computer projects. The beginning of the course gives an overview of computer vision and introduces low level image analysis techniques for binary images. Binary vision systems are useful when the silhouette of imaged objects convey enough information to recognize them. Examples can be found in optical character recognition, chromosome analysis and recognition of industrial parts. Moreover, many techniques developed for binary systems can be applied to gray level or color images. Next, the course covers image segmentation and contours. These topics are the foundation of most computer vision techniques. For an image to be correctly interpreted, it must be partitioned into regions that correspond to distinct objects or parts of objects. First, region based techniques such as thresholding, split and merge, region growing and texture analysis are introduced. Next, edge based techniques using gradient and Laplacian operators are discussed. Finally, contour representations and curve approximations linking edges into region boundaries are studied. Next, depth from vision, with emphasis in stereo vision, is considered. Calculating distances to and among various points in the scene is important in many computer vision tasks such as inspection, robot manipulation, and autonomous navigation. In this part of the course the geometry of stereo systems and how to obtain depth maps from stereo image pairs is studied. Also, alternative 3D imaging sensors such as laser based range finders and radars are discussed. Following stereo, the topic of computer vision is broadened to understand sequences of images over time. In this section techniques using information on spatial and temporal changes are used to design computer vision systems capable of coping with moving and changing objects, changing illumination and changing viewpoints. Visual motion is
important primarily for two reasons. First, motion is a very important cue to understand the scene structure. Second, biological systems do use motion to infer properties of the surrounding world with very little a priori knowledge. Finally, the topic of 3D object recognition is discussed. Object recognition entails two main issues: object identification and object localization. Identification determines the objects being imaged while localization determines their position in the world and with respect to the sensors. This topic builds upon all the different techniques discussed until this point.

Cross-Listed Courses: CMPEN 454
Prerequisite: MATH 230 or MATH 231; CMPSC121 or CMPSC201

Changes Effective Summer 2021:

• Prerequisites

EE 455: An Introduction to Digital Image Processing
Old Listing Effective Through Spring 2021:

Overview of digital image processing techniques and their applications; image sampling, enhancement, restoration, and analysis; computer projects. E E (CMPEN) 455 An Introduction to Digital Image Processing (3) E E/CMPEN 455, a technical elective available to both electrical and computer engineering seniors and graduate students, discusses many current techniques for processing and manipulating digital images. The course involves both pedagogical written assignments and computer projects. The beginning of the course gives an overview of digital image processing systems and digital image fundamentals. During this unit, important elements of human visual perception are reviewed; these ideas help motivate many of the computer-based techniques described in subsequent units. Also, the standard model for a digital image, in addition to the concepts of sampling and quantization, are described. Finally, basic topological concepts between digital image pixel are discussed. The next unit considers image transform analysis, with a primary focus on Fourier-based techniques. The one-dimensional Fourier transform is reviewed, and then two-dimensional Fourier transform analysis is discussed. To bridge the gap from the continuous world to the digital world, the sampling theorem is introduced. Next, the Discrete Fourier Transform and its properties are described. Fourier-based filtering techniques, such as the ideal low-pass and Butterworth filters are then introduced. The Fast Fourier Transform is also discussed. Finally, the Discrete Cosine Transform, used later in JPEG and MPEG, is introduced. The next unit discusses techniques for image enhancement and segmentation. These techniques include point-based techniques based on histogram analysis. They also involve linear and nonlinear mask-based methods for noise reduction and region sharpening. Further, techniques of mathematical morphology, which involve an application of set-theoretic concepts to image processing, are described. Finally, image segmentation methods, based on edge detection and thresholding, are described. The final unit considers the concept of image compression. Techniques for image encoding and decoding are discussed. A brief model of the encoding-decoding process is described. Next, compression techniques, such as run-length encoding and Huffman coding, are described. Finally, the multimedia image-compression methodologies, JPEG and MPEG, are discussed.

Cross-Listed Courses: CMPEN 455
Prerequisite: E E 350 or E E 353; CMPSC201 or CMPSC121

Changes Effective Summer 2021:

• Prerequisites

EE 471: Introduction to Plasmas
Old Listing Effective Through Spring 2021:

Plasma oscillations; collisional phenomena; transport properties; orbit theory; typical electric discharge phenomena.

Cross-Listed Courses: AERSP 490 NUCE 490
Prerequisite: E E 330 or PHYS 467

Changes Effective Summer 2021:

• Description
• Prerequisites

EE 472: Space Astronomy and Introduction to Space Science
Old Listing Effective Through Spring 2021:

The physical nature of the objects in the solar system; the earth’s atmosphere, ionosphere, radiation belts, magnetosphere, and orbital mechanics.

Cross-Listed Courses: AERSP 492
Prerequisite: E E 330 or PHYS 400

Changes Effective Summer 2021:

• Prerequisites

EE 474: Satellite Communications Systems
Old Listing Effective Through Spring 2021:

Overview of satellite communications systems, principles, space platforms, orbital mechanics, up/down links and link budgets, modulation techniques. E E 474 Satellite Communications Systems (3) This course is designed to give seniors and graduate students an overview of the principles of satellite communications systems. Building on junior-level courses in electromagnetics and communications, it shows how complex satellite systems operate and provide services that we depend on, such as telephone, television, weather forecasting, and global positioning. Specific topics include: historical background on how satellite systems came to be, present uses of satellite systems, and future trends in satellite systems design, construction, and uses; orbital mechanics and launch systems and vehicles; earth stations; radio propagation and link analysis; signals and satellite access methods. Student performance is evaluated via exams, homework assignments, and projects. Hands-on experience in the design of satellite communications links is gained through the use of industry-standard satellite system analysis software. In their design, the student must achieve specific goals of satellite accessibility, earth coverage footprint, orbital launch and stability, and communications link budget.

Prerequisite: E E 330 and E E 360

Changes Effective Summer 2021:

• Prerequisites

EE 477: Fundamentals of Remote Sensing Systems
Old Listing Effective Through Spring 2021:

Overview of satellite remote sensing systems, principles, space platforms, accessibility, earth coverage footprint, orbital launch and stability, and communications link budget.
The review of fundamental physical properties leads into discussions of various techniques, including imaging, spectroscopy, radiometry, and active sensing.

Cross-Listed Courses: METEO 477
Prerequisite: E E 330 or METEO436

Changes Effective Summer 2021:

• Prerequisites

**EME 466: Energy and Sustainability in Society**

Old Listing Effective Through Spring 2021:

Capstone course in energy technology and policy options for reduced-carbon communities. Covering agent/stakeholder relations, sustainability, communication and public engagement.

Prerequisite: GEOG 030, METEO469, EME 432

Changes Effective Summer 2021:

• Description
• Prerequisites

**ENGL 162N: Communicating Care**

Old Listing Effective Through Spring 2021:

Communicating Care ENGL 162N / SOC 162N / CAS 162N What do we talk about when we talk about health? Our states of well-being and illness are topics that, like the weather, drive our daily conversations, but we rarely have time to study and practice these vital exchanges. Spoken in emergency rooms or on long-distance calls, by medical professionals, family members, or strangers making small talk, the languages we use to share pain and recovery require our knowledge of long-established scripts and our willingness to improvise. By exploring how these encounters draw from and work as textual and dramatic performances, this course will guide students to achieve a new level of literacy in the most essential communicative art of caring. Students will analyze health conversations in literary texts, such as short stories, poems, memoirs, and graphic novels. They will explore real-life scenarios drawn from their own experiences, fieldwork, social science theories, and published case studies. Developing skills in the humanities (GH), they will see how subjective, often individual experience, historical perspectives, and creative expression help people to communicate about health and care. Developing their abilities in the social and behavioral sciences (GS), they will see how theory provides insights to predict and understand health and practices of care, investigate objective perspectives and recognize the contributions of fieldwork and data-driven studies to analyzing and improving communication when health is a main concern. They will integrate these methodologies especially to pursue these fields' common goals of making beneficial connections between individuals and groups, and managing private and public life.

**RECOMMENDED PREPARATION:** ENGL 15; ENGL 30

Changes Effective Summer 2021:

• Not Repeatable
• Remove Recommended Preparation

**ENGL 221W: British Literature to 1798**

Old Listing Effective Through Spring 2021:

Focusing on major writers and their cultural contexts, ENGL 221W surveys British literature to 1798. A remarkable amount of important work was produced over this period. Students will read major texts like Beowulf, Romeo and Juliet, and Tom Jones; learn about renowned authors such as Chaucer, Shakespeare, and Fielding; and be introduced to influential literary forms, such as the epic, the revenge tragedy, and the picaresque novel. The tradition of British literature evolved over periods of significant upheaval and change. Students will also learn about the shifting historical and ethical orientations that energized this tradition, from the Heroic Ethos to Christian Humanism to Neoclassicism. As an introductory survey of British literature, English 221W welcomes non majors: no previous course in literature is required. By reading and discussing some of the best-known works in British literature, students will sharpen their skills of interpretation while surveying an important literary tradition.

Changes Effective Summer 2021:

• IL Attribute

**ENGL 237N: Reading and Writing Documentary Poetry**

Old Listing Effective Through Spring 2021:

You've probably heard of documentary photographs and documentary films, but you may not be familiar with documentary poetry. In this course, we will discuss how poets can use letters, diaries, transcripts, and other materials to create poems that capture historical events and everyday life in order to bear witness to particular moments in time. An important element of the course will be the role of documenting our world in terms of social justice and ethical responsibility. Whether focusing on public education, poverty, race, class, disability, gender, environmentalism, or other subjects, documentary poets personalize issues that are typically represented with broader brushstrokes. As Paul Metres observes, documentary poets invite "the real life outside the poem" into the poem itself, thereby "testing" the boundaries of what Wallace Stevens called "the pressure of reality." We will begin by viewing and discussing documentary poetry within the context of photography and filmmaking. Next, we will read and discuss documentary poems, including persona, collage, and erasure poems. These readings will also include interviews with select documentary poets about their processes. An overview of poetry terminology, research methods, and the ethics of documentary art will provide you with the basis for composing your own documentary poems. The last third of the course will be spent writing and workshopping your original documentary poems.

Prerequisites: ENGL 15; ENGL 30 OR ( ENGL 137H, ENGL 138T )

Changes Effective Summer 2021:

• Remove Prerequisites

**ENGL 310: Honors Thesis in English**

Old Listing Effective Through Spring 2021:

Research paper or creative project on a topic approved by the Departmental Honors Committee.

Prerequisite: 9 credits of ENGL 300H

Changes Effective Summer 2021:

• Number
• Prerequisites
ENGL 478: Grant Writing
Old Listing Effective Through Spring 2021:

Grants can do many things. Let's say you are a student who has always dreamed of combining help for food-insecure people with support for the mentally ill homeless. You've written papers about it for classes; you've read lots of research that points to past pitfalls and future innovative possibilities—but now you want to make it real by finding funding for the program you've envisioned. Or maybe you have your sights set on finding an existing non-profit foundation that might serve as a fiscal conduit for grants that will feed the cause you feel passionately about. These scenarios and many others call for finding and winning a grant. Here's what grants can't do: Write themselves. Given that writers of grants do not have one how-to professional manual to rely on, professional grant-seekers must learn to have flexible responses to a variety of writing situations. Every grant proposal is different, as is every population with a problem to solve, and every organization hoping to help with the solution. A successful grant-writer achieves confidence with hands-on practice—confidence earned from mastering the underlying principles of effective research and outreach; feasible and complete content generation; and the writing of precise, clear, audience-centered prose. English 478 will provide you with the basic knowledge and practice needed to get you on your way to professional confidence. Six Main Learning Goals: * Comprehensive understanding of the grant-writing field * Strategic use of research skills to match program to foundation, need to grant-maker * Beginning mastery of all elements of the basic proposal, including: mission match, objectives that fill a proven need, evaluation strategies that reliably measure outcome, a feasible budget, and proof of capacity and sustainability * Practice of skills most needed in the current economic and political climate, including collaboration, diversified funding, and innovation within an established organization * Practical use of social media and cultivation skills for sustainability of project * Mastery of applied rhetorical style emphasizing clarity and precision

Prerequisite: ENGL 15; OR ENGL 30; OR (ENGL 137, ENGL 138) AND (ENGL 202A; OR ENGL 202B; OR ENGL 202C; OR ENGL 202D)

Changes Effective Summer 2021:

• Prerequisites

ENGL 478W: Senior Seminar
Old Listing Effective Through Spring 2021:

Issues, themes, periods, critical theories, etc., that invite students to use prior English studies, limited to seniors majoring in English.

Prerequisite: six credits of 400-level courses in English

Changes Effective Summer 2021:

• Prerequisites

HM 368: Introduction to the Gaming and Casino Industry
Old Listing Effective Through Spring 2021:

Students will learn about those traits of the casino industry which distinguish it from other segments of the hospitality industry.

Prerequisites: Enforced Prerequisite or Concurrent at Enrollment: HM 201

Concurrent Courses: Enforced Prerequisite or Concurrent at Enrollment: HM 201

Changes Effective Summer 2021:

• Abbreviated Title
• Description
• Remove Prerequisites

IE 478: Retail Services Engineering
Old Listing Effective Through Spring 2021:

Introduction to retail services operations, process models, and application of information technologies to enhance productivity and profitability. IE 478 Retail Services Engineering (3)Objective of this course is to understand modern retail industry with focus on their operations and information technologies that are used in such systems. The course starts with an overview of the basics of types of retailing, their channels, and economics of their operations. Much of the emphasis in the course is on processes and information technologies used in retail industry such as point of sale systems, barcode, RFID/EPC, global data synchronization, EDI, XML, data warehouse, analytics for decision support and supply chain management. Several case studies will be used to draw out the application of tools and techniques covered in the course. Course includes a group project focused on retail industry. Specific topics will include: Global retail industryMulti-channel retailingPerformance and metricsPricingLayout and workforceInformation Systems and SCMBarcode and RFIDData warehouse and analyticsCase studies This course is a senior undergraduate level technical elective course in the IT and Service Engineering track in the Industrial & Manufacturing Engineering Department.

Prerequisite: IE 330

Changes Effective Summer 2021:

• Description
• Prerequisites

KINES 485: Science of Training Athletes
Old Listing Effective Through Spring 2021:

Application of scientific data knowledge to analyze sport training.

Prerequisites: Enforced Prerequisites at Enrollment: KINES 350 and KINES 384

Changes Effective Summer 2021:

• Title
• Abbreviated Title
• Description
• Enforced Prerequisites

LARCH 116: Design II: Spatial Design
Old Listing Effective Through Spring 2021:

Landscape Architecture Studio 2 - the second design studio in the undergraduate Landscape Architecture curriculum - introduces students to small-scale site design. Students are introduced to essential topics in site design: the importance of understanding and responding to site and program, the fundamentals of pedestrian and vehicular circulation, the necessity of designing within a broader social and natural landscape context, and creating refinement in design form. Students are introduced to fundamental concepts through lectures and readings then presented with design projects intended to provide immediate application of those concepts. At the end of each design project, students develop
presentation graphics that explain their final designs and supporting information.

Prerequisite: LARCH 115 Corequisites: LARCH 156

Changes Effective Summer 2021:
• Prerequisites
• Concurrents

LARCH 156: Skills Lab II: Hand & Digital Graphics
Old Listing Effective Through Spring 2021:

Landscape Architecture Skills Lab 2 is the skills lab that runs concurrently with the second design studio in the undergraduate Landscape Architecture curriculum. This skills lab will develop students at the intermediate level of visual communication in landscape architecture with a primary focus on 2D and 3D raster and vector drawing. Spatial design composition is developed through experiencing a variety of approaches to visual communication. Students explore design ideas through sketching in plan, section and perspective and by modeling their ideas in three dimensions.

Prerequisites: LARCH 155 Corequisites: LARCH 116

Changes Effective Summer 2021:
• Prerequisites
• Concurrents

LARCH 215: Design III: Site Design
Old Listing Effective Through Spring 2021:

Landscape Architecture Studio 3 - the third design studio in the undergraduate Landscape Architecture curriculum - follows LARCH 116 (Spatial Design) and further explores site design through expanded complexity of site and program. Students are presented with design projects that include more extensive and complex programs and a broader range of site scales, existing conditions and contexts. Projects also expand the extent and complexity of pedestrian and vehicular circulation. These expanded site and program considerations require students to consider a broader range of design responses while building skill in site design. Throughout the semester, students will continue to develop skills in graphic representation and visualization to explore design ideas and develop presentation graphics. Students are expected to draw upon visualization skills developed in the concurrent LARCH 255.

