LING 632  INTRODUCTION TO ACOUSTIC PHONETICS  
Introduction to articulatory, acoustic, and perceptual characteristics of speech with emphasis on the acoustic properties of phonemes. While primarily lecture format with assigned text, a few laboratory sessions provide an introduction to computer-based methods used in instrumental studies of speech.

LING 675  LANGUAGE ACQUISITION  
See EDUC675 for course description.

LING 676  SECOND LANGUAGE ACQUISITION AND BILINGUALISM  
Psycholinguistic, sociolinguistic and neurolinguistic approaches to Second Language Acquisition (SLA). General models of first and second language learning. SLA within bilingual education programs. The linguistic, psychological and social experiences of the bilingual. Bilingual instruction and models of bilingual education.  
May be cross-listed with EDUC676.

LING 677  THE STRUCTURE OF ENGLISH  
Explores current generative linguistic theories and the analysis of English phonology/morphology and syntax in the light of these theories. Contrastive analysis of English and a second language (such as Spanish).  
May be cross-listed with EDUC677 and/or ENGL677.

LING 680  INTRODUCTION TO SOCIOLINGUISTICS  
Theories (e.g., variation theory), research and methods of analysis of the interrelationships of language and society. Particular attention paid to application of sociolinguistic research to the solution of educational problems of various groups.

LING 691  SEMANTICS I  
Introduction to linguistic theories of meaning. Survey of the semantic issues in reference, ambiguity, presupposition and implicature. Selected linguistic phenomena such as tense, aspect, predication and thematic roles. Some elements of formal semantics.  
PREREQ: LING101 or equivalent.

LING 697  SOCIOLINGUISTICS OF ENGLISH IN THE INNER CITY  
Application of sociolinguistic principles and research to the teaching of multicultural students in American educational systems. Topics include societal multilingualism, language attitudes, vernacular language education, diglossia, instructional methods for teaching English as a second dialect, and reactions of the educational community to Black English Vernacular.

LING 698  TEACHING ENGLISH AS A SECOND LANGUAGE  
Investigation of the literature containing the traditional and modern techniques of teaching the pronunciation, grammar and vocabulary of American English. Devising and presenting lesson plans.  
PREREQ: Three credits of English at the 200-level.

LING 699  ISSUES IN TEACHING LIMITED ENGLISH PROFICIENT STUDENTS  
Addresses theoretical and instructional issues related to teaching Limited English Proficient (LEP) students. Topics include issues in bilingual education, theories of L2 acquisition, LEP educational models, integrating language and content instruction, documentation and assessment of LEP skills, and understanding cultural diversity.  
PREREQ: LING608.

LING 801  LINGUISTIC TYPOLOGY  
Introduction to the concerns of linguistic typology and the study of language universals and language documentation.  
COREQ: LING607, LING609.

LING 802  STUDIES IN OLD AND MIDDLE ENGLISH  
See ENGLISH2 for course description.

LING 830  SYNTAX III  
In-depth investigation of syntactic universals and recent developments in the theory of syntax.  
PREREQ: LING610.  
RESTRICTIONS: May be repeated for credit when topics vary.

LING 831  TOPICS IN SYNTAX  
Current topics in syntactic theory, problems in the syntactic analysis of specific languages.  
PREREQ: LING830.  
RESTRICTIONS: May be repeated for credit when topics vary.

LING 832  THE ACQUISITION OF SYNTAX  
Current issues in the acquisition of syntax, such as: relationship between UG and specific language grammars, parameter setting model in L1 acquisition, effect of input frequency, methods for assessing children's syntax.  
PREREQ: Syntax I and II, or concurrent enrollment in Syntax II.

LING 848  SEMINAR IN LANGUAGE DEVELOPMENT  
See EDUC848 for course description.

LING 850  LINGUISTICS AND WRITING  
Survey of writing systems. Problems of text structure.

LING 851  LINGUISTIC FIELD METHODS  
Development of skills and techniques in various kinds of field analysis. Use of native informants. Discussion of the relationship between data collecting and grammatical statement.

LING 853  TOPICS IN THE STRUCTURE OF CHINESE  
Formal analysis of selected aspects of the grammar of Chinese and related dialects. Topics may include phonology, morphology, syntax and semantics.  
RESTRICTIONS: May be repeated for credit when topics vary.