Prerequisite: LARCH 116 Corequisites: LARCH 255

Changes Effective Summer 2021:
• Prerequisites
• Concurrents

LARCH 216: Design IV: Expanded Use, Scale, and Context
Old Listing Effective Through Spring 2021:

Landscape Architecture Studio 4 - the fourth studio in the undergraduate Landscape Architecture curriculum - follows LARCH 215 and introduces students to the broader perspective of landscapes as expressions of cultural and natural processes. Theories, methods, and tools for effectively studying and analyzing larger scale landscapes will be explored through readings and studio assignments. Students will be presented with landscapes in different geographic contexts and develop skills in conducting landscape research and analysis and using appropriate tools and techniques for effectively exploring alternative land use scenarios. In support of the expanded complexity of working at a larger scale, students are expected to draw upon their knowledge of ecology and ecosystems from previous coursework (LArch 145 and 245). Students will also draw upon precedent studies they may have conducted in landscape architecture history (LArch 060) and previous design studio courses. Students enrolled in LArch 216 will be concurrently enrolled in the associated skills course (LArch 256) that will develop their knowledge and skills with the tools of landscape planning, specifically geographic information systems (GIS). In addition, students will continue to develop skills in graphic representation and written and oral communication as a means to disseminate their planning and design proposals for review and discussion.

Prerequisite: LARCH 245, LARCH 215 Corequisites: LARCH 256

Changes Effective Summer 2021:
• Prerequisites
• Concurrents

LARCH 235: Design Implementation I: Grading
Old Listing Effective Through Spring 2021:

Introduction of basic principles and tools supporting landform data, site systems, grading, visualization representation and site circulation. LARCH 235 Design Implementation I: Grading (2) As an introductory design implementation course, this course provides the foundation for site design in landscape architecture. At the core of the course are four general bodies of knowledge: Geometrics, Landform Manipulation, Site Systems, and Computer Applications for Site Analysis and Design Geometrics: In order to perform landform manipulation, students must be able to efficiently acquire and process basic physical information about a site and are required to understand a suite of measurements. This course will first provide an overview of the digital and paper data sources available to landscape architects. Students will develop basic skills in manipulating or processing these data in order to comply with the requirements of site design. The course will also provide the basic measurements and formulae required for students to efficiently and accurately manipulate landforms. Landform Manipulation: One of the most critical skills landscape architects must acquire as designers is the ability to design landforms to accommodate changes in use and to translate their design ideas into dimensionally precise topographic representations of their designs. This course provides the basic knowledge for students to complete this process. Beginning with a single site element, students are expected to explore the suite of opportunities to place and modify a site to fit a single site element. Increased complexity is added to the suite throughout the remaining portions of the semester, thus enabling students to balance the opportunities and constraints presented by each individual design element and the overall site design. Site Systems: Building on ecological components of the curriculum, this course provides the first site specific and physical understanding of basic site systems critical to every landscape architect’s design. Students will primarily focus on the major site features as related to site drainage, such as soil, topography, and surface geology, but will also be expected to recognize regional context in their designs. Computer Applications for Site Analysis and Design: A central component underlying the instruction of the course is providing students with a suite of computer tools. Course objectives: a) To assist in initial efforts in acquiring and processing site data; b) To perform calculations such as cut and fill, spot elevations, and slope calculations; c) To visualize and complete basic manipulation of landforms; d) To understand the interaction of physical site features on individual sites.
Prerequisite: LARCH 245

The method is transferable. For and how to observe a landscape, they can apply this method to any important to all spatial design work—as a source of essential information and as a source of design inspiration. The Ridge & Valley region contains an especially clear, distinct and "readable" relationship between the geophysical and the biological-between the geological underpinnings and the plants and animals that inhabit the surface. This makes the Ridge & Valley an outstanding context to learn how to observe these important, sometimes subtle, relationships. Once students understand what to look for and how to observe a landscape, they can apply this method to any landscape in the world. The conditions change from place to place, but the method is transferable.

Prerequisite: LARCH 245

Changes Effective Summer 2021:

- Prerequisites

LARCH 236: Design Implementation II: Materials
Old Listing Effective Through Spring 2021:

The landscape architect calls upon a rich array of materials to construct the built elements of landscape: walls, ground surfaces, overhead structures and furniture systems. The functional success and durability of many historical and traditional construction methods is based on a learned appreciation of the qualities and behaviors of materials in use in the landscape. Students develop understanding of the fundamental structural qualities of materials and use that knowledge to devise and illustrate their own design details. The same understanding of material behaviors will be used to investigate the qualities of novel construction materials, and will guide the development of construction details that respond to new constraints and opportunities. The main focus of 236 will be on materials and construction detailing, with emphasis on techniques appropriate for an array of design situations. Representation of design ideas using computer-aided-drafting is expected in this class.

Prerequisite: LARCH 235

Changes Effective Summer 2021:

- Prerequisites

LARCH 246: Ridge & Valley in the Field
Old Listing Effective Through Spring 2021:

LARCH 242 Ridge & Valley Field Study explores the intrinsic links between landform, geophysical and biological processes, vegetation communities, and human manipulation of the landscape through time. It comprises a series of four one-day trips to select locations across our local Ridge & Valley landform region (Appalachian Mountain section), providing the opportunity to examine phenomena at the site level, particularly plants, soils, and landscape contexts. The field experience is immediately preceded by a few skills-building preparatory activities (e.g. workshop(s), test) to establish basic competencies and fore-knowledge. An essential tenet of the course is that layered and interconnected landscape systems learning is something all landscape architects should pursue in their region of practice. Every place possesses a particular relationship between the underlying geology, climate, hydrology, landform, soils, and the plants and animals that inhabit it. Understanding this relationship and learning how to analyze and interpret landscapes is important to all spatial design work—as a source of essential information and as a source of design inspiration. The Ridge & Valley region contains an especially clear, distinct and "readable" relationship between the geophysical and the biological-between the geological underpinnings and the plants and animals that inhabit the surface. This makes the Ridge & Valley an outstanding context to learn how to observe these important, sometimes subtle, relationships. Once students understand what to look for and how to observe a landscape, they can apply this method to any landscape in the world. The conditions change from place to place, but the method is transferable.

Prerequisite: LARCH 245
216 and introduces community and spatial design that accommodates civic and public functions while addressing social and environmental imperatives. It also expands on site design and program that creatively reconciles community-based (i.e. residential and/or public space) agendas. In support of focused explorations of community-oriented design, students are expected to draw on their knowledge of regional and landscape systems from LARCH 216, as well as site design in LARCH 215. In designing public spaces that lie at the heart of thriving communities, students are also expected to draw on technical skills in grading, materials, and planting acquired the implementation sequence. Throughout the semester, students will continue to develop skills in graphic representation and visualization to explore design ideas and develop presentation graphics. Students are expected to draw upon visualization skills developed through the skills lab sequence.

Prerequisite: LARCH 216

Changes Effective Summer 2021:

- Prerequisites

LARCH 335: Design Implementation III: Planting Methods
Old Listing Effective Through Spring 2021:

The third of four courses in the landscape architecture implementation sequence, this course addresses the applied principles, tools and techniques of planting design implementation, with a focus on landscape planting methods and technically proficient documentation. It relies on students having achieved foundational planting design knowledge and abilities in prior design studios and prerequisite courses. Proceeding briskly through site and contextual analysis and conceptual design, we will concentrate on methodical design development, investigation of planting implementation and management methods, and preparation of planting contract documentation. Upon completion of the course, students will have achieved proficiency in planting design implementation as integral to the overall design process and vital to realizing goals for landscape performance, aesthetics, site functionality, and broader social and environmental values.

Prerequisite: LARCH 236, LARCH 245

Changes Effective Summer 2021:

- Prerequisites

LARCH 336: Design Implementation IV: Stormwater
Old Listing Effective Through Spring 2021:

This course is the fourth of four studio courses in the implementation sequence, all of which focus upon the more technical aspects of landscape architectural practice. By means of lectures, studio problems, assigned readings, and computer coursework, LARCH 336 will present the principles and techniques of: Advanced Landform Design and Site Grading- integration of landform and structure through iterative grading design process; water flow and surface drainage. Site Systems and Stewardship - soil, water, and vegetation interactions and ecology; site protection; site systems management; environmental responsibilities and stewardship. Hydrology and Stormwater Management - basic site hydrology; overview of hydrology and stormwater management concepts, infiltration; surface runoff calculations, surface and subsurface drainage systems design. Production of technical drawings using computer-aided drafting is expected in this class.

Prerequisite: LARCH 335, LARCH 315
LARCH 414: Design and Theory V: Advanced Landscape Architectural Design
Old Listing Effective Through Spring 2021:

Review of landscape architectural theories and issues; supports development of comprehensive design study and/or independent honors (Thesis-Based) design projects. LARCH Majors only. LARCH 414 Design and Theory V: Advanced Landscape Architectural Design (5-15) Fourth- and fifth-year design studios are designated 'depth' studios. Each studio is aligned with one of the department's associated research centers or pursues special topical content and continues the development of site-scale planning and design skills for landscape architecture students with larger and more complex sites and programs. Students select a topic from the range of options. Students may choose to take a given topic on a maximum of two occasions. Topics are related to issues that have been introduced in previous studios and are as varied as possible from studio to studio. This allows students to select a topic of interest to explore with great intensity and detail. The studio alternatives offered each year are based on faculty expertise and student interest, and are chosen by the department head's review of faculty proposals. To date, studio topics have ranged from historic preservation to recreational landscapes, urban ecology to community planning. The type of project is determined on an individual basis, and will be rigorous and require a high level of depth of thought and a sophisticated product. Project types include regional master planning, landscape site planning and medium-scale community housing design. The design issues emphasize urban form, community identity and open-space systems in the United States as a follow-up to urban patterns experienced during the student's previous study abroad. The project types may include such topics as inner-city locations with mixed-use and complex programs that progress from research and planning to plan-scale design. Often, students work with an actual client, such as an urban planning commission or a city economic development entity, etc. Issues of urban form as a setting for significant practice opportunities are emphasized. Locations such as brown fields, urban entertainment districts, waterfronts, housing infill, etc., form the basis for design response in context. Course Objectives: -To develop an in-depth understanding of one or another aspect of landscape architecture. -To be exposed to the rigor and challenges of developing and implementing one's own design expertise in the context of a specific environmental concern. -To exercise the design principles, technological tools and communication strategies developed during the course of the specific design studios.

Prerequisite: LARCH312, LARCH322

Changes Effective Summer 2021:

• Prerequisites

LARCH 424: Design Theory Seminar
Old Listing Effective Through Spring 2021:

Inquiry-based reading and discussion of design theory literature relevant to contemporary landscape architecture issues. Topics vary each semester. LARCH 424 Design Theory Seminar (1-3) LARCH 424, Design Theory Seminar, is a companion to the depth studios, LARCH 414. However, unlike the seminars offered during second and third years, LARCH 424 is not tied topically to any particular depth studio. Instead, this seminar provides a vehicle for rigorous and structured exploration of the theoretical and philosophical issues that face landscape architectural designers and planners. The seminar is a small group setting where directed readings, independent research and reflection are employed to explore the context of contemporary design. These seminars, offered to fourth- and fifth-year students, enable professors and students to take their investigations to greater depth. Seminars are offered by different professors each semester and the content is expected to be somewhat aligned with the faculty member's research and scholarship or pursues special landscape architectural topical content of the faculty's choosing. Students select seminars from the range of options offered. This allows students to select a topic of interest to explore with great intensity and detail. Students are required to take up to three seminars to achieve a minimum of three credits. Topics are related to issues that have been introduced in previous studios and seminars and the department ensures that students have access to the widest range of topics. The seminar alternatives offered each year are based on faculty expertise and student interest, and are chosen by the department head's review of faculty proposals. Seminar topics related to our research centers include historic preservation, urban ecology, community planning and watershed stewardship. From time to time topics independent of our research centers, such as the impact of technology on design or the impact of public policy on design and planning, will be addressed. The type of seminar outcome is determined by instructors on an individual basis, and will be rigorous and require a high level of depth of thought and a sophisticated product. Course Objectives: -To further develop an in-depth understanding of the theoretical or socio-political context for one or another aspect of landscape architecture. -To challenge students to articulate their own values in the context of a specific environmental concern. -To examine the means by which designers reconcile their own, their clients', and society's values in the pursuit of particular design or planning goals.

Prerequisite: LARCH312, LARCH322

Changes Effective Summer 2021:

• Prerequisites

LER 466: Labor Union Structure, Administration and Governance
Old Listing Effective Through Spring 2021:

This course provides a comprehensive description and analysis of the manner in which the American Labor Movement is structured, administered and governed as it pursues economic, social and political objectives.

Prerequisite: LER 100

Changes Effective Summer 2021:

• Prerequisites

LER 468: American Labor Unions
Old Listing Effective Through Spring 2021:

Students will examine, debate and gain a fundamental understanding of the current state of the American labor movement.

Changes Effective Summer 2021:

• Prerequisites

LLED 5: College Reading Improvement I
Old Listing Effective Through Spring 2021:
Improvement of basic reading skills: vocabulary development, literal and interpretive comprehension, application of these skills more efficiently into college work.

Prerequisite: limited to students whose academic profile sheets indicate help in reading is needed

**Changes Effective Summer 2021:**

- Remove Prerequisites
- Description

**LLED 10: College Reading Improvement II**

Old Listing Effective Through Spring 2021:

Development of higher level comprehension, vocabulary, and study skills incorporated into content area reading.

Prerequisite: LLED 5

**Changes Effective Summer 2021:**

- Remove Prerequisites

**LLED 400: Teaching Reading in the Elementary School**

Old Listing Effective Through Spring 2021:

Introduction to the reading program; acquaintance with materials and techniques; observations of reading instruction; correlation with human growth and development. LLED 400 Teaching Reading in the Elementary School (3) LLED 400 is intended to help teacher candidates become knowledgeable users of theory and about language, literacy and culture; and to think through instructional problems thoroughly, using multiple sources of information to experiment with alternative solutions. Dealing specifically with reading, we recognize that text goes beyond print texts to include multimodal visual, auditory, digital, movement, and artifactual texts. In LLED 400, candidates learn to understand how children develop as readers and users of literacies in and out of school. Candidates learn how to teach in ways that support children’s successful development and uses of multiple kinds of literacy, including reading. Literacy teaching is both an intellectual and practical matter in which teachers work with students in ways that recognize the complexities of language and its social uses, learning and its cultural contexts, and schooling as organizational phenomena. Children enter schools with multiple types of literacy knowledge and cultural experiences. Coming to understand these complexities requires the coordination of both theoretical awareness and applied knowledge. Candidates’ practice is developed as they learn to address the puzzles children present as they construct their knowledge of language, literacy, and literature in various social situations. Developing practical strategies to teach literacy requires a dedication of head, hand, and heart to treat all people with dignity, acknowledging the contributions of all cultural groups and respecting diversity as it honors ideals of social justice. In LLED 400, teacher candidates develop a repertoire of organizational, instructional, and evaluative strategies that are based on research and best professional practices. Candidates work on projects independently and in collaborative groups. Content is presented by the instructor through a combination of lectures, weekly readings and reflections on readings, class discussion, activities and demonstrations, and viewing and analyzing video. Projects include an analysis of children as readers and curriculum planning. A field experience connected to LLED 400 and LLED 401 affords teacher candidates the opportunity to inquire about children’s encounters with literacy in elementary grade classrooms. LLED 400 is part of a block of courses in a PSU teacher education program that is unified by the basic set of principles supporting the development of a broader and more inclusive understanding of texts, children, and communities.