LING 854  TOPICS IN THE STRUCTURE OF FRENCH  
Formal analysis of selected aspects of the grammar of French and related dialects. Topics may include phonology, morphology, syntax and semantics.  
RESTRICTIONS: May be repeated for credit when topics vary.

LING 855  TOPICS IN THE STRUCTURE OF GERMAN  
Formal analysis of selected aspects of the grammar of German and related dialects. Topics may include phonology, morphology, syntax and semantics.  
RESTRICTIONS: May be repeated for credit when topics vary.

LING 856  TOPICS IN THE STRUCTURE OF ITALIAN  
Formal analysis of selected aspects of the grammar of Italian and related dialects. Topics may include phonology, morphology, syntax and semantics.  
RESTRICTIONS: May be repeated for credit when topics vary.

LING 857  TOPICS IN THE STRUCTURE OF JAPANESE  
Formal analysis of selected aspects of the grammar of Japanese and related dialects. Topics may include phonology, morphology, syntax and semantics.  
RESTRICTIONS: May be repeated for credit when topics vary.

LING 861  TOPICS IN PHONOLOGY  
Detailed examination of one or more current (controversial) issues in phonological theory.  
PREREQ: LING608.  
RESTRICTIONS: May be repeated for credit when topics vary.

LING 862  ACQUISITION OF PHONOLOGY  
Development of phonology in normal children from babbling stage through acquisition of phonemes and basic phonological rules of a language. Examination of data from a variety of languages, focusing on language: specific and universal phenomena.  
PREREQ: LING608.

LING 863  PROJECTS IN ACOUSTIC PHONETICS  
Brief review of the articulatory, acoustic, and perceptual characteristics of speech and computer-based laboratory instrumentation. Students conduct research projects in acoustic phonetics, speech analysis, or speech synthesis. Projects will be suggested by the instructor, however, students may (with instructor's approval) choose a project of their own design.

LING 880  SECOND LANGUAGE ACQUISITION  
A detailed analysis of current issues in second language acquisition based on extensive readings of research findings. Topics include model pidginization process, natural versus formal second language acquisition, and adult versus child acquisition.

LING 890  STUDIES IN LINGUISTICS  
Varying topics in linguistics, such as grammatical theory, grammatical analysis, syntax, historical-comparative linguistics, stylistics and grammar testing.  
May be cross-listed with CGSC890 and/or ENGL890.

LING 964  PRE-CANDIDACY STUDY  
Research and readings in preparation of dissertation topics and/or qualifying examinations for doctoral students before admission to candidacy but after completion of all required course work.  
RESTRICTIONS: Not open to students who have been admitted to candidacy.

LING 969  DOCTORAL DISSERTATION  
1-12 PF

MALS 600  NATURE AND HUMAN NATURE  
Concentrates on salient views of nature and human nature, and the ways in which they have been shaped by the historical circumstances and disciplinary perspectives from which they were developed.  
RESTRICTIONS: Open to majors only.
MALS 610 Forensics, Conflict and Change 3
From antiquity to the present, the use of force and the resolution of conflict have been among humanity's enduring preoccupations. Examines ideas about these issues, and associated questions such as the meaning of "heroism" and "just war."
RESTRICTIONS: Open to majors only.

MALS 611 Documentary: Journalism and Film 3
Explores non-fiction narratives, both in print and on film. It looks at social reporting from the Victorian Era to the present, drawing analogies between the techniques of literature and cinema.
RESTRICTIONS: Open to majors only.

MALS 613 Latin American Experience 3
Examines recurring issues and problems in Latin America. The conflict between church and state, nationalism and a place in world affairs, tensions between the individual and society and the influence of the United States.
RESTRICTIONS: Open to majors only.

MALS 617 American Art in Context 3
Designed to give the non-specialist in art history an understanding of how social, economic, religious, and cultural attitudes in America are reflected in its art, architecture, and decorative arts from the colonial period to the present. Discussion encompasses such subjects as patronage, regionalism, ethnicity, and gender.
RESTRICTIONS: Open to majors only.

MALS 619 The Scientist in Society 3
Scientific research is directly influenced by the society in which it is conducted. In addition to financial limitations, constraints are imposed by societal norms of what are acceptable topics and procedures for research. Focus on the philosophical basis of science as well as consequences to society of the scientific revolution.
RESTRICTIONS: Open to majors only.

MALS 620 The Use of Science in Public Discourse 3
Examines important questions of general interest to both individuals and to governmental bodies that depend heavily on scientific information.
RESTRICTIONS: Open to majors only.

MALS 621 The Impacts of European Contacts on Native Americans 3
Considers how the arrival of the first Europeans in North America affected the indigenous Native Americans.
RESTRICTIONS: Open to majors only.

MALS 622 Interpreting the Past 3
Considers the different perspectives that can be applied to learning about the past.
RESTRICTIONS: Open to majors only.

MALS 624 Introduction to Graduate Research/Writing in Liberal Studies 3
Focuses on developing research and writing skills by concentrating on one issue, such as the family, the environment, or education. Students are taught to narrow the focus of a topic, create an arguable thesis, gather source information from both library and on-line resources, evaluate the source of information, organize a logical argument, incorporate source information into the argument and revise into a finished paper.
RESTRICTIONS: Open to majors only.

MALS 625 Film and American Society 3
Using major motion pictures, explores how Hollywood dealt with critical historical events: the Cold War, McCarthyism, the Civil Rights Movement, Vietnam, Watergate, and the modern Presidency.
RESTRICTIONS: Open to graduate majors only.

MALS 626 Studies in Twentieth Century American Literature 3
Examines narrative and thematic concerns in American fiction written before and after World War II. The fiction is explored against a background of cultural, philosophical, and literary trends.
RESTRICTIONS: For MALS students only.

MALS 648 Environmental Ethics 3
See PHIL 648 for course description.

MALS 660 On Becoming Human 3
Examines the biological and cultural evolution of humans, focusing on similarities and differences between humans and our closest primate relatives.
RESTRICTIONS: Open to majors only.

MALS 869 Master's Thesis 1-6

MALS 879 Synthesis Project 1-6

MAST 200 The Oceans 3
Integrates physical, chemical, geological and biological principles into an overview that addresses why and how the oceans work. Draws heavily on current oceanic issues to illustrate processes and problems.
RESTRICTIONS: Open only to non-science majors or with permission from instructor.

MAST 314 Comparative Terrestrial and Marine Ecology 3
See ENWC 314 for course description.

MAST 366 Independent Study 1-6

MAST 464 Marine Science Summer Internship 1-3
Students design a research project with an advisor and present it to peers, advisors and instructor.

MAST 466 Independent Study 1-3

MAST 468 Undergraduate Research 1-6

MAST 482 Introduction to Ocean Sciences 3
A quantitative introduction to the ocean world including geography, geophysics, chemistry of water and sediments, physics of ocean circulation and waves and tides, description of oceanic and nearshore environments, and biology of the seas.
PREREQ: MATH 241 or MATH 221; CHEM 103 or CHEM 111; PHYS 201 or PHYS 207.

MAST 601 Introduction to Oceanography 3
Topics include the geology and history of the ocean floor, oceanic sediments, the physics of the marine environment and the oceanic circulation, chemical processes in the ocean, and biological processes and production in the oceans.
RESTRICTIONS: For non-oceanographers. Requires graduate status.

MAST 602 Physical Oceanography 3
Geographic and hydrodynamic aspects of oceanography. The geography of ocean basins; physical properties of seawater; radiation; and observed distributions of temperature, salinity, oxygen and currents. Scalar and vector fields; hydrodynamics; kinematics, momentum dynamics, vorticity dynamics, viscous flow and eddy flux.
RESTRICTIONS: Requires permission of instructor.

MAST 603 Introduction to Marine and Aquatic Education 3
Water environments and associated marine and aquatic curricula are highlighted through inquiry learning, lecture and field trips. Emphasized is the integration of science, math, language arts, history and exploratories in development of thematic curricula.
RESTRICTIONS: Inservice educators only.

MAST 604 Environmental Data Management 1
Emphasizes the use of remotely sensed data for research and management of coastal resources. Environmental issues and data requirements are discussed. Case studies illustrate the use of Geographic Information Systems for integrating remotely sensed imagery with ancillary data to address coastal environmental problems.
RESTRICTIONS: Requires approval of instructor.

MAST 605 Topics: Marine Science Education 1-4
Stimulates Delaware teachers into incorporating integrated marine sciences into their classroom teaching.

MAST 606 Ocean and Atmosphere Remote Sensing 3
Fundamentals of ocean and atmosphere remote sensing including space platforms, their orbits, instruments, data retrieval and image processing methods. Oceanographic and atmospheric applications of remote sensing and new developments in sensors and data analyses.