Prerequisites: CI 295A and EDTHP 115

Corequisites: LLED 401, LLED 402, CI 460

**Changes Effective Summer 2021:**

- Prerequisites

**LLED 401: Teaching Language Arts in Elementary School**

Old Listing Effective Through Spring 2021:

Principles, problems, materials, and techniques involved in teaching speaking, listening, writing, and reading in the elementary school. LLED 401 Teaching Language Arts in Elementary School (3) The purpose of LLED 401 is to acquaint teacher candidates with theories and practices of teaching writing. Candidates are immersed in the study and experience of workshop and strategic models of writing instruction. Basic goals of this course are to help candidates to use language well and thoughtfully concerning writing instruction, literacy, literature and culture; and to think through instructional problems thoroughly, using multiple sources of information to experiment with alternative solutions. We also expect candidates to understand the roles which culture plays in literacy practices, literature, identifications of “ability,” and schooling; to learn how people function effectively in groups; and to develop a repertoire of organizational, instructional, and evaluative strategies. A field experience connected to LLED 400 and LLED 401 affords teacher candidates the opportunity to inquire about children’s encounters with literacy while learning alongside children and teachers in elementary grade classrooms. LLED 401 is part of a block of courses in a PSU teacher education program that is unified by the basic set of principles supporting the development of a broader and more inclusive understanding of texts, children, and communities.

Prerequisites: CI 295A and EDTHP 115

Corequisites: LLED 400, LLED 402, CI 460

**Changes Effective Summer 2021:**

- Prerequisites

**LLED 402: Teaching Children’s Literature**

Old Listing Effective Through Spring 2021:

Survey of children’s literature with an emphasis on the importance of literature in the development of the elementary school curriculum. LLED 402 Teaching Children’s Literature (3) The purpose of LLED 402 is to familiarize teacher candidates with different theories and practices of teaching literature. Candidates are immersed in the study and experiences of literature and strategic models of literature instruction. Understanding that belief systems inadvertently determine the models of literature instruction educators adopt. LLED 402 asks candidates to be mindful of the diverse nature of our communities, and encourages them to strive to create literary communities that respect, value, and encourage multiple modes of expressions. The basic course goals are to help candidates to understand the importance of story in all human lives; to exhibit a wide repertoire of flexible strategies for interpreting literature; and to think through instructional problems thoroughly, using multiple sources of information to experiment with alternative solutions. We also expect candidates to understand the roles which culture plays in literacy practices, literature, identifications of “ability,” and schooling; to learn how people function effectively in groups; and to develop a repertoire of organizational, instructional, and evaluative strategies. A field experience connected to LLED 400 and LLED 401 affords teacher candidates the opportunity to inquire about children’s encounters with literacy while learning alongside children and teachers in elementary grade classrooms. LLED 401 is part of a block of courses in a PSU teacher education program that is unified by the basic set of principles supporting the development of a broader and more inclusive understanding of texts, children, and communities.

Prerequisites: CI 295A and EDTHP 115

Corequisites: LLED 400, LLED 402, CI 460

**Changes Effective Summer 2021:**

- Prerequisites
of each of these goals a struggle to understand and to accept human difference; and to understand the role that literature plays in the school curriculum. The course presents theories of teaching literature and models of literature instruction that place at the center socio-cultural practices typical of democratic literary communities. This requires knowledge of how literature and texts work in real life and in a variety of social and cultural contexts. Informed by research, standards and current practices, LLED 402 exhibits the power of literature, the complexities of students’ learning and experiences with texts, and the problem solving character of teaching. LLED 402 is part of a block of courses in a PSU teacher education program that is unified by the basic set of principles supporting the development of a broader and more inclusive understanding of texts, children, and communities.

Prerequisite: CI 295A or CI 295B; EDTHP 115 or EDTHP selection; Concurrent: LL ED 400, LL ED 401 for CEAED majors

Changes Effective Summer 2021:

• Description
• Prerequisites

LLED 450: Content Area Reading
Old Listing Effective Through Spring 2021:

Study of reading skills and materials for specific content areas; diagnostic and instructional procedures for classroom teachers. LLED 450 Content Area Reading (3) LLED 450 is designed to explore the roles of texts and literacies within the daily lives of middle school age students. We will examine both in-school and out-of-school literacy practices related to meaning-making in specific communities of practice. In doing so, we will work from a broader definition of "text" that includes print, images, sound, hybrid combinations and artifacts from popular culture. In school, we examine how literacies are involved in the learning of content, emphasizing how social practices of thinking in different ways about the world have been organized into school subjects and how teachers can help students to engage productively in those practices. Out of school, we look at the ways in which this age group uses text and other forms of literacy to make sense of and in their lives. Toward that end, we look closely at the media that they use and the types of texts that are produced for and by them. Although we honor the traditional practices of academic disciplines, we recognize how new texts and tasks for those boundaries in order to pose and address school and everyday problems. The basic goals of this course are to help teacher candidates to use language well and thoughtfully concerning literacy, text, and culture; and to think through instructional problems thoroughly, using multiple sources of information to experiment with alternative solutions. We also expect candidates to understand the roles that culture plays in literacy practices, texts, schooling and assessments of "ability"; to learn how people function effectively in groups; and to develop a repertoire of organizational, instructional, and assessment strategies. This course considers how intermediate grades and middle schools are communities of practice that connect disciplines through the use of language and texts to make sense of the world. The communities surrounding schools influence these uses, and this course follows the students’ learning outside the classroom and schools as well as within.

Prerequisite: EDPSY014 or teaching experience

Changes Effective Summer 2021:

• Prerequisites

LLED 462: The Art of the Picturebook
Old Listing Effective Through Spring 2021:

An in-depth study of picturebooks as art objects providing aesthetic experiences and contributing to our aesthetic development in literacy education. LL ED 462 The Art of the Picturebook (3) The Art of the Picturebook explores a wide range of picturebooks with the idea that illustrations are visual art evoking thoughts and feelings. Because picturebooks provide aesthetic experiences and contribute to aesthetic development, they are rich and important sources for literacy education. This course provides opportunities to extend students’ repertoire of strategies for making sense of picturebooks, to deepen knowledge about picturebooks and the artists who create them, and to consider ways to help children become more sophisticated readers of picturebooks. While picturebooks are often emphasized as integral to the literacy development of young children, they can be engaging and desirable for older children as well. Course topics include picturebooks for the very young, as well as picturebooks that could appeal to elementary and middle school children. Whether picturebooks appear relatively simple and straightforward or contain innovatively complex or metafictive design elements, close readings of them with an understanding of terminology offer opportunities to express and discuss reactions and interpretations. The Art of the Picturebook provides students a forum for exploring preferences, ideas, insights, and questions about selected picturebooks, along with curricular and pedagogical considerations. Course readings include interviews with illustrators, selections about creating picture compositions, and scholarly essays presenting theoretical perspectives and ideas about picturebooks as literature and art for children’s literacy development. This course emphasizes that reading and interpreting picturebooks is an active, creative process that is socially, culturally, and historically situated. Authors and illustrators are influenced by culture, so their art reflects values of that culture, consciously or unconsciously. A reader’s experience with a picturebook is also influenced by cultural and social contexts in a given moment. Because engaging in aesthetic experiences is an active, creative process, reading picturebooks is, as Jane Doonan (1993), author of Looking at Pictures in Picture Books, asserts, a form of play. The Art of the Picturebook approaches picturebooks as sources of deep play. The course also provides opportunities to research selected illustrators, both for class discussions and an illustrator study project (e.g., a Wiki page). The culminating illustrator study project involves an in-depth investigation of a key children’s book illustrator and a process of sharing works-in-progress with classmates for collaborative editing.

Prerequisite: ENGL 015 and 5th semester standing or higher

Changes Effective Summer 2021:

• Description
• Prerequisites

LLED 464: Nonfiction Literature for Children and Adolescents
Old Listing Effective Through Spring 2021:

A study of nonfiction literature for children and adolescents with an emphasis on inspiring curiosity and agency. LL ED 464 Nonfiction Literature for Children and Adolescents Nonfiction Literature for Children and Adolescents explores a wide range of nonfiction literature in a variety of subject areas including social studies, math, science, and the arts. This course takes the position that reading nonfiction literature can inspire curiosity and a life-long love of learning, shape inquiry, nourish empathy and compassion, and inform agency. Topics include nonfiction as literature, resources for locating nonfiction literature,
nonfiction literature in different subject areas, nonfiction literature as a catalyst for inquiry, creative nonfiction and hybrid texts, biographies and autobiographies, and nonfiction literature for agency. This course also examines techniques of writing nonfiction literature to develop an understanding of strategies that published authors use to create engaging works to inform readers and provide pleasurable reading experiences. This understanding can help adults who work with children and adolescents recognize and identify the qualities that they find desirable for selecting and sharing nonfiction literature with children and youths, whether shared for reading or serving specifically as mentor texts for writing.

Prerequisite: ENGL 015, 5th semester standing or higher

Changes Effective Summer 2021:

- Description
- Prerequisites

LLED 465: Fantasy Literature for Children
Old Listing Effective Through Spring 2021:

A study of fantasy literature for children looking at a variety of fantasy stories and examining them from different perspectives. LL ED 465 Fantasy Literature for Children (3) Fantasy Literature for Children explores a range of fantasy literature including literary fairy tales, toy fantasies, ghosts/horror/suspense, science fiction, reworked fairy tales, low fantasy, and high fantasy. This course will consider different rationalizations for fantasy literature and will examine some of the key stories that illustrate fantasy from different perspectives, such as literary, social, and psychological angles. This course will look at, first, the beginnings of modern fantasy with the fairy tales of Hans Christian Andersen and Carlo Collodi’s classic, Pinocchio. Then the course reading will include ghosts and other supernatural fantasy stories, and ‘reworked’ fairy tales, a current trend in fantasy literature. Despite of some scholarly debates on science fiction, that is, whether it should be categorized into fantasy or not, this course will consider science fiction as being similar enough to fantasy for it to be included. The course will also include a study of fantasy books currently popular with school-age readers. Fantasy can be divided into two main groups: low fantasy and high fantasy. Several of the stories to be read in the course are perhaps best categorized as low fantasies, not because of what they are, but because they are not high fantasy, which has a mythic quality to it. High fantasy seems to go beyond the particulars of its story to explore the nature of good and of evil. Though high fantasies can be humorous at times, the overall tone is serious. Often characters are on quests and the stakes of success or failure usually involve saving the world from some great evil or preventing the tyranny of some powerful and evil ruler. Reading the different types of fantasy literature and the literary critiques and analyses of those works, this course will be wrestling with the overall importance of those books in the lives of children by pondering imagination and its role in the lives of children throughout the course.

Prerequisites: Enforced Prerequisite at Enrollment: (BA 304 or MGMT 301) and MGMT 341

Changes Effective Summer 2021:

- Abbreviated Title
- Description
- Enforced Prerequisites

MTHED 411: Teaching Secondary Mathematics I
Old Listing Effective Through Spring 2021:

This course focuses on developing knowledge and skills for managing demographic, functional, occupational and identity-based differences within and among organizations. MGMT 445 Managing a Diverse Workforce (3) This course focuses on developing knowledge and skills for managing differences within and among organizations. It provides an in-depth look at the sources of diversity-related conflicts in organizations, constructive approaches for managing these conflicts, and how corporations can leverage diversity for competitive advantage. The overall objective is to provide students with an understanding of the business case for diversity, the legal requirements surrounding the management of diversity in organizations, the structural dimensions of implementing diversity programs, skills for managing diversity in teams, as well as a general sensitivity to the kinds of issues that create conflicts within and between firms. Students will explore legal requirements including: EEOC, affirmative action, and the Americans with Disabilities Act and the implications of these for selection, compensation, promotion and dismissal. Examples of specific steps corporations have taken to address demographic, functional, occupational, and identity-based differences will be provided. Through the use of interactive case studies and experiential exercises, students will be given opportunities to learn about and appreciate their own and others’ cultural heritages, reflect on constructive approaches for handling diversity-related conflicts (including those stemming from functional, occupational and identity-based differences as well as demographic ones) and for designing human resource management systems that capitalize on diversity and promotes inclusion.

Prerequisite: ENGL 015 and 5th semester standing or higher

Changes Effective Summer 2021:

- Description
- Prerequisites

MTHED 411: Teaching Secondary Mathematics I
Old Listing Effective Through Spring 2021:

Conditions for learning mathematics; problem solving; subject matter types; curriculum; learning goals; nature and history of mathematics at secondary level MTHED 411 Teaching Secondary Mathematics I (3) This is the first of two secondary mathematics methods courses. In this course, participants look at mathematics teaching and learning from a teacher’s perspective as well as from a student’s perspective. Course participants engage in mathematical problem solving and in the study of the history and nature of mathematics as the foundation for understanding current curriculum and standards. Lesson planning follows from the consideration of different types of mathematical content, including skills and concepts. Looking specifically at the teaching of mathematics and questioning to promote higher-level thinking prepares students for field experiences in subsequent semesters. The goals for the course are: - To improve understanding of some of the mathematical concepts which are important in secondary school mathematics. - To improve understanding of the nature of mathematics: what is important, how it is practiced, how mathematical validity is determined. - To improve understanding of the historical development of selected topics from secondary school mathematics. - To develop a vision of good school mathematics. - To see mathematics, mathematics learning, and mathematics teaching as problematic and to develop an inquiry approach to and an ability to reflect on these domains. - To increase understanding of secondary school students’ mathematical thinking and understanding. - To increase ability to specify subject matter
involved in a specific mathematics topic and make distinctions among
them. - To improve understanding of various teaching strategies and
their strengths and weaknesses. - To increase ability to choose among
lessons and curriculum materials based on the intended mathematical
subject matter and the current understandings of the students. - To
increase insight into creating a thriving, supportive mathematics
classroom culture. Students are evaluated through written assignments,
examinations, classroom performance, presentations, and lesson plans.

Prerequisite: acceptance into Secondary Education/Mathematics Option
certification program; C I 295 ; a grade of C or better in CMPSC101 ,
MATH 140 , MATH 141 , MATH 220 , MATH 230 , MATH 311W ;
Concurrent: MTHED427

Changes Effective Summer 2021:

- Prerequisite
- Corequisite

MTHED 412W: Teaching Secondary Mathematics II
Old Listing Effective Through Spring 2021:

Assessing learning and instruction; methods of evaluation and grading;
long-term planning; accommodating needs of diverse learners;
connecting theory and practice. MTHED 412 Teaching Secondary
Mathematics II (3) MTHED 412 is an inherently cumulative experience.
This course builds upon ideas developed in MTHED 411 and MTHED
427. In particular, students continue to consider types of subject
matter, problem solving, lesson planning, technology use, questioning,
history and nature of mathematics, and curriculum and standards.
MTHED 412 then links understanding of mathematics education with
other education courses and with field experiences as well as with
understanding of K-16 mathematics. Students focus on lesson and
unit development and implementation, assessment and evaluation,
classroom management and organization within school communities,
and continued professional growth as reflective practitioners. Students
are encouraged to draw whenever possible on education psychology,
adolescent psychology, educational theory and policy, mathematics,
and other bodies of knowledge. In other words, course participants live
as teachers with a wealth of knowledge and responsibility to draw on
that knowledge in the service of their students. Student goals are to: *
Develop an expanded view of the process of teaching mathematics; *
Develop a deeper understanding of what it means to learn mathematics
and the processes by which mathematics is learned; * Be able to reflect
on the instruction and one’s learning in MTHED 412 and to relate it to
students’ learning of secondary mathematics; * Be able to plan and teach
appropriate mathematics lessons and reflect on one’s teaching; * Be
familiar with and be able to draw on a variety of teaching resources;
* Investigate current issues influencing evaluation in the secondary
mathematics curriculum; * Choose goals and content for middle school
and high school mathematics courses; * Develop strategies for assessing
and evaluating what students have learned * Create and implement
assessment instruments for middle school and high school mathematics
courses; * Develop insights into student understanding, especially
in relationship to exceptional students as well as to mathematically
talented and challenged students; * Identify the needs of diverse
learners and to develop strategies to address these needs; * Create
classroom environments that are conducive to learning; and * Incorporate
appropriate technology in the teaching and learning of mathematics.
Students are evaluated through written assignments, examinations,
classroom performance, unit lesson and evaluation plans. Throughout
the course writing is a process to help students learn course content
as well as to help students learn ways of writing needed in the work of
the secondary mathematics teacher. The course is offered each Fall and
Spring semester with typical enrollment of 20-25 students in each of
1 or 2 sections. Through corequisite course, CI 495C, students spend
approximately five full weeks in secondary school classrooms.