MAST 607 Writing Papers in the Marine Sciences 3
The process and mechanics of publishing scientific papers in marine journals. Covers organizing data in tables and figures; mechanics of drawing up effective figures; marshalling of tables, figures and scientific ideas into a coherent story; and strategies and techniques used in effective writing.

MAST 615 Introduction to Marine Biology 3
Involves laboratory, field and lecture study for a broad understanding of marine biology and biochemistry.
RESTRICTIONS: For non-biologically oriented marine studies graduate students.

MAST 616 Methods in Molecular Biology 3
Conceptual experience in molecular biological techniques with an emphasis on their application to marine related problems. Topics include: nucleic acid extractions, cloning, gene amplification and characterization, and expression methodologies.
PREREQ: MAST 634.
**MAST 617 METHODS IN MOLECULAR BIOLOGY LABORATORY** 3
Provides practical experience in molecular biological techniques with emphasis on applications tomarine related problems.
COREQ: MAST616.

**MAST 618 MARINE MICROBIAL ECOLOGY** 3
Examines role of microbes in the oceans and their impact on oceanographic processes and bio-geochemical cycles in marine environments. Emphasis is on bacteria and their interactions with other marine organisms. Introduces use of molecular tools to examine uncultivated microbes.
RESTRICTIONS: Requires permission of instructor.

**MAST 620 ENERGY POLICY AND ADMINISTRATION** 3
See POSC624 for course description.

**MAST 621 COASTAL FIELD BIOLOGY** 2
Hands-on study of estuarine and coastal communities with emphasis on patchiness in time and space. Instruction in field techniques as well as analysis and presentation of data. Experience in scientific writing.
PREREQ: General biology, ecology, genetics, physiology.

**MAST 622 CONSERVATION AND RENEWABLE ENERGY POLICY** 3
See UAPP626 for course description.

**MAST 623 PHYSIOLOGY OF MARINE ORGANISMS** 3
Processes and mechanisms of adaptation of organisms to marine environments. Examines how environmental factors affect physiological processes in marine organisms. Lectures address physiological processes at cellular, whole organism and habitat levels.
PREREQ: MAST634 or equivalent. Requires permission of instructor.

**MAST 625 MICROBIAL PHYSIOLOGY AND DIVERSITY** 3
Emphasis on the diversity of physiological strategies developed by prokaryotic microbes and some simple eukaryotes. Approach is to examine and dissect specific metabolic pathways both in isolation and in how they integrate with central metabolism.
PREREQ: BISC207/208, CHEM321 or CHEM331, or permission of instructor.
RESTRICTIONS: Juniors, seniors, and graduate students.

**MAST 626 TOPICS IN HALO PHYTE BIOLOGY** 1
Analysis of current research in the biology of halophytic plants. Emphasis on student seminars and group discussions of the current literature.
RESTRICTIONS: May be repeated for credit when topics vary.

**MAST 627 MARINE BIOLOGY** 3
Ecologically oriented study of elementary oceanography, adaptive physiology, aspects of population and community ecology, reproductive and larval biology and marine production systems. Emphasis on coastal and estuarine habitats including soft and hard-substrate intertidal regions, subtidal regions and coral reefs.
PREREQ: General biology, ecology, genetics, and physiology.
RESTRICTIONS: Requires permission of instructor.

**MAST 628 OFFSHORE WIND POWER: SCIENCE, ENGINEERING & POLICY** 1-4
Covers multiple disciplines required to develop offshore wind resources for large-scale power production. As a case study, it will integrate science, engineering, and policy.
RESTRICTIONS: open to graduate students only

**MAST 629 TOPICS IN MARINE ECOLOGY** 1-6
Selected topics in marine ecology and physiology. Topics may vary and will be announced in the registration booklet.
RESTRICTIONS: Requires permission of instructor. May be repeated for credit when topics vary.

**MAST 634 MARINE BIOCHEMISTRY** 3
Addresses biochemical processes and enzyme, metabolic and structural adaptations of marine plants and animals. Discussions on topics such as enzyme kinetics, enzyme structure and metabolic pathways to organisms in the marine environment.
RESTRICTIONS: Requires sufficient background in chemistry and permission of instructor.

**MAST 635 TURBULENCE IN THE ENVIRONMENT** 3
Fundamentals of turbulence including the dynamics of vorticity, the cascade of energy and the theory of Kolmogarov, turbulent diffusion and turbulence in density-stratified flows. Applications to many engineering disciplines as well as to meteorology and oceanography.