Prerequisite: a grade of C or better in MTHED411; Concurrent: CI 412W, CI 495C

Changes Effective Summer 2021:

- Prerequisite
- Corequisite
- Recommended Preparations

MTHED 420: Teaching Mathematics In The Elementary Schools
Old Listing Effective Through Spring 2021:

STRATEGIES FOR TEACHING MATHEMATICS AT THE ELEMENTARY
SCHOOL LEVEL; ANALYSIS OF THE PHILOSOPHY AND CONTENT OF
CONTEMPORARY PROGRAMS OF INSTRUCTION. MTHED 420 Teaching
Mathematics in the Elementary Schools (3) MTHED 420 is designed to
help teacher candidates: 1) to come to see mathematics, mathematics
learning, and mathematics teaching as complex and to develop an
inquiry approach to these domains; 2) to improve their understanding
of the mathematical concepts and procedures they will teach, and to
improve their understanding of children's mathematical learning and
thinking about these concepts and procedures; 3) to increase their
ability to choose among tasks, lessons, and curriculum materials from a
variety of print and electronic sources based on intended mathematical
understandings; 4) to develop a productive mathematics culture in the
classroom; and 5) to explore key educational issues, such as
equality, assessment, and technology, with respect to mathematics
teaching and learning. In the course, teacher candidates explore
important mathematical ideas and their development. They will become
familiar with important pedagogical principles and questions. To help
candidates develop an inquiry approach toward teaching mathematics,
course assignments engage them in reflecting on readings and class
discussions, their previous experiences as a learner of mathematics, and
their ongoing experiences observing and teaching in classroom settings.
MTHED 420 is a part of a block of courses in a PSU teacher education
program that is unified by a basic set of principles and a field experience
component.

Prerequisite: LL ED400 , LL ED401 , LL ED402 ; a grade of C or better
required in MATH 200; Concurrent: CI 495A or CI 495B ; SCIED458 , SS
ED430W

Changes Effective Summer 2021:

- Description
- Prerequisites

MTHED 427: Teaching Mathematics in Technology-Intensive
Environments
Old Listing Effective Through Spring 2021:

Interaction among pedagogy, content, and technology in mathematics
teaching and learning in technology-intensive environments; secondary,
early college curricula; laboratory experience. MTHED 427 Teaching
Mathematics in Technology-Intensive Environments (3) Students should
expect to learn something about each of several common types of
mathematics software, new things about secondary school mathematics,
and a lot about how to make decisions about how to use technology as
an effective mathematics teacher. Students will also use communication
software (e.g., word processors, e-mail, PowerPoint) not as objects of our discussion but in simple ways to generate and share products, assignments, and ideas. The course has a significant lab component. Students will be assessed based on written assignments, lesson plans, oral presentations, class participation, and examinations. The course is offered each fall and spring semester with an approximate enrollment of 20 students per semester. Students must enroll concurrently in MTHED 411.

Prerequisite: acceptance into Secondary Education/Mathematics Option certification program; C I 295; a grade of C or better in CMPSC101, MATH 140, MATH 141, MATH 220, MATH 230, MATH 311W;

Concurrent: MTHED411

Changes Effective Summer 2021:

• Prerequisites
• Corequisites

MTHED 428: Fundamentals of Middle Grades Mathematics 1
Old Listing Effective Through Spring 2021:

This course develops essential understanding of number and algebra for teaching middle grades mathematics and builds on earlier mathematics courses. MTHED 428 Fundamentals of Middle Grades Mathematics 1 (3) MTHED 428 builds upon experiences in early undergraduate courses to enhance prospective and/or practicing teachers’ mathematical knowledge by supporting them to build deep and connected understandings of rational number, ratio, proportion, variable, expressions, and equations and be able to call upon those understandings in order to interpret grades 4-8 students’ mathematical understandings. In particular, students in this course will learn that rational number arise as an extension of whole numbers and can be represented in many forms and interpreted as ratios, measures, quotients, operators, and part-whole relationships. Students will also build understandings of equivalence and the mathematical concepts and relationships that underlie previously learned computational algorithms. Students will understand that ratios involve coordinating two quantities and multiplicative relationships, and that a proportion is a statement of equality between two ratios. Students will learn how number concepts in prekindergarten-grade 4 connect to algebra topics in grades 4-8. Topics in this area include different views and uses of variable, the nature of and use of algebraic expressions and how expressions and equations differ, multiple strategies for manipulating and representing algebraic expressions and equations, and how expressions and equations can be used to represent real-world situations. Students will also learn what research has documented about how the concepts of rational number, ratio, proportion, variable, expressions, and equations develop in grades 4-8; the challenges that grades 4-8 learners face in learning this content; the main themes of the course will involve understandings the mathematical structure of these statistical concepts. For example, students should be able to answer, from a mathematical perspective, why some data analysis techniques are more useful than other techniques. Intended as an elective for students in Secondary Education/Mathematics Education, the course helps students both to enrich and apply the pedagogical ideas and technology uses from their methods courses and to connect their collegiate mathematics experiences to school curricula. In particular, it helps to build prospective teachers’ understanding of statistics as a vital part of secondary mathematics. Class activities involve use of physical manipulatives and mathematics technology (e.g., spreadsheets, dynamic statistics environments, and graphing calculators), as appropriate. Students in this course would be expected to complete weekly assignments and exams and to participate in classroom investigations of statistical concepts. Course grades depend on students’ performance on all of these measures.

MTHED 429: Fundamentals of Middle Grades Mathematics 2
Old Listing Effective Through Spring 2021:

This course develops essential understanding of geometry and probability for teaching middle grades mathematics and builds on earlier mathematics courses.

Prerequisite: formal admission to CEAED major or permission of program

Changes Effective Summer 2021:

• Prerequisites

MTHED 430: Students’ Mathematical Thinking
Old Listing Effective Through Spring 2021:

Develop abilities in planning, conducting, and interpreting mathematics interviews to gain an understanding of students’ thinking processes and current knowledge.

Prerequisite: C I 495D, C I 495E, or experience teaching mathematics

Changes Effective Summer 2021:

• Prerequisites

MTHED 431: Data Analysis in Secondary School Mathematics
Old Listing Effective Through Spring 2021:

Intense development of foundations of data analysis for secondary mathematics as a process using statistical concepts for predictions and inferences. MTHED 431 Data Analysis in Secondary School Mathematics (3) As prospective secondary mathematics teachers, students will develop broad and deep understanding of measures of and representations for center, measures of spread, distribution, and correlation. They will become fluent in using dynamic statistics programs, various physical models, and representations to convey the essence of these statistical concepts to secondary school students. They will compare various statistical methods and measures and make and defend claims both in terms of the discipline and in terms of how these ideas unfold for learners in school mathematics. They will connect these statistical concepts to the broader study of secondary school mathematics. In particular, students will see data analysis as a process. It involves the systematic application of statistical techniques, as well as logical techniques, to summarize, interpret, and compare data. Although the emphasis of the course will be on statistical concepts, one of the main themes of the course will involve understandings the mathematical structure of these statistical concepts. For example, students should be able to answer, from a mathematical perspective, why some data analysis techniques are more useful than other techniques. Intended as an elective for students in Secondary Education/Mathematics Education, the course helps students both to enrich and apply the pedagogical ideas and technology uses from their methods courses and to connect their collegiate mathematics experiences to school curricula. In particular, it helps to build prospective teachers’ understanding of statistics as a vital part of secondary mathematics. Class activities involve use of physical manipulatives and mathematics technology (e.g., spreadsheets, dynamic statistics environments, and graphing calculators), as appropriate. Students in this course would be expected to complete weekly assignments and exams and to participate in classroom investigations of statistical concepts. Course grades depend on students’ performance on all of these measures.
Prerequisite: CMPSC101 or equivalent; at least 18 credits of mathematics at or above the calculus level; acceptance into secondary mathematics certification program or permission of program

Changes Effective Summer 2021:

• Prerequisites

MTHED 432: Mathematical Modeling in Secondary School Mathematics
Old Listing Effective Through Spring 2021:

Students work from teaching and curricular perspective to explore and apply school and undergraduate mathematics to model real-world phenomena. MTHED 432 Mathematical Modeling in Secondary School Mathematics (3) Given the attention to mathematical modeling and applications in secondary school mathematics, prospective teachers need to be able to recognize situations that allow secondary school students to use relevant mathematics to apply mathematics and to model real-world phenomena as a means to learn about various mathematical topics. This course provides experiences in generating, interpreting, and evaluating geometric, discrete, stochastic, and function models. The course also helps prospective teachers develop an understanding of how mathematical modeling arises in school mathematics and how students learn mathematics through modeling. Intended as an elective for students in Secondary Education/Mathematics Education, the course helps students both to enrich and apply the pedagogical ideas and technology uses from their methods courses and to connect their collegiate mathematics experiences to school curricula. Class activities involve use of physical manipulatives and mathematics technology (e.g., spreadsheets, geometry construction environments, and graphing calculators), as appropriate. Students in this course would be expected to complete a major modeling project and paper in addition to weekly assignments, exams, quizzes, and written reflections of classroom participation. Course grades depend on students’ performance on all of these measures.

Prerequisite: CMPSC101 or equivalent; at least 18 credits of mathematics at or above the calculus level; acceptance into secondary mathematics certification program or permission of program

Changes Effective Summer 2021:

• Prerequisites

MTHED 433: Function Concept in Secondary School Mathematics
Old Listing Effective Through Spring 2021:

This course develops the concept of function as an essential topic that underlies and connects school and collegiate mathematics. MTHED 433 Function Concept in Secondary School Mathematics (3) Prospective teachers as students need to understand the concept of function deeply as an essential topic of school and collegiate mathematics. In this course, they develop greater facility in using multiple representations and function models. The course also helps prospective teachers develop an understanding of how mathematical modeling arises in school mathematics and how students learn mathematics through modeling. Intended as an elective for students in Secondary Education/Mathematics Education, the course helps students both to enrich and apply the pedagogical ideas and technology uses from their methods courses and to connect their collegiate mathematics experiences to school curricula. In particular, it helps to build prospective teacher’s conceptual understanding of function so that they may draw more strongly on this understanding to engage secondary students in mathematics. Class activities involve use of physical manipulatives and mathematics technology (e.g., spreadsheets, geometry construction environments, and graphing calculators), as appropriate. Students in this course would be expected to complete a major project and paper in addition to weekly assignments, exams, quizzes, and written reflections of classroom participation. Course grades depend on students’ performance on all of these measures.

Prerequisite: CMPSC101 or equivalent; at least 18 credits of mathematics at or above the calculus level; acceptance into secondary mathematics certification program or permission of program

Changes Effective Summer 2021:

• Prerequisites

MUSIC 84: Jazz Ensemble
Old Listing Effective Through Spring 2021:

Survey and performance of historic and contemporary big band styles. MUSIC 084 Jazz Ensemble (1 per semester/maximum of 8) (GA)(BA) This course meets the Bachelor of Arts degree requirements. MUSIC 084, Jazz Ensemble, includes three sections - Centre Dimensions (001), Inner Dimensions (002), and Outer Dimension (003). These are performance groups of 1619 members each. Admission to the groups is by audition. Students are placed by ability level. The course consists of the study and performance of big band jazz from the mid 1920s to the present. Important composers of the idiom are routinely represented as well as newer contributors. There is a focus on ensemble group sound as well as individual solo improvisation. Part of the learning process includes working on the fundamentals of jazz playing, rhythm, articulation, and harmony. Each learning segment, or unit, is concluded with public performance of the music studied and learned. Section one, Centre Dimensions, represents the School of Music at collegiate jazz festivals as an advanced enhancement of the learning experience. Members are expected to learn their individual parts, attend sections and rehearsals, and participate in the performances. These courses are offered each fall and spring semester.

Prerequisite: audition

Changes Effective Summer 2021:

• General Education Recertification
• Travel Component
• Description
• Remove Prerequisite

MUSIC 93: Essence of Joy
Old Listing Effective Through Spring 2021:

Rehearsal and performance of choral repertoire from the African/ American tradition. MUSIC 093 Essence of Joy (3) (GA;US;IL)(BA) This course meets the Bachelor of Arts degree requirements. Essence of Joy is a highly selective mixed choral ensemble that specializes in repertoire written by African-Americans. The repertoire of the 45-voiced ensemble includes all art, folk, and sacred genres within this large field of study. Essence of Joy has performed at numerous prestigious national and regional meetings of music educators and choral conductors. In addition, the choir tours extensively and has presented performances throughout Pennsylvania, the eastern region, the southern region, and eastern Europe. Membership is open to undergraduate and graduate
students. The goal of the ensemble is to provide artistic, meaningful, and successful choral performances of African-American choral music. To achieve this goal, the learning objectives for individual students include attention toward individual vocal development, increased musicianship skill, and the discovery of new means of artistic expression. In addition to these individual objectives, the conductor of the ensemble also teaches directly toward the objectives of ensemble tone, blend, balance, intonation, dynamics, diction, phrasing, etc. Grades are determined by a combination of vocal and musicianship assessments (both written and aural) and attendance at rehearsals and performances.

Prerequisite: Audition

Changes Effective Summer 2021:
- General Education Recertification
- Description

PHIL 437: World Philosophies and Cultures
Old Listing Effective Through Spring 2021:

Philosophical traditions, problems, and authors in African, Asian, Middle-Eastern, Native American, or other non-Western cultures and intellectual traditions.

Prerequisite: 9 credits of philosophy, including 6 credits of philosophy at the 200 level or 5th semester standing

Changes Effective Summer 2021:
- Title
- Abbreviated Title
- Description

PHIL 461: Plato
Old Listing Effective Through Spring 2021:

Examines the metaphysics, epistemology, politics, aesthetics, and moral theory of this central figure in the history of philosophy.

Prerequisite: 9 credits of philosophy, including PHIL 200 or 6 credits of philosophy at the 200 level

Changes Effective Summer 2021:
- Description
- Prerequisites

PHIL 478: Ethics After the Holocaust
Old Listing Effective Through Spring 2021:

This course analyzes the ethical and philosophical consequences of the Holocaust. Primary areas of examination will be (1) the nature of pre-Holocaust ethical theories and how those theories have failed to sufficiently account for the Holocaust, both philosophically and empirically, and (2) possibilities for a post-Holocaust ethics. Course topics will include the history of ethical theory, the nature and problem of evil, goodness and suffering, witnessing and testimony, and the promise of an ethics. In addition, recent approaches to trauma theory and rights discourse will also be introduced, with some emphasis on how post-Holocaust ethics have been utilized in contemporary human rights work. This course provides students with philosophical approaches to the issues that emerge out of the events of the Holocaust. The course will help students expand their knowledge of the events of the Holocaust through a philosophical approach that does not merely expose them to what happened, but asks them to think about the implications of what happened: most specifically, how do we understand ethical life, if it cannot stop or confront evil? The course will encourage students to think critically, write effectively and express their thoughts logically. Student evaluation will be based on both regular writing assignments and in-class work, possibly including presentations and group-work. This course covers material in the history of philosophy, contemporary philosophy, and writings pertaining to the Holocaust in various forms (historical, literary documentary, and so forth). It provides links to other major areas in the history of philosophy, postmodernism, ethics, philosophy of religion, and Jewish history.

Cross-Listed Courses: JST 478 RLST 478

Prerequisite: One course in either JST or PHIL

Changes Effective Summer 2021:
- Abbreviated Title
- Description

PHIL 485: Heidegger
Old Listing Effective Through Spring 2021:

Studies Heidegger’s metaphysical thought from his early to later works regarding being, history, subjectivity, aesthetics, language, and his influence.

Prerequisite: 9 credits of philosophy, including PHIL 402 or 6 credits of philosophy at the 200 level

Changes Effective Summer 2021:
- Description
- Prerequisites

PPEM 412: Turfgrass Disease Management
Old Listing Effective Through Spring 2021:

Introduction to biology of turfgrass pathogens and management of cool- and warm-season turfgrass disease. PPEM 412 Turfgrass Disease Management (3) This course will provide an introduction to concepts of disease processes in plants and biology of plant pathogens, principles of turfgrass disease diagnosis based on symptom development, recognition of signs and microscopic structures of the pathogens, environmental and cultural management factors influencing disease development, significance of pathogen life cycle in disease epidemic development, and integrated turfgrass disease management practices for root and foliar disease. Disease of various turf types for golf courses, residential lawns, landscapes, and athletic fields will be discussed. Disease topics will include diseases that commonly occur in winter, disease that develop in spring and persist into summer, and disease that initiate in summer and remain active until late fall in most regions of North America. A number of non-infectious disorders of turf caused by extreme environmental conditions and improper cultural practices will also be discussed.

Prerequisites: TURF 230, TURF 235, CHEM 101 or CHEM 110, BIOL 127

Changes Effective Summer 2021:
- Abbreviated Title
- Description
- Prerequisites
SC 205N: Identifying Bias and Falsehood
Old Listing Effective Through Spring 2021:

The course will consider the ways statements are used for aims other than to convey accurate information. This disregard for truth results in the increasingly difficult task of identifying bias and falsehood in the age of information. There are three areas most corrosive to knowledge: language, science, and statistics. The course will examine the appeal of rhetorical arguments and the role of bias in assessing claims; various ways evidence fails to support a conclusion; and the manipulation of data to make information appear more compelling than it is. Students will learn to evaluate the truth of arguments based on philosophical and scientific criteria, and use a variety of skills to identify bias and falsehood in the media.

Changes Effective Summer 2021:

- Cross-Listing

SCIED 411W: Teaching Secondary Science I
Old Listing Effective Through Spring 2021:

Introduction to teaching secondary school science, including curriculum, learning theory, media, evaluation as they relate to student progress. SCIED 411W Teaching Secondary Science I (3) Science Education 411W is an introduction to secondary science education. The course is a project based course for individuals planning to teach science in grades 7-12 and has a significant emphasis on professional writing. The course is also appropriate for those interested in teaching or in program development of out-of-school science learning environments (e.g., science centers, nature centers, museums). Students will participate in activities that are designed to help forge a 'philosophy of science teaching' that is supported by research based findings on 1) learning and assessing learning, 2) best practices for teaching, 3) images of science and scientific inquiry, and 4) the effective design of lessons and activities. There are several peer-teaching assignments where students teach each other and two student teaching assignments with middle school children from area schools. Students are expected to complete written reports and reflections on-type assignments for lesson plan reviews, curriculum assessments, science research reports, and clinical interviews. One of the major goals of SCIED 411 is to promote 'reflection in action' and 'reflection on action' among the students. These are two constructs put forth by Donald Schon that argues an important meta cognitive dynamic for teachers is to think about what they are doing while teaching (in action), and to also think about what they will do differently in future episodes of teaching (on action). On each occasion in 411 when students compete a peer teaching or clinic teaching experience they are requested to compete a 'reflection writing assignment'. Criteria for success on the writing assignments is 1) to provide an accurate description (which may include a lesson plan or references to the lesson plan) of the teaching; 2) to diagnose and identify the successes and the shortcomings of the lesson in terms of student learning; 3) to make connections to course readings that offer suggestions for adapting the lesson to promote learning. The reflection assignments are typically 2 to 3 single-spaced pages accompanied by the lesson plan. Across the semester, from the first 'reflection' assignment to the last 'reflection' assignment there is an expectation that the 411 students will demonstrate a increasing depth and sophistication of reflection, analysis and attention with respect to the construction of learning goals and instruction strategies that promote working with students prior knowledge, employing formative assessment tasks to make students' thinking visible, and using questions and strategies that frame a student-centered discourse learning environment. The course professor will grade the written assignments and provide written and oral feedback. Each assignment will be revised and posted to an on-line student portfolio. Written communication is important in the field of education and science. In this course, the importance of written communication as a means to learn and reflect on the subject matter of the science disciplines and on teaching is emphasized. The value of scientific reports, analysis of curricular materials, development and reflection on lesson plans, and statements regarding the student's philosophy of science teaching will be evident through written assignments, feedback, and revision. Through the experience of reading, discussion, development of lessons, and practice teaching, students will develop the ability to do the following: (a) Use appropriate techniques to probe students' prior knowledge and understandings of scientific concepts. Knowledge about students' alternative conceptions and intuitions is then used to design effective lesson plans and assessments. (b) Plan and teach science lessons employing sound research-based techniques for inquiry teaching. Students will complete both peer and student teaching assignments that are videotaped. (c) Prepare written reflections and evaluations that incorporate analytical perspectives that are based on personal experiences and on course readings and research-based frameworks and practices. Students will be offering written reflective comment on their own teaching and that of classmates. The course goals include the ability to develop a 'reflection in action' and 'reflection on action' decision-making orientation that is informed by evidence-based practices linked to student learning.

Prerequisite: CI 295 ; appropriate courses for certification option and approval of department

Changes Effective Summer 2021:

- Prerequisites

SCIED 457: Environmental Science Education
Old Listing Effective Through Spring 2021:

Philosophy, techniqus, and skills for teaching environmental science, including curriculum development, fieldwork, and the use of appropriate technologies. SCIED 457 Environmental Science Education (3)This course provides an introduction to teaching environmental science to children. Although our emphasis is school-based instruction in the middle and secondary sciences, the course is also appropriate for grade K-6 teachers and teachers of other environmentally related subjects (e.g., social studies, agriculture), as well as educators who plan to work in nonformal educational settings such as nature centers and museums. The course builds students' knowledge in the philosophy, methods, and skills of environmental education; engages students in environmental curriculum analysis and development; and provides hands-on training in classroom-based and field-based environmental investigations. Training and practice with appropriate environmental technologies is included, including CBLS, GPS, and computer software.

Prerequisite: 3 credits of calculus, 9 credits of sciences, 400-level teaching methods course

Changes Effective Summer 2021:

- Description
- Prerequisites
- Recommended Preparations

SCIED 458: Teaching Science in the Elementary School
Old Listing Effective Through Spring 2021:
Interpreting children’s science experiences and guiding development of their scientific concepts; a briefing of science content material and its use. SCIED 458 Teaching Science in the Elementary School (3) SCIED 458 is designed to support teacher candidates in developing their own reflective practice in science teaching for young learners. Candidates in this course engage in a series of experiences that move them from their own understanding of engagement in science, to understanding children’s engagement in science, and finally towards methods of designing science instruction for young learners. Central to this work is a focus on reflective practice; expert teachers reflect on their own teaching practices. During this course, candidates learn to be critical of their own learning, instructional design, and teaching. Candidates use this to revise their practice as they grow as science teachers. The course activities, assignments, readings, and placement experiences offer multiple opportunities for candidates to learn essential knowledge and practices to support children’s curiosity about the world. Course assignments and in-class experiences are designed to help teacher candidates understand the importance of engaging their future students in a strongly integrated focus on science content and practice. This encompasses both how scientists work (the practice of doing science and building our knowledge of the world) and how children learn the skills and practices of doing science. Helping children understand the practices of science is of equal importance as helping them learn the content of science. To start understanding ways of supporting children in learning to do science in age appropriate ways, teacher candidates in this course contrast their understanding and experiences with those of children. Assignments are designed to help facilitate exploration of the links between understanding children’s prior knowledge and beliefs, using knowledge of how people learn, and making pedagogical choices to move children towards specific content and practice goals. Candidates consider the role of differentiated instruction and methods of assessment in science teaching. Finally, the course examines methods of adapting science curriculum using knowledge of children and specified learning goals. Teacher candidates bring together what they have learned about the practices of science, social constructivist instructional methods, and assessment to think critically about how to support elementary students learning science across time. SCIED 458 is a part of a block of courses in a PSU teacher education program that is unified by a basic set of principles and a field experience component.

Prerequisite: LL ED400, LL ED401, LL ED402, three credits each in biological, earth, and physical sciences; Concurrent: C I 495AOR C I 495B; MTHED420, SS ED430W

Changes Effective Summer 2021:

• Prerequisites

SPLED 400: Inclusive Special Ed Foundations: Legal, Characteristics, Collaboration, Assessment, and Management
Old Listing Effective Through Spring 2021:

Legal issues, learner characteristics, collaboration skills, assessment, and behavior management related to educating students with disability in inclusive settings. SPLED 400 Teaching Exceptional Students in General Education Settings (4) This course is delivered via a model of blended instruction and addresses foundational skills (assessment and management) and knowledge (laws, etiologies, collaboration) for those working with students with special education needs in general education classrooms. Almost 30% of the content includes students understanding of the history and current relevance of special education law; roles and responsibilities of general education teachers in providing services to students with special education needs; characteristics and etiologies relevant to providing effective instruction to students with mild and severe disabilities; and developing and maintaining effective education teams. Roughly 35% of content is relevant to assessment in inclusive settings and is centered on sound instructional decision making as well as linking instruction to standards based curricula. Coverage includes understanding formative and summative assessment; creating and administering curriculum-based assessments in reading, mathematics, and writing; designing systems to collect behavioral data; interpreting a variety of norm-referenced test scores; using brief experimental analyses is adequate for a given purpose. Roughly 35% of content is relevant to applying principles of Applied Behavior Analysis (ABA) to managing and motivating learners with special needs placed in inclusive settings. Broad objectives include student acquisition of knowledge and skills related to ABA principles and interventions such as: identifying the nature (positive and negative) of consequences maintaining or decreasing specific behaviors; operationally defining behavior; establishing a classroom and school environment conducive to learning for all students; creating classwide, school-wide; and individual motivation systems; intervening to decrease specific behavior; and using functional behavioral assessments (FBAs) and positive behavior supports.

Prerequisite: EDPSY014 and EDPSY010 or relevant child development course (e.g. HD FS 229, HD FS 239). Fifth semester standing or higher

Changes Effective Summer 2021:

• Prerequisites

Recommended Preparations

SPLED 400H: Inclusive Special Ed Foundations: Legal, Characteristics, Collaboration, Assessment, and Management
Old Listing Effective Through Spring 2021:

Legal issues, learner characteristics, collaboration skills, assessment, and behavior management related to educating students with disability in inclusive settings.

Prerequisite: EDPSY014 and EDPSY010 or relevant child development course (e.g. HD FS 229 or HD FS 239)

Changes Effective Summer 2021:

• Not Repeatable

• Description

• Prerequisites

Recommended Preparations

SPLED 401: Motivating Exceptional Learners
Old Listing Effective Through Spring 2021:

GROUP AND INDIVIDUAL TECHNIQUES TO PROMOTE STUDENT TASK ENGAGEMENT AND PROSOCIAL BEHAVIOR.

Prerequisite: or concurrent: a grade of C or better required in SPLED395W

Changes Effective Summer 2021:

• Description

• Prerequisites

• Corequisite
SPLED 401W: Evidence-Based Instruction for Elementary Students with Disabilities in Reading, Math, and Writing
Old Listing Effective Through Spring 2021:

Evidence-based methods for design, delivery, and adaption of instruction for elementary students with disabilities in reading, mathematics, and writing. SPLED 403A Evidence-Based Instruction for Elementary Students with Disabilities in Reading, Math, and Writing (3) This course is delivered via a model of blended instruction and addresses aspects of designing, delivering, and adapting instruction for students across the range of disability (i.e., mild, moderate, and severe) in elementary, inclusive settings. Content on relevant learner characteristics of special needs students is found throughout the course. About half the course covers content relevant to a wide range of literacy concerns and includes: evidence based practices for instruction in early reading (e.g. decoding, phonemic awareness, phonic and structural analysis; and vocabulary); reading comprehension at primary and intermediate levels (e.g. test structure, content specific vocabulary, and narrative and expository reading in content domains); writing (e.g. handwriting, spelling grammar, and written expression); and mathematics (e.g. number sense and early numeracy, basic facts and operations, applied skills, problem solving, fractions, decimals, and percents).

Prerequisites: SPLED 400

Changes Effective Summer 2021:

- Prerequisites

SPLED 403B: Evidence-Based Methods for Teaching Secondary Students with Disabilities in Inclusive Settings
Old Listing Effective Through Spring 2021:

Evidence-based methods for designing, delivering, and adapting instruction for students with disabilities in inclusive secondary education settings. SPLED 403B Evidence-Based Methods for Teaching Secondary Students with Disabilities in Inclusive Settings (3) This course is delivered via a model of blended instruction and addresses aspects of designing, delivering, and adapting instruction for students across the range of disability (i.e., mild, moderate, and severe) in secondary inclusive settings. Content on relevant learner characteristics of special needs students is found throughout the course. About half the course covers content relevant to designing direct and explicit instruction; self-regulated learning; assistive technology; adaptations and accommodation for learners with several disabilities; and the hierarchy of taxonomical units relative to instructional design. The remaining half of the course covers content relevant to a wide range of literacy concerns and includes: evidence based practices for instruction in early reading (e.g. decoding, phonemic awareness, phonic and structural analysis; and vocabulary); reading comprehension at primary and intermediate levels (e.g. test structure, content specific vocabulary, and narrative and expository reading in content domains); writing (e.g. handwriting, spelling grammar, and written expression); and mathematics (e.g. number sense and early numeracy, basic facts and operations, applied skills, problem solving, fractions, decimals, and percents).

Prerequisites: SPLED 400

Changes Effective Summer 2021:

- Prerequisites
provide scientifically based best practice instruction in reading to K-12 students with special needs. Students will learn how to select reading skills necessary to scaffold and enhance students’ present reading skills. Methods for using researched based assessment strategies and developing foundational reading skills within a classroom context, will be described. This course builds on prerequisite Special Education courses in curriculum and instructional methods. Students in SPLED 409A extend knowledge of explicit instructional strategies in the context of reading. The content offered in this course complements 409B and 409C through the integration of researched based methods and sound instructional design within a curriculum to most effectively teach students with special needs.

Prerequisite: A grade of C or better required in SPLED425, SPLED395W, SPLED401, SPLED412, SPLED454, SPLED495E

Changes Effective Summer 2021:

• Description
• Prerequisites
• Corequisites

SPLED 409B: Writing and Content Literacy for Students with Special Needs

Effective curriculum and materials for teaching writing and content literacy to students with special needs. SPLED 409B Writing and Content Literacy for Students with Special Needs (3) Effective application of classroom-based measurement, curriculum development, and instructional strategies for teaching writing and content literacy to educate students with special needs will be described in this course. Students will learn how to use assessment to develop curriculum and provide scientifically based best practice instruction in writing mechanics (handwriting, spelling, capitalization & punctuation) and written expression (pre-planning to revision) to K-12 students with special needs. Students will learn how to identify, select, and teach content text structure. Methods for using assessment to develop a reading comprehension curriculum within a content classroom context and teach K-12 students with special needs to read and comprehend narrative and expository text (such as text found in Math, Science, Social Studies, and other content textbooks) will be described. Methods for using assessment to develop curriculum and teach K-12 students with special needs to respond to content text and materials through writing will also be examined. This course builds on prerequisite Special Education courses in curriculum and instructional methods. Students in SPLED 409B will have achieved mastery in basic reading theory, assessment, curriculum, and instructional methods. The content offered in this course adds to the existing course content by specifically addressing writing mechanics, written expression, and content reading, curriculum development, and instructional methods (including plans for generalization and maintenance) for students with special needs. Written responses for assigned readings will be required for each topic area. Written evaluations and class assignments will be given to assess student learning throughout the course time period. Students’ learning will be further evaluated through projects that demonstrate understanding of classroom-based assessment, curriculum development, and the instructional methods required to effectively teach content-area mathematics skills to students with special needs. Student applied projects, in coordination with practicum placement, for mathematics instruction will include: (1) the collection of baseline mathematics performance data for a student with special needs, (2) development of a curriculum scope and sequence, (3) development of a research validated instructional intervention, (4) implementation of the intervention, (5) the collection of writing data throughout instruction and after instruction, and (6) development and implementation of an instructional plan for maintenance and generalization. To demonstrate understandings of teaching content reading and writing, students will prepare a presentation of an identified research-based content reading or writing instructional strategy or approach taught within a curriculum scope and sequence.