**MAST 637 GEOLOGICAL OCEANOGRAPHY** 3
Focuses on processes that create the oceanic and continental margin sedimentary record. Topics include marine particle production and composition, transport, seafloor morphology, stratigraphy and paleoceanography. Students gain a broad understanding of concepts in geological oceanography and marine geology.

**MAST 645 GENERAL OCEANOGRAPHY** 3
Introduction to the science of oceanography for teachers, emphasizing the physical and natural sciences, nature of the subject matter and application to social schemes. Where applicable mid-Atlantic environments are emphasized to demonstrate physical, chemical, geological and biological themes associated with oceanographic sciences.
RESTRICTIONS: Offered off-campus, for public school teachers and general public.

**MAST 646 CHEMICAL OCEANOGRAPHY** 3
Composition of seawater; physiochemical properties of seawater distributions of gases, nutrients and trace metals; and effect of biological processes on seawater composition.
PREREQ: CHEM103 and CHEM104.

**MAST 647 PHYSICAL CHEMISTRY OF SEAWATER** 3
Introduction to chemical equilibria in seawater. Topics include electrolyte theory, gas solubility, chemical speciation, acid-base equilibria and the carbon dioxide system. Emphasizes use of computer techniques to study oceanic chemical processes.
PREREQ: One year of chemistry.
RESTRICTIONS: Computer experience not required.

**MAST 648 WATER WAVE MECHANICS** 3
See CIEG672 for course description.
PREREQ: CIEG205.

**MAST 663 DECISION TOOLS FOR POLICY ANALYSIS** 3
Develops quantitative decision-making skills for science and technology policy decisions. Covers decision-making under uncertainty, axioms of decision analysis, decision trees, influence diagrams, sensitivity analysis, confidence intervals, value of information, probabilistic risk assessment, and multi-attribute decision theory.
May be cross-listed with POSC663 and/or UAPP663.

**MAST 664 MARINE TRANSPORTATION POLICY** 3
Overview of marine transportation policy and analysis under local, national, and international contexts. Topics include: maritime transportation technology and fleet development; policy frameworks affecting trade, safety, and environment; quantitative analysis of shipping business economics and logistics under policy constraints.

**MAST 670 UNITED STATES OCEAN AND COASTAL POLICY** 3
Provides an overview and assessment of the evolution of U.S. ocean and coastal policy, including such policy areas as coastal management, fisheries management, marine mammal protection, offshore oil development, and marine pollution control.

**MAST 671 COASTAL PROCESSES AND MANAGEMENT** 3
Introduction to key processes operating in the coastal zone and to management techniques appropriate to these processes and environments. Emphasis on policy, regulatory and intergovernmental complexities that characterize coastal zone management in the United States and in other coastal nations.

**MAST 672 APPLIED POLICY ANALYSIS** 3
Empirical analysis of environmental and natural resource policy issues. Topics include valuation of natural resources, decision making under uncertainty, dynamic control and intertemporal issues in resource use and institutional aspects of policy analysis.
May be cross-listed with Econ4670.
PREREQ: ECON401.

**MAST 673 INTERNATIONAL LAW** 3
Origins, sources and applications of law to international relations, including the nature of treaties, the legal powers of states and international organizations, jurisdiction and immunities, and the role of international courts. Special attention given to the law of the sea for navigation, fisheries conservation, mineral exploitation and environmental protection.
May be cross-listed with LES763 and/or POSC604.
RESTRICTIONS: Requires permission of instructor.

**MAST 674 LEGAL ASPECTS OF THE COASTAL ZONE** 3
Examines basic legal doctrines and public policy implications relevant to the development and protection of the coastal zone of the United States. Use, ownership and control of water and land beneath and bordering upon water, relationships between the states and the federal government in areas of marine affairs; environmental protection and legal controls of water pollution.
RESTRICTIONS: Requires permission of instructor.

**MAST 675 ECONOMICS OF NATURAL RESOURCES** 3
Study of the allocation of natural resources, especially marine and coastal zone resources, in modern economics. Application of economic theory to the problems of misallocations and the means of correction, under both free and planned markets.
May be cross-listed with Econ675.
RESTRICTIONS: Requires permission of instructor.
MAST 676 ENVIRONMENTAL ECONOMICS 3
Study of the choice of policies to protect the environment, including land, air and water resources. Theory of market failure and externalities, use of economic incentives in policy design, valuation of environmental resources and examination of inefficiencies in existing U.S. environmental policies. May be cross-listed with ECON676. PREREQ: ECON300.

MAST 677 INTERNATIONAL OCEAN AND ENVIRONMENTAL POLICY 3
Focuses on understanding the strengths and weaknesses of the legal framework which governs ocean resources, ocean space and the environment beyond the limits of national jurisdiction. Evaluates international conventions which pertain to the ocean and environment as to impact and effectiveness.

MAST 678 ADMIRALTY AND MARITIME LAW 3
Introduction to U.S. admiralty and maritime law including jurisdiction carriage of goods by sea, personal injuries, collisions, salvage, insurance and marine pollution. May be cross-listed with POSC679 and/or UAPP678. RESTRICTIONS: Open to juniors, seniors and graduate students.

MAST 679 SHIPPING AND PORT MANAGEMENT 3
A seminar to study the structure and management of the shipping industry and ports, policies for ocean commerce, international trade, and merchant marine. May be cross-listed with POSC679.

MAST 681 REMOTE SENSING ENVIRONMENT 3
Detection and mapping of land and ocean resources with optical, infrared and microwave sensors. Digital analysis of satellite images using multispectral and spatial analysis techniques and correlation with ground/ship data. Application to oceanography, coastal processes, geology, land use, geography, agriculture, climate and pollution studies. May be cross-listed with ELEG681 and/or GEOG681. RESTRICTIONS: Requires permission of instructor.

MAST 685 FUNDAMENTALS OF ACOUSTICS 3
Fundamentals of sound and vibration, including equations governing vibrating string, vibration of bars, two-dimensional wave equation in plates, acoustic wave equation, transmission phenomena and acoustic radiation and reception. Other topics include absorption and attenuation of sound, resonators and ducts and filters, in the context of environmental and underwater acoustics. PREREQ: Calculus and introduction to differential equations.

MAST 686 REMOTE SENSING SEMINAR 1
Basic and applied research topics in remote sensing of earth resources, coastal processes, estuarine productivity, ocean dynamics and climatic effects presented by University students, faculty and guest speakers. Stresses advanced data acquisition and spectral and spatial image analysis techniques. RESTRICTIONS: May be repeated for credit when topics vary.

MAST 691 OCEAN FLUID DYNAMICS 4
See CIEG639 for course description.

MAST 692 ENVIRONMENTAL VALUES, MOVEMENTS AND POLICY 3
Examines citizens’ beliefs and values, voluntary environmental groups and the ways in which individuals and groups affect environmental policy. Shows how research in areas such as environmental sociology and ecological anthropology can inform policy. May be cross-listed with UAPP692.

MAST 693 WAVES IN THE MARINE ENVIRONMENT 3
General principles of wave mechanics, kinematics and dynamics. Applications to surface gravity waves, acoustic waves, electromagnetic waves and large scale geophysical waves. May be cross-listed with CIEG693. PREREQ: MEEG690.

MAST 696 ENVIRONMENTAL MEASUREMENT TOOLS 1-5
Provides exposure to limitations of techniques used in sampling and analyses that develop information used in resource management decision making. The 3-credit team-taught course has separate components. Students in the Marine Management degree program would take all 5 credits. RESTRICTIONS: Winter Session offering for MA program in the College of Marine and Earth Studies. Students outside the program may take portions of the full course as 1 or 2 credit components.

MAST 802 CASE STUDY IN COASTAL AND OCEAN MANAGEMENT 3
Analyzes issues in coastal and ocean management. Develops interdisciplinary problem-solving strategies. Engages students in real-world marine science/policy problems. Applies disciplinary knowledge, develops synthesis skills. Topics change, but case designs contain multi-disciplinary elements, e.g., physical ocean science, marine biology, oceanography, and marine policy. PREREQ: MAST801 or instructor approval.

MAST 806 GEOPHYSICAL FLUIDDYNAMICS I 3
Development of the fundamental fluid dynamics used in analyzing flows in physical oceanography and meteorology. Fundamentals of vorticity dynamics and geotrophy, inviscid theory of Rossby waves, and Ekman boundary layers. PREREQ: MEEG683 and MEEG684.