Prerequisite: a grade of C or better required in SPLED425, SPLED395W, SPLED401, SPLED409A, SPLED412, SPLED454, SPLED495E

Changes Effective Summer 2021:

• Prerequisites
• Corequisites

SPLED 409C: Mathematics Instruction for Students with Special Needs

Effective instruction for teaching mathematics skills to students with special needs. SPLED 409C Mathematics Instruction for Students with Special Needs (3) Research-based assessment, instruction, and intervention strategies for teaching mathematics skills to students with special needs will be described in this course. Students will identify (a) the risk factors associated with mathematics disabilities, (b) effective prevention and remediation models of mathematics disabilities, (c) characteristics of scientifically based instruction in content-area skills (e.g., counting, addition, fractions, problem solving, geometry) for K-12 students with disabilities, and (d) how to effectively provide and assess the effects of such instruction while provided in general and special education classrooms. This course builds on prerequisite Special Education courses in curriculum and instructional methods. Students in SPLED 409C will have achieved mastery in assessment, curriculum, and instructional methods. The content offered in this course adds to the existing course content by specifically addressing how to teach content-area skills for students with special needs. Written responses for assigned readings will be required for the topic areas. Written evaluations and class assignments will be given to assess student learning throughout the course time period. Students’ learning will be further evaluated through projects that demonstrate understanding of classroom-based assessment, curriculum development, and the instructional methods required to effectively teach content-area mathematics skills to students with special needs. Student applied projects, in coordination with practicum placement, for mathematics instruction will include: (1) the collection of baseline mathematics performance data for a student with special needs, (2) development of a curriculum scope and sequence, (3) development of a research validated instructional intervention, (4) implementation of the intervention, (5) the collection of writing data throughout instruction and after instruction, and (6) development and implementation of an instructional plan for maintenance and generalization. To demonstrate understandings of teaching content area mathematics skills, students will prepare a presentation of a self- or instruction-selected research-based curriculum and instructional strategy or approach that meet "best practice" standards (e.g., those identified through previous meta-analysis).

Prerequisite: a grade of C or better required in SPLED425, SPLED395W, SPLED401, SPLED409A, SPLED412, SPLED454, SPLED495E

Changes Effective Summer 2021:
Using this Bulletin

• Description
• Prerequisites
• Corequisites

SPLED 411: Intervention for Students with Severe Disabilities
Old Listing Effective Through Spring 2021:
Assessment, teaching strategies, curricula, materials, and assistive techniques for use with individuals having severe disabilities (mental and physical).
Prerequisite: a grade of C or better required in SPLED395W, SPLED401, SPLED425

Changes Effective Summer 2021:
• Description
• Prerequisites
• Corequisites

SPLED 412: Instruction for Students with Mild Disabilities
Old Listing Effective Through Spring 2021:
Appropriate teaching strategies, curriculum sequences, and materials selection and evaluation for children with mild special needs.
Prerequisite: a grade of C or better required in SPLED395W, SPLED401, SPLED425, SPLED454

Changes Effective Summer 2021:
• Description
• Prerequisites
• Corequisites

SPLED 415: Early Special Education
Old Listing Effective Through Spring 2021:
Includes early identification methods, assessment, curricula, parent involvement, and program evaluation for exceptional preschoolers in mainstreamed or segregated settings.
Prerequisite: a grade of C or better required in the following courses SPLED454; a course in child development

Changes Effective Summer 2021:
• Prerequisites

SPLED 418: Technologies for Persons with Disabilities
Old Listing Effective Through Spring 2021:
Sensory aids, communication systems, computer systems, expert systems, simulations, and other technologies for students with disabilities.
Prerequisite: SPLED400 or SPLED425

Changes Effective Summer 2021:
• Description
• Prerequisites
• Corequisites

SPLED 419: Assistive Technology for General Education Teachers
Old Listing Effective Through Spring 2021:
Strategies to support use of assistive technologies by students with disabilities in general education classrooms. SPLED 419 Assistive Technology for General Education Teachers (2-3) This course will teach students the role of the general education teacher in supporting the use of assistive technology (AT) by students with disabilities in general education classrooms. Students will learn the role of the general education teacher in the AT process, including (as appropriate) how to identify student AT needs, obtain information on common AT applications and devices, make first-hand use of current AT solutions, and evaluate the use of AT to address specific student needs. Particular attention will be given to the use of AT to assist students with disabilities in reading, writing, math, communication, and the development of social skills. Students will learn the role and responsibilities of the general education teacher on the AT team, as well as issues of "scope of practice", and the roles and responsibilities of the other licensed professionals on the AT team. Students will also be provided with resources and strategies for making use of state and national information resources and services related to AT.
Prerequisite: SPLED400, SPLED403A or SPLED403B

Changes Effective Summer 2021:
• Prerequisites

SPLED 425: Foundations of Special Education, Etiologies, Law, and Implications for Practice
Old Listing Effective Through Spring 2021:
An introduction to exceptional individuals being served in special education programs across the life span. SPLED 425 Foundations of Special Education, Etiologies, Law, and Implications for Practice (4) This course is designed to provide an introduction to all exceptionalities included in special education programs as delineated by the most recent federal legislation guiding services for individuals with special needs. An important component of this course is the exploration of typical developmental stages and milestones used to monitor children's growth and progress over time. Fourteen (14) categories of disability are defined in relation to how states define who is eligible for a free appropriate public education under special education law. In addition, recent legislation is explored in relation to services provided, funding requirements, accommodations and classroom placement. The primary objective of this course is to provide future educators with a solid foundation for their understanding disabilities, services, and legislation as they enter into the special education profession. Secondary objectives include preparing students to (a) address common misconceptions and myths associated with special education, (b) work with interdisciplinary teams in the formation of Individualized Education Program (IEP), and (c) promote the preparation of exceptional individuals to assume adult roles.
Prerequisite: admission into the SPLED Undergraduate or Graduate Program

Changes Effective Summer 2021:
• Prerequisites
• Corequisites

SPLED 454: Assessment for Instruction
Old Listing Effective Through Spring 2021:
ORIENTATION TO EVALUATION OF SPECIAL STUDENTS WITH EMPHASIS ON THE CREATION, USE, AND INTERPRETATION OF TEACHER-MADE ASSESSMENT PROCEDURES.

Prerequisite: a grade of C or better required in EDPSY101

Changes Effective Summer 2021:

- Description
- Prerequisites
- Corequisites

SPLED 461: Introduction to Autism Spectrum Disorders: Issues and Concerns
Old Listing Effective Through Spring 2021:

Overview of issues, characteristics, and evidenced-based assessment strategies, and approaches for individuals with autism/PDD. SPLED 461 Introduction to Autism Spectrum Disorders: Issues and Concerns (3) This course will center on working with individuals having Autism Spectrum Disorders (ASD) and Pervasive Developmental Disorders (PDD) in educational and related settings. Topics include an overview of characteristics and diagnosis, ethical issues in treatment, assessment, the use of science in treatment approaches, working effectively with families, and strategies for successful inclusion of students with ASD/PDD in integrated settings. Course content will be delivered through DVD lectures, and required as well as supplemental readings. Evaluation procedures will include on line multiple-choice exams. The course will be changed to assess students through 6 (v.4) online multiple choice exams. Multiple choice format offers immediate feedback to students. To ensure assessment of applications skills, exams will include case studies in which students must apply skills to areas such as child assessment, data analysis, and strategies for working effectively with parents.

Prerequisite: EDPSY010 or EDPSY014 or equivalent or admission into the Professional Development Certificate in Autism or relevant child development course

Changes Effective Summer 2021:

- Prerequisites

SPLED 462: Autism and Applied Behavior Analysis
Old Listing Effective Through Spring 2021:

This course addresses principles of applied behavior analysis and empiricism related to instruction and special issues affecting individuals with autism. SPLED 462 Autism and Applied Behavior Analysis (3) This world campus course will include an overview of basic principles of applied behavior analysis (ABA) and elements of empiricism and ethics in educational settings. Course objectives will center on acquisition of content related to: a) principles of ABA instruction; b) ethical standards in education; c) best practice interventions for learning; d) strategies for diagnosing and programming for behavioral issues; e) special issues affecting individuals with ASD and their families. Course content will be delivered through DVD lectures, and required as well as supplemental readings. Evaluation procedures will include on line multiple-choice exams, and on line assignments.

Prerequisite: 4th semester standing or higher

Changes Effective Summer 2021:

- Prerequisites

SPLED 463: Communication and Social Competence
Old Listing Effective Through Spring 2021:

Overview of deficits and strategies in speech, language, and communication across the Autism Spectrum Disorder. SPLED 463 Communication and Social Competence (3) Communication and Social Competence is the third course in the 5 course (12 credit) series leading to the Professional Development Certificate in Autism. All information, activities, and assignments are through videotaped and web-based learning. Content includes an overview of the deficits in the area of speech, language, and communication across the Autism Spectrum Disorders (ASD). Basic information on the nature of these deficits is provided from both a psycholinguistic model as well as a behavioral model. In addition to information on deficits, the majority of the course content will provide practical information related to intervention.

Prerequisite: SPLED461

Changes Effective Summer 2021:

- Prerequisites

SPLED 464: Assessment and Curriculum
Old Listing Effective Through Spring 2021:

Overview of screening, diagnosis, and identification of skills in developmental domains and curricula for individuals with autism. SPLED 464 Assessment and Curriculum (3) Assessment and Curriculum is the fourth course in the 5 course (12 credit) series leading to the Professional Development Certificate in Autism. All information, activities, and assignments are through videotape and web-based learning. Content includes types of assessment and identification of skills in developmental domains. Practical strategies will be outlined.

Prerequisite: SPLED461

Changes Effective Summer 2021:

- Prerequisites

SPLED 495E: Experience with Exceptional Children
Old Listing Effective Through Spring 2021:

Supervised activities with exceptional children in a variety of possible settings, e.g., schools, institutions, day care centers, vocational settings.

Prerequisite: a grade of C or better required in SPLED395W , SPLED401 , SPLED425 SPLED454 . PA Act 34 clearance required. In addition, non-Pennsylvania residents must provide evidence of an FBI background information check. (Forms: 228 Cha

Changes Effective Summer 2021:

- Description
- Prerequisites
- Corequisites
- Recommended Preparations

SPLED 495F: Practicum in Special Education
Old Listing Effective Through Spring 2021:

Teaching experience with mildly/moderately disabled children in age appropriate settings, e.g., infant/preschools, schools, vocational/job sites.
Prerequisite: a grade of C or better required in SPLED495G. PA Act 34 clearance required. In addition, non-Pennsylvania residents must provide evidence of an FBI background information check. (Forms: 228 Chambers)

Changes Effective Summer 2021:
- Prerequisites
- Recommended Preparations

SPLED 495G: Experience with an Integrated Inclusion Classroom
Old Listing Effective Through Spring 2021:

Supervised teaching in integrated general classrooms with activities in assessment, diagnosis, and direct intervention with students in need or with disabilities.

Prerequisite: a grade of C or better required in SPLED425, SPLED395W, SPLED401, SPLED412, SPLED454, SPLED495E. PA Act 34 clearance required. In addition, non-Pennsylvania residents must provide evidence of an FBI background information check.

Changes Effective Summer 2021:
- Description
- Prerequisites

SSED 430W: Teaching Social Studies in the Elementary Grades
Old Listing Effective Through Spring 2021:

Principles underlying use of social studies in the elementary school; practical demonstration of desirable methods. SS ED 430W Teaching Social Studies in the Elementary Grades (3) Social studies transforms the social sciences and humanities to promote civic competence (National Council for the Social Studies, 2002). In this course, teacher candidates learn to coordinate and conceptualize the richness of anthropology, economics, geography, history, civics, and sociology for elementary classroom pedagogy. Candidates become familiar with various instructional strategies that support social studies. Candidates gain an understanding of the information, concepts, theories, analytical approaches, and different perspectives—including global and multicultural perspectives—that are important to teaching social studies. Candidates also learn how to assess social studies learning in a variety of ways. This course stresses technology, content integration, social science competence, differentiated instruction, multicultural/global knowledge, teaching social historical inquiry, and constructing democratic learning communities. Teacher candidates learn how to apply the State Learning Frameworks and National Standards in their classroom instruction. At the conclusion of the course, candidates have a good understanding of elementary social studies and are able to develop and demonstrate powerful social studies curricula. Being a "W" course, SS ED 430 incorporates both formal and informal writing into in-class and graded assignments to encourage teacher candidates to develop as critical thinkers and productive writers. This writing includes an essay describing one's own experiences as a social studies learner, reading responses, the creation of a unit of instruction, and several lesson plans that describe significant activities. These writing tasks are meant to professionalize the communication skills required to effectively teach social studies as well as to effectively communicate with parents, educators, and administrators. SS ED 430W is a part of a block of courses in a PSU teacher education program that is unified by a basic set of principles and a field experience component.

Prerequisite: a grade of C or better required in SPLED425, SPLED395W, SPLED401, SPLED412, SPLED454, SPLED495E. PA Act 34 clearance required. In addition, non-Pennsylvania residents must provide evidence of an FBI background information check.

Changes Effective Summer 2021:
- Description
- Prerequisites
- Recommended Preparations

STAT 319: Applied Statistics in Science
Old Listing Effective Through Spring 2021:

Statistical inference: principles and methods, estimation and testing hypotheses, regression and correlation analysis, analysis of variance, computer analysis. Students who have passed MATH 415/STAT 415 may not schedule this course for credit.

Cross-Listed Courses: MATH 319
Prerequisites: Enforced Prerequisite at Enrollment: MATH 318 or STAT 318 or MATH 414 or STAT 414

Changes Effective Summer 2021:
- Title
- Abbreviated Title
- Description
- Enforced Prerequisites

WFS 301: Vertebrate Laboratory
Old Listing Effective Through Spring 2021:

Overview of the anatomy, identification, collection, and preservation of the vertebrates. W F S 301 Vertebrate Laboratory (2) The purposes of this course are to introduce students to the anatomy of the vertebrates and to prepare students for the diversity of vertebrates that reside in Pennsylvania. Students will dissect and learn the anatomy of the dogfish, frog, and cat or mink. Additional laboratory periods will concentrate on collecting/observing, and identifying fish, amphibians, reptiles, birds, and mammals. Museum curation techniques will be taught, and students will be required to construct dichotomous keys to specimens that inhabit Pennsylvania. The identification part of the course is meant to introduce students to representatives of the taxa that occur within the Commonwealth in preparation for higher-level courses in ichthyology, herpetology, ornithology, or mammalogy. Collection techniques will emphasize the proper collection and preservation of organisms for natural history museums.

Prerequisite: or concurrent: W F S209; W F S300

Changes Effective Summer 2021:
- Description
- Concurrents

WFS 406: Ornithology Laboratory
Old Listing Effective Through Spring 2021:

Laboratory and field identification of Pennsylvania birds, avian ecology and behavior, field survey techniques. W F S 406 Ornithology Laboratory (2) Ornithology Laboratory establishes the basic skills for identifying bird species in the field. This laboratory and field course is open to students with some background in wildlife and should be taken after completing or at the same time as the ornithology lecture course. The objectives of
this course are for students to use laboratory specimens, identification software, field guides, and instructor-led field trips to 1) define, locate, and recognize anatomical features used to describe birds and characterize families; 2) recognize and identify approximately 160 species of birds by sight and approximately 60 by song in the field and/or lab; and 3) describe habitat, seasonal abundance, and distribution of bird species within the state. Most weeks include an introductory lecture followed by field instruction.

Prerequisite: or concurrent: W F S 209, W F S 407

Changes Effective Summer 2021:

- Description
- Concurrents
- Travel Component

WFS 407: Ornithology
Old Listing Effective Through Spring 2021:

Introduction to the biology, ecology, adaptations, and conservation of birds.

Prerequisites: BIOL 110, WFS 209

Changes Effective Summer 2021:

- Travel Component
- Prerequisites

WFS 409: Mammalogy Laboratory
Old Listing Effective Through Spring 2021:

Laboratory and field identification of mammals, ecology and behavior of mammals, field survey techniques. W F S 409 Mammalogy Laboratory (2) Mammalogy Laboratory provides the necessary skills for identifying North American mammals. Taken concurrently with or after completing the mammalogy lecture course, this laboratory and field course is open to students with some background in wildlife. The objectives of this course are for students to 1) identify North American mammals by skulls and skins, 2) identify eastern North American mammals by tracks in the field, 3) capture and measure small mammals, and 4) gain an understanding of the characteristic behavior and ecology of North American mammals. Fields skills include animal handling, tracking, and observation. Additional skills may include skin and skull preparation and museum techniques for the care of mammals.

Prerequisite: or concurrent: WFS 209, WFS 408

Changes Effective Summer 2021:

- Travel Component
- Description
- Prerequisites

WFS 410: General Fishery Science
Old Listing Effective Through Spring 2021:

Introduction to the study, management, and uses of fish populations; methods of investigation, culture, and harvest of fishes.

Prerequisite: BIOL 210 or WFS 20

Changes Effective Summer 2021:

- Travel Component
- Abbreviated Title
- Concurrent

WFS 422: Ecology of Fishes
Old Listing Effective Through Spring 2021:

Role of fishes in aquatic communities and general ecosystems. Environmental factors influencing fish as individuals, populations, and communities.

Prerequisite: BIOL 220W or WFS 209

Changes Effective Summer 2021:

- Abbreviated Title
- Prerequisites

WFS 454: Field Ichthyology
Old Listing Effective Through Spring 2021:

Introduction to collection and field identification of the fishes of Pennsylvania. W F S 454 Field Ichthyology (2) This course is designed to familiarize students with collection, observation, and field identification of Pennsylvania’s fish fauna. Students are taught how to collect, preserve, catalog, curate, and observe fishes. Additionally, they are taught how to gather pertinent in situ behavioral and distributional information on fishes and how to manage, record, and store field data. With the increasing emphasis on biodiversity and environmental monitoring, students need to be able to collect, manage, and store data as well as secure the chain of custody. This course is offered annually at the end of spring semester at the Tom Ridge Environmental Center in Erie, PA. Classes begin Sunday night at 1800 and extend until 1700 on Friday. After the three-hour introductory class, students meet each day at the Tom Ridge Environmental Center at 0700. Field collections/observations begin promptly, and end about 1700. Students reassemble in the laboratory at 1830 for a two-hour discussion of the day’s activities. On one day, a series of night collections is made that extends until midnight. Students are responsible for their motel and food expenses during the week. All transportation to and from the collection sites is provided.

Prerequisite: BIOL 110, BIOL 240W

Changes Effective Summer 2021:

- Travel Component
- Description
- Prerequisites

WLED 400: Foundations of Language in Second Language Teaching
Old Listing Effective Through Spring 2021:

Critical understanding of basic concepts and principles in second language acquisition and teaching. WLED 400 Foundations of Language in Second Language Teaching (3)This is an advanced course designed for practicing classroom teachers who want to further their knowledge of language acquisition/language teaching. It provides a critical understanding of basic concepts and principles in first and second language acquisition and teaching. The core of the course explicates processes of language acquisition viewed from major theories of first and second language acquisition and common issues within these major theories are presented and debated. Using their classroom experiences, students will be able to critically examine language teaching methodologies derived and implied from first and second language
acquisition theories and to apply them in their classrooms. This course requires active participation, group reflections and self-critique, and completion of required readings; 20-30 hours of volunteer work in an ESL setting; and development of a professional growth portfolio including the four domains stated in the Penn State Model of Teacher Preparation (planning and preparing for student learning; teaching; inquiring and analyzing learning and teaching; and professionalism) and the competencies for English Usage and Developing Linguistic Awareness stated by the Pennsylvania Department of Education.

Prerequisite: PA Instructional I or II teaching certificate

Changes Effective Summer 2021:

• Prerequisites

WLED 495B: Field Experience for World Languages Teacher Preparation in Grades 1-5
Old Listing Effective Through Spring 2021:

W. ED 495B Field Experience for World Languages Teacher Preparation in Grades 1-5 (3) Practicum situation where Prospective World Language teachers will demonstrate acquired knowledge on second language learning/teaching and educational theories. Prospective World Language teachers will have assigned school placements and will attend a weekly seminar where issues in World Language learning and teaching will be discussed. At their assigned school placement, prospective World Language teachers will have many opportunities to observe/work with children in grades 1-5 (1) focusing on second language learning/teaching and the socio/cultural issues associated to classroom practices while implementing and self-evaluating own designed activities and lessons; (2) weekly seminars will engage students in reflective activities that will enable them to analyze each week’s events; (3) inquiry projects on teaching and learning of World Languages.

Prerequisite: EDPSY014, EDTHP115, WL ED295A, WL ED300; PA Act 34 and Act 151 Clearances required; FBI background information check; and Professional Liability insurance.

Changes Effective Summer 2021:

• Prerequisites

WLED 495C: Field Experience for World Languages Teacher Preparation in Grades 6-12
Old Listing Effective Through Spring 2021:

W. ED 495C Field Experience for World Languages Teacher Preparation in Grades 6-12 (3) Practicum situation where prospective World Language teachers will demonstrate acquired knowledge on second language learning/teaching and educational theories. Prospective World Language teachers will have assigned school placements in grades 6-12 and will attend a weekly seminar where issues in World Language learning and teaching will be discussed. At their assigned school placement, prospective World Language teachers will have many opportunities to observe/work with students in grades 6-12 (1) focusing on second language learning/teaching and the socio/cultural issues associated to classroom practices while implementing and self-evaluating their own designed activities and lessons, (2) weekly seminars will engage students in reflective activities that will enable them to analyze each week’s events, and (3) inquiry projects on teaching and learning of World Languages.

Prerequisite: WL ED411; WLED 495B; PA Act 34 and Act 151 Clearances required; FBI background information check; and Professional Liability insurance.

Changes Effective Summer 2021:

• Prerequisites

Program Changes

Addictions and Recovery, Minor (ADRCV_UMNR)
Effective Fall 2020:

• New minor added

Administration of Justice, B.A. (AJAUC_BA)
Effective October 5, 2020:

• Enrollment Hold implemented; program not accepting new students

Administration of Justice, B.S. (AJSUC_BS)
Effective October 5, 2020:

• Enrollment Hold implemented; program not accepting new students

Advertising/Public Relations, B.A. (ADPR_BA)
Effective Summer 2020:

• Changed COMM 494 and 499 to 3-6 credits in the Additional Courses in the Advertising Option
• Added COMM 495 to Additional Courses in the Advertising Option
• Added COMM 411 and 495 to Additional Courses in the Public Relations Option

Aerospace Engineering, B.S. (AERSP_BS)
Effective Summer 2020:

• Revised Entrance to Major Requirements

African American Studies, B.A. (AAST_BA)
Effective Summer 2020:

• Changed the Requirements for the Degree from 125 to 120 credits
• Removed AFAM 364 from Gender and Sexuality Concentration in Additional Courses
• Added AFAM 412 to the Gender and Sexuality Concentration in Additional Courses
• Changed PLSC 123 to 223 in Social Sciences and Community Development Concentration in Additional Courses
• Changed EDTHP 411 to 447 in the Social Sciences and Community Development Concentration in Additional Courses

African American Studies, Minor (AFAMR_UMNR)
Effective Summer 2020:

• Revised Program Description
• Changed AFR 110 to AFAM 110 in Prescribed Courses
• Removed AFR/HIST 191, HIST 415, and EDTHP 447 from Additional Courses

Agribusiness Management, B.S. (AGBM_BS)
Effective Summer 2020:
• Added MIS 250 to Additional Courses

**Agricultural Systems Management, Minor (ASM_UMNR)**
**Effective Summer 2020:**
• Revised Description
• Added Prescribed Courses section
• Moved ASM 310 and 327 from Additional Courses to Prescribed Courses
• Removed ASM 320, 420, BRS 221, 495, 496, and 497 from Additional Courses
• Added Supporting Courses and Related Areas section

**Animal Science, B.S. (ANSC_BS)**
**Effective October 5, 2020:**
• Phased out Integrated B.S. in Animal Science and Master of Biotechnology in Biotechnology

**Applied Psychology, B.A. (APSYC_BA)**
**Effective August 26, 2020:**
• Enrollment Hold implemented; program not accepting new students

**Effective Spring 2021:**
• Program phased out
• Changed Requirements for the Major from 148 to 148-152 credits

**Architectural Engineering (AE_BS)**
**Effective Summer 2020:**
• Revised Entrance to Major Requirements
• Decreased Prescribed Courses for the Major from 102-103 to 85-86 credits
• Removed ARCH 210, 211, 443, EDSGN 130, MATH 231, ME 201, STAT 401 from Prescribed Courses for the Major
• Added AE 411 and ARTH 202N to Prescribed Courses for the Major
• Increased credits for Additional Courses for the Major from 10 to 27-30 credits
• Added ARCH 100, 210, CAS 138T, EDSGN 100, 130, ENGL 137H, IE 424, MATH 230, 231, 250, 251, ME 201, 300, and STAT 401 to Additional Courses for the Major
• Added AE 405 to Prescribed Courses for the Construction Option
• Increased the number of credits for the Prescribed Courses in the Construction Option from 24 to 28 credits
• Decreased the number of credits for the Supporting Courses and Related Areas in the Construction Option from 12 to 8 credits
• Removed AE 444 and 454 from Prescribed Courses for the Lighting/Electrical Option
• Added AE 468 to Prescribed Courses in the Lighting/Electrical Option
• Decreased the number of credits from 24 to 21 credits in the Prescribed Courses for the Lighting/Electrical Option
• Added Additional Courses section to the Lighting/Electrical Option
• Increased the credits from 27 to 30 credits for Prescribed Courses in the Mechanical Option
• Added AE 453 to Prescribed Courses in the Mechanical Option
• Decreased the number of credits from 9 to 6 credits in Supporting Courses and Related Areas in the Mechanical Option
• Added AE 405 to Prescribed Courses in the Structural Option

• Increased the number of credits from 23 to 27 credits for the Prescribed Courses in the Structural Option
• Decreased the number of credits from 13 to 9 credits for the Supporting Courses and Related Areas in the Structural Option

**Architectural History, Minor (ARC_H_UMNR)**
**Effective Summer 2020:**
• Changed ARTH 202 to 202N in Prescribed Courses
• Revised Additional Courses section
• Added Supporting Courses and Related Areas section

**Art History, Minor (ARTH_UMNR)**
**Effective Fall 2020:**
• Revised Description
• Removed Prescribed Courses section
• Revised Additional Courses section

**Biobehavioral Health, B.S. (BBH_BS, BBHCA_BS, BBHUC_BS)**
**Effective Fall 2020:**
• Decreased Requirements for the Major to 97-99 credits
• Added BIOL 497, CHEM 110, 130, FDSC 406W, HDFS 250H, 468, and NUTR 11 to Additional Courses

**Biological Engineering, B.S. (BE_BS)**
**Effective Summer 2020:**
• Entrance to Major Requirements
• Change NUTR 100 to 3 credits in the Food and Biological Processing Engineering Option

**Biological Engineering, Minor (BE_UMNR)**
**Effective Fall 2020:**
• Removed Prescribed Courses
• Added AGRO 28, ANSC 201, ASM 309, BIOL 110, BIOL 127, BMB 211, BMB 251, CHEM 202, CHEM 210, FDSC 200, HORT 101, MICRB 201, SOILS 101, to Additional Courses
• Removed AE 308, ASM 420, ASM 424, CE 340, CE 341, CE 342CE 370, CE 371, CE 461, CHE 410, CHE 340, CHE 438, CHE 449, ESC 484, FDSC 430, IE 312, ME 431, and ME 480 from Additional Courses
• Added Supporting Courses and Related Areas section

**Biology, Minor (BIOL_UMNR)**
**Effective Summer 2020:**
• Added BIOL 161, BIOL 162, BIOL 163, and BIOL 164 to Additional Courses

**Biomedical Engineering, B.S. (BME_BS)**
**Effective Summer 2020:**
• Revised Entrance to Major Requirements

**Biomedical Engineering Technology, A.ENGT. (2BET_AENGT)**
**Effective Spring 2021:**
• Removed CHEM 101 and IST 110 from Prescribed Courses
• Added BE_T 206 and SRA 111 to Prescribed Courses
• Removed BE_T 202, BE_T 206, and BIOL 141 from Additional Courses
• Added BIOL 161, BIOL 162, BIOL 163, BIOL 164, CHEM 110, and CHEM 130 to Additional Courses

BioRenewable Systems, B.S. (BRS_BS)
Effective Spring 2021:
• Revised Program Option Descriptions.
• Decreased minimum credits required for BioProducts Option from 120 to 121 credits.
• Increased the Requirements for the Major from 105-109 to 106-109 credits.
• Removed BRS 300, BRS 393, and BRS 437 from Prescribed Courses for the Major.
• Added BRS 350, BRS 430W, and BRS 431W to Prescribed Courses for the Major.
• Removed First-Year Seminar from Additional Courses for the Major.
• Added AGBM 302, BA 303 and STAT 250 to Additional Courses for the Major.
• Increased BioProducts Option required credits from 32 to 33 credits.
• Added BRS 300 to Prescribed Courses in the BioProducts Option.
• Changed BRS 411 and 417 from 4 to 3 credits in the Bioproducts Option in Prescribed Courses.

Business, B.S. (BSBUC_BS)
Effective Fall 2020:
• Health Services Option Added to Lehigh Valley Campus

Effective Spring 2021:
• Health Services Option Added to Schuylkill Campus

Chemical Dependency Prevention and Counseling, Certificate (ALCDPC_UCT)
Effective Fall 2020:
• Added RHS 303 and HDFS 414 to Required Courses

Chemical Engineering, B.S. (CHE_BS)
Effective Summer 2020:
• Revised Entrance to Major Requirements
• Revised Program Description
• Removed all options
• Changed Requirements for the Major to 97 credits
• Increased Prescribed Courses to 73 credits
• Removed Electives
• Added BIOL, CHEM 358, 450, 451, 452, 453, ENGL 202C and MATH 230 to Prescribed Courses
• Removed CHEM 316, 400, 443, and 457 from Prescribed Courses
• Changed the credits of CHEM 431W from 3 to 4 credits in Prescribed Courses
• Added Additional Courses and Supporting Courses and Related Areas sections

Chemistry, B.S. (CHMBC_BS)
Effective Spring 2021:
• Revised Program Description
• Removed all options
• Changed Requirements for the Major to 97 credits
• Increased Prescribed Courses to 73 credits
• Removed Electives
• Added BIOL, CHEM 358, 450, 451, 452, 453, ENGL 202C and MATH 230 to Prescribed Courses
• Removed CHEM 316, 400, 443, and 457 from Prescribed Courses
• Changed the credits of CHEM 431W from 3 to 4 credits in Prescribed Courses
• Added Additional Courses and Supporting Courses and Related Areas sections

Civil Engineering, B.S. (Engineering, Capital) (CE_BS, CECA_BS)
Effective Summer 2020:
• Revised Entrance to Major Requirements

Communication Arts and Sciences, B.A. (University College) (CASUC_BA)
Effective Fall 2020:
• Discontinued Program at York Campus

Communication Arts and Sciences, Minor (CAS_UMNR)
Effective Summer 2020:
• Revised Program Description
• Added Prescribed Courses section
• Removed CAS 200, CAS 213, CAS 214, CAS 250, CAS 252, CAS 271, CAS 280W, CAS 283, CAS 301 and CAS 303 from Additional Courses
• Added CAS 210 and CAS 220 to Additional Courses
• Changed Supporting Courses Area

Communication Sciences and Disorders, B.S. (Capital) (CSDCA_BS)
Effective Fall 2020:
• Added Program to Penn State Harrisburg, the Capital College

Communications, B.A. (University College) (COMUC_BA)
Effective Summer 2020:
• Changed the Requirements for the Major from 49-56 to 55-56 credits
• Moved COMM 260W from Prescribed Courses for the Major to Additional Courses for the Major
• Added COMM 100N/AMST 106N, COMM 110, COMM 230, CAS 301, CAS 303, COMM 403, COMM 430, and COMM 458 to Additional Courses for the Major
• Changed COMM 495 to 495A in the Strategic Communication Track in the Corporate Communications Option
• Added CC 200 and MKTG 220 to the PR/Marketing Track in the Corporate Communication Option
• Changed CAS 271 to 271N in the Strategic Communication Track in the Corporate Communications Option
• Added CC 200, CC 401, CC 402, CC 404, CC 405, CC 406, CAS 301, and COMM 290N to the Strategic Communication Track in the Corporate Communications Option
• Removed COMM 100, 110, CAS 202 and 201 from Additional Courses in the Corporate Communications Option
• Removed COMM 403 from Prescribed Courses for the Corporate Communications Option
• Removed STAT 200 from Additional Courses in the Digital Journalism Option
• Added CAS 301, CAS 303, COMM 222N, COMM 305, COMM 409, COMM 462, and COMM 478 to Additional Courses in the Digital Journalism Option
• Changed COMM 495 to 495A in Additional Courses in the Digital Journalism Option

Communications, Minor (Altoona) (COMAL_UMNR)
Effective Fall 2020:
• Revised description
• Removed Prescribed Courses
• Removed COMM 180, 205, 250, 261, 320, 370, 401, 403, 408, 409, 411, and 413W from Additional Courses
• Added COMM 100N, 110, 150N, and 251 to Additional Courses
• Added Supporting Courses and Related Area

**Computer engineering, B.S. (Engineering) (CMPEN_BS)**
Effective Summer 2020:
• Revised Entrance to Major Requirements

**Computer Engineering, Minor (Engineering) (CMPEN_UMNR)**
Effective Summer 2020:
• New minor added

**Computer Science, B.S. (Engineering) (CMPSC_BS)**
Effective Summer 2020:
• Revised Entrance to Major Requirements

**Corporate Communication, B.A. (University College) (CCUC_BA)**
Effective Fall 2020:
• Added program to Shenango campus

**Criminal Justice, B.A. (University College) (CRMUC_BA)**
Effective Fall 2020:
• Added program to Beaver, DuBois, Fayette, Greater Allegheny, Hazleton, New Kensington, Schuylkill, Shenango and Wilkes-Barre campuses

**Criminal Justice, B.S. (University College) (CRMUC_BS)**
Effective Fall 2020:
• Added program to Beaver, DuBois, Fayette, Greater Allegheny, Hazleton, New Kensington, Schuylkill, Shenango and Wilkes-Barre campuses

**Cybersecurity Analytics and Operations, B.S. (Capital) (CAOCA_BS)**
Effective Fall 2020:
• Added program to Penn State Harrisburg, the Capital College

**Cybersecurity Analytics and Operations, B.S. (University College) (CAOUC_BS)**
Effective Fall 2020:
• Added program to Beaver, Brandywine, Greater Allegheny, Lehigh Valley, Schuylkill, Shenango, and York campuses

**Dance, B.S. (DANCE_BS)**
Effective Fall 2020:
• Program phased out

**Education and Public Policy, B.S. (EPP_BS)**
Effective Summer 2020:
• Added New Integrated B.S. in Education and Public Policy/Masters in Educational Theory and Policy
• Revised Program Description

**Electrical Engineering, B.S. (Engineering) (EE_BS)**
Effective Summer 2020:
• Revised Entrance to Major Requirements

**Elementary and Early Childhood Education, B.S. (CEAED_BS)**
Effective Spring 2021:
• Revised Program Description
• Revised Entrance to Major Requirements
• Moved AED 303 and HD FS 229 from Prescribed Courses to Additional Courses
• Added CI 460 and EDPSY 11 to Additional Courses
• Added APLNG 493, ECE 452, 453, 454, HDFS 250, 315, 330, 415, 418, 424, 427, 428, 429, 430, 431, 432, 469J, LLED 450, 467, SOC 30, WLED 400, 444, and 483 to Supporting Courses and Related Areas

**Elementary Education, B.El.Ed. (ELEM_BELED)**
Effective Fall 2020:
• Add CAS 100, EDUC 454, 466, GEOG 126, SPLED 404 and MATH 201 to Prescribed Courses for the Major. Change EDUC 315 to 315W in Prescribed Courses for the Major
• Change credits of CI 295 from 2 credits to 3 credits in Prescribed Courses for the Major
• Change credits for EDUC 495B to 3 credits in Prescribed Courses for the Major
• Remove ECON 102, 104, and 14 from Additional Courses for the Major
• Added HDFS 229 to Additional Courses for the Major
• Added EDUC 467, 468, 475, 495, PSYCH 443, SPLED 409A, 409B, 418 and 462 to Supporting Courses and Related Areas for the Major
• Removed EDUC 321 and ENGL 470 from Prescribed Courses for the English/Language Arts and Reading (4-8) Option
• Moved HDFS 239 from Prescribed Courses for the English/Language Arts and Reading (4-8) Option to Additional Courses for the Major
• Removed ENGL 449 from Additional Courses in the English/Language Arts and Reading (4-8) Option. Added EDUC 470 to Prescribed Courses for the English/Language Arts and Reading (4-8) Option
• Added ENGL 231, 232, 432, 433, 434, 435, 436, 437, 438, 439, EDMTH 301 and SPLED 409C to Additional Courses for the English/Language Arts and Reading (4-8) Option
• Moved HDFS 239 from Prescribed Courses in the Mathematics (4-8) Option to Additional Courses for the Major
• Removed MATH 26 and MATH 220 from Prescribed Courses for the Mathematics (4-8) Option
• Added MATH 37, EDMTH 302 and STAT 200 to Prescribed Courses for the Mathematics (4-8) Option
• Removed ENGL 1W and ENGL 103 from Additional Courses in the Mathematics (4-8) Option
• Moved HDFS 229 from Prescribed Courses for the PK-4 Early Childhood Education Option to Additional Courses for the Major
• Removed EDUC 402 from Prescribed Courses for the PK-4 Early Childhood Education Option
• Add EDMTH 301 and HLTH 306 to Prescribed Courses for the PK-4 Early Childhood Education Option
• Removed ENGL 1 and ENGL 103 from Additional Courses for the PK-4 Early Childhood Education Option
• Moved HDFS 239 from Prescribed Courses for the Social Studies (4-8) Option to Additional Courses for the Major
• Added EDMTH 302 to Prescribed Courses for the Social Studies (4-8) Option
• Removed ENGL 103 from Additional Courses in the Social Studies (4-8) Option

**Engineering, B.S. (GE_BS)**
Effective Summer 2020:
• Revised Entrance to Major Requirements

**Engineering Science, B.S. (ESC_BS)**
Effective Summer 2020:
• Revised Entrance to Major Requirements
• Changed ME 302 to EMCH 302H in the Prescribed Courses for the Major

**English, B.A. (Liberal Arts, Abington, Altoona, University College) (ENGL_BA, ENGAB_BA, ENGAL_BA, ENGUC_BA)**
Effective Summer 2020:
• Added Traditions of Innovation Option and Writing and Literature in Context Option

**Enterprise Technology Integration, B.S. (ETCHI_BS)**
Effective Fall 2020:
• New B.S. program added

**Entrepreneurship and Innovation, Minor (ENTI_UMNR)**
Effective Summer 2020:
• Revised Description
• Added New Bio-Tech Cluster
• Removed LA 403 from Required Courses in the Entrepreneurship as Advocacy Cluster
• Added AFAM 100N, AFAM/SOC/WMNST 103, AFAM/LEER/WMNST 136, AFAM/HIST/WMNST 213, CAS/ENGL 137H, CAS 175, CAS 210, CAS 220, CAS 222N/AYFCE 211N/CIVCM 211N, CAS 321, CAS 373, ENGL 162N, ENGL 228, ENGL 236N, LER 100, LER 201, PLSC 2, PLSC 91, PLSC 210N, PSYCH 100, SOC 1, SOC 5, SOC/CRIM/CRIMJ 12, SOC 23, WMNST 100, WMNST 105N, and WMNST 200 to the Entrepreneurship as Advocacy Cluster
• Removed CEDEV 452 from Food and Bio-innovation Cluster
• Changed HORT 410 to 410W and TURF 436 to 436W in the Food and Bio-innovation Cluster
• Changed ANSC 327 from 3 credits to 4 credits; FDSC 411 from 2 credits to 3 credits in the Food and Bio-innovation Cluster
• Changed MGNT 451 to 451W in the New Ventures Cluster

**Environmental Resource Management, B.S. (ERM_BS)**
Effective Summer 2020:
• Revised program description
• Increased the Requirements for the Major from 93-108 to 95-108 credits
• Removed CAS 100 from Prescribed Courses for the Major
• Moved ENGL 15 and CHEM 202 from Prescribed Courses to Additional Courses
• Added ENGL 30, CAS 100A, 137H, 138T, and CHEM 210 to Additional Courses
• Added SOILS 450 to Prescribed Courses for the Environmental Science Option
• Moved GEOG 160 from Prescribed to Additional Courses in the Environmental Science Option
• Added GEOG 260 to Additional Courses in the Environmental Science Option
• Removed AGBM 200, ERM 402, and MGMT 215 from Additional Courses in the Environmental Science Option
• Removed ERM 433, 444, and SOILS 419 from Additional Courses in the Soil Science Option
• Removed ENT 425 and ERM 440 from Additional Courses in the Water Science Option
• Added GEOG 260, SOILS 450, ERM 448 and 449 to Additional Courses in the Water Science Option
• Moved GEOG 160 from Prescribed Courses to Additional Courses in the Water Science Option

**Film-Video, B.A. (FILM_BA)**
Effective Summer 2020:
• Changed name of major from Film-Video to Film Production

**German, B.S. (GERBS_BS)**
Effective Summer 2020:
• Decreased the number of credits required for the degree from 123 to 120 credits
• Decreased the number of credits required for the Major from 55-66 to 52-66 credits
• Changed Supporting Courses and Related Areas in the Applied German Option
• Changed Electives from 23-25 credits to 20-23 credits

**Graphic Design, B.Des. (GD_BDES)**
Effective Summer 2020:
• Revised Entrance to Major Requirements
• Removed IST 110 and PHOTO 200 from Prescribed Courses
• Added PHOTO 202 to Prescribed Courses
• Added AA 121 and GD 115N to Additional Courses

**Health, Policy and Administration, B.S. (HPA_BS, HPACA_BS, HPAUC_BS)**
Effective Fall 2020:
• Revised Program Description
• Added HPA 435, 443, 444, 454, 475, and MIS 204 to Additional Courses
• New Integrated B.S. in Health Policy and Administration and M.I.A. in International Affairs added (University Park campus only)
• New Integrated B.S. in Health Policy and Administration and M.P.P. in Public Policy added (University Park campus only)

**Human-Centered Design and Development, B.S. (Capital) (HCDCA_BS)**
Effective Fall 2020:
• Added Program to Penn State Harrisburg, the Capital College

**Industrial Engineering, B.S. (IE_BS, IESBC_BS)**
Effective Summer 2020:
• Revised Entrance to Major Requirements
Information Sciences and Technology for Industrial Engineering, Minor (ISTIE_UMNR)
Effective Summer 2020:

• Removed IE 462, IST 441, and MATH 456 from Additional Courses
• Added IE 408, IST 402, 431, 442, and 454 to Additional Courses

Interdisciplinary Digital Studio, B.Des. (IDS_BDES)
Effective Summer 2020:

• Changed Program Name from Interdisciplinary Digital Studio to Digital Arts and Media Design
• Revised Program Description
• Removed AA 105, AA 106, AA 110, AA 210, AA 310, AA 410, and AA 411 from Prescribed Courses
• Added DART 100, DART 200, DART 201, DART 202, DART 203, DART 204, DART 205, DART 300, DART 301, DART 400, DART 401, DART 495 to Prescribed Courses
• Removed ARCH 481, ART 201, ART 202, ART 203, ART 314, ART 315, ART 316, ART 318, ART 319, ART 415, ART 416, ART 419, INART 50, LARCH 450, and PHOTO 200 from Additional Courses
• Added AA 121, AA 122, AA 193N, ART 101, ART 220, ART 250, ART 260, ART 320, ART 343, ART 350, COMM 242, CMPSC 101, CMPSC 102, CMPSC 121, CMPSC 131, DART 206, DART 213, DART 302, DART 303, DART 304, DART 305, DART 314, DART 315, DART 404, DART 405, DART 406, DART 410, DART 296, DART 297, DART 496, DART 497, DART 497, DART 495, GD 100, GD 200, GD 201, GD 203, IST 140, INART 258A, MUSIC 455, 458, PHOTO 100, PHOTO 101, PHOTO 202, PHOTO 300, PHOTO 303, PHOTO 400, PHOTO 402, PHOTO 404, THEA 285, and THEA 484 to Additional Courses
• Removed Supporting Courses and Related Areas

Intermediate Business, Certificate (INTBUS_UCT)
Effective Fall 2020:

• Certificate phased out

Jazz Performance, Minor (JAZZP_UMNR)
Effective Summer 2020:

• New minor added

Kinesiology, B.S. (KINES_BS)
Effective Summer 2020:

• New Integrated B.S. Kinesiology and M.P.H. in Public Health added

Manufacturing Engineering Technology I, Certificate (METCI_UCT)
Effective Fall 2020:

• Certificate phased out

Marine Sciences, Minor (MARSC_UMNR)
Effective Spring 2021:

• Added BIOL 483 to Supporting Course and Related Areas
• Changed credits of EARTH 240 from 3 to 4
• Removed GEOSC 410 from Supporting Courses and Related Areas

Marketing, B.S. (Behrend) (MRKTG_BS)
Effective Fall 2020:

• Changed total number of credits for Prescribed Courses to 48 credits
• Moved MKTG 441 from Prescribed Courses to Additional Courses
• Added MKTG 441, 450, 473, 478, and 496 to Additional Courses

Mechanical Engineering, B.S. (Engineering) (ME_BS)
Effective Fall 2020:

• Phased out the Integrated BS in Mechanical Engineering and MS in Mechanical Engineering

Military Studies, Minor (MLTRY_UMNR)
Effective Summer 2020:

• Removed AIR 251 from Prescribed Courses in the Air Force section
• Removed NAVSC 311 from Prescribed Courses in the Marines section
• Added NAVSC 201 to Prescribed Courses in the Marines section and the Navy section
• Removed NAVSC 302 from Prescribed Courses in the Navy section
• Changed NAVSC 323 to 301 in Prescribed Courses in the Navy section

Music, B.M. (MUSBM_BM)
Effective Spring 2021:

• Increased minimum degree requirements for the Composition option from 123 credits to 134 credits
• Increased minimum degree requirements for the Voice option from 129 credits to 131 credits
• Increased Requirements for the Major from 79-88 credits to 81-91 credits
• Added MUSIC 422, 431, 461W, 462W, 463W, 472 to Additional Courses for the Major
• Increased credits required for the Composition option from 47-49 credits to 55-57 credits
• Added MUSIC 120, 255, 459, 451, and 452 to Prescribed Courses for the Composition Option
• Removed INART 258A and MUSIC 336 from Prescribed Courses in the Composition Option
• Added MUSIC 471 to Additional Courses in the Keyboard Instruments Option
• Increased credits required for the Voice option from 51-56 credits to 53-56 credits
• Added MUSIC 478 and 480 to Supporting Courses and Related Areas in the Voice Option

Nuclear Engineering, B.S. (NUCE_BS)
Effective Summer 2020:

• Revised Entrance to Major Requirements

Polymer Engineering and Science, B.S. (PES_BS)
Effective Fall 2020:

• New B.S. program added

Pre-Medical/Healthcare, Certificate (ABMED_UCT)
Effective Fall 2020:

• Certificate phased out

Psychology, B.A. (Berks) (PYABK_BA)
Effective Fall 2020:
• Added Program to Penn State Berks, the Berks College

Psychology, B.S. (Berks) (PYSBK_BS)  
Effective Fall 2020:
• Added Program to Penn State Berks, the Berks College

Public Policy, B.S. (PUBL_BS)  
Effective Spring 2021:
• Revised Program Description  
• Added CRIMJ 241 to Additional Courses  
• Removed PUBPL 485 from Additional Courses

Recreation, Park, and Tourism Management, B.S. (Abington, University College) (RPTAB_BS, RPTUC_BS)  
Effective Fall 2020:
• Added Program to Penn State Abington and University College

Risk Management, B.S. (RM_BS)  
Effective Spring 2021:
• Increased Requirements for the Option from 15 credits to 24 credits  
• Moved RM 301 from Prescribed Courses for the Major to Prescribed Courses in the Enterprise Risk Management Option  
• Moved RM 475 in the Real Estate Option from Additional Courses to Prescribed Courses

Sales, Minor (SALES_UMNR)  
Effective Fall 2020:
• New minor added

Secondary Education, B.S. (SECED_BS, SECBC_BS)  
Effective Fall 2020:
• Added Classics and Ancient Studies and Holocaust and Genocide Studies concentrations to Supporting Courses and Related Areas in the Social Studies Teaching Option

Secondary Education Social Studies, B.SOSC. (SESSTBSOSC)  
Effective Summer 2020:
• Revised Entrance to Major and Retention Requirements

Social Justice in Education, Minor (SJSED_UMNR)  
Effective Summer 2020:
• New minor added

Technical and Business Writing, Certificate (TECHWR_UCT)  
Effective Fall 2020:
• Certificate phased out

Telecommunications, B.A. (TELCM_BA)  
Effective Summer 2020:
• Changed name of major from Telecommunications to Telecommunications and Media Industries