MAST 808 COASTAL/ESTUARINE PHYSICAL DYNAMICS 3
Coastal and estuarine dynamics covering continental shelf wind-forced circulation; continental shelf waves; modes of estuarine circulation; shelf-estuary interaction; shelf break front dynamics; and estuarine and river plume fronts. PREREQ: MAST602.

MAST 809 THE OCEAN AND CLIMATE VARIATION 3
Study of the ocean-atmosphere system; the fluxes of heat, water and energy in the ocean and interchanges with the atmosphere; budgets and mechanisms of exchange; and interannual and long-term climate variations as related to the ocean. PREREQ: MAST602.

MAST 811 OCEANOGRAPHIC TIME SERIES ANALYSIS 3
Quantitative techniques for data processing and time series analysis. Topics include basic definitions, linear systems, digital filters, statistical techniques, auto-spectrum estimation, cross-spectrum estimation, Monte Carlo technique, empirical orthogonal function analysis and rotary spectrum estimation. RESTRICTIONS: Requires permission of instructor.

MAST 814 POLITICAL ECONOMY OF THE ENVIRONMENT 3
See UAPP810 for course description.

MAST 816 BIOLOGICAL OCEANOGRAPHIC PROCESS 1-4
Multidisciplinary approach to the abundance and distribution of organisms in the oceans, the physiological and behavioral responses of organisms to the abiotic and biotic environment and the role of organisms in modifying the environment. Taught as six modules: algae, bacteria, protozoa, zooplankton, benthos, fish and fisheries. PREREQ: General biology, ecology, microbiology, and invertebrate biology. RESTRICTIONS: May be repeated for credit when topics vary.

MAST 817 RESEARCH DESIGN AND METHODS 3
Covers the logic, design and practice of public policy research, and should be helpful for planning thesis or dissertation research, regardless of topic or methods used. Methods covered draw from social and political sciences, and process evaluation of policy.

MAST 820 EXPERIMENTAL DESIGN SEMINAR 1
Forum for presentation of research plans or results with emphasis on experimental design and data analysis. Ensuring discussion aids preparation of research proposals and sharpens critical assessment of own and colleagues' work.

MAST 821 MARINE BIOLOGY/BIOCHEMISTRY SEMINAR 1
With each offering, addresses a different specific topic, e.g., tropical marine biology, larval dispersal, estuarine productivity, etc. RESTRICTIONS: May be repeated for credit when topics vary.

MAST 827 CURRENT TOPICS IN MARINE BIOLOGY 1-4
Subject areas change each term and will be announced in the registration booklet. Topics include aspects of plant biology, fish and invertebrate ecology and other aspects of marine ecology. May include lectures, tutorials and demonstration of techniques. RESTRICTIONS: Requires permission of instructor. May be repeated for credit when topics vary.

MAST 828 CURRENT TOPICS IN MARINE BIOCHEMISTRY 1-4
Subject areas change each term and will be announced in the registration booklet. Topics include marine chemical ecology, marine natural products chemistry, marine biochemistry of marine plants and animals. May include lectures, tutorials and demonstration of technique. PREREQ: Graduate course in biochemistry. RESTRICTIONS: May be repeated for credit when topics vary.

MAST 831 COASTAL AND ESTUARINE GEOLOGY 3
Sedimentation processes and products in coastal, estuarine, and shelf environments. Topics include: sediment production, transport and physical/chemical properties; shoreline and seabed morphodynamics; strata formation and sea level variability. Emphasis is on the character and distribution of sedimentary deposits in relation to coastal ocean processes. PREREQ: MAST637 or GEOG631 or permission of instructor.
MAST 838  Public Policy Analysis  3
See POSC838 for course description.

MAST 843  Global Governance: Theory and Cases  3
See POSC843 for course description.

MAST 847  Current Topics in Chemical Methods in Oceanography  1-3
Principles, capabilities and limitations of analytical methods to the chemistry of marine waters and sediments. Analytical methods include electrochemical, spectrophotometric, chromatographic, electron microscopy and surface techniques. Emphasis on the analysis of trace components (biochemical, inorganic and organic) in the marine environment. Laboratory experiments. Topics vary and will be announced in the registration booklet.
PREREQ: MAST646 or analytical chemistry.
RESTRICTIONS: May be repeated for credit when topics vary.

MAST 850  Marine Inorganic Chemistry  3
Principles of inorganic chemistry are used to explain and to understand the speciation and reactivity of the elements in the marine environment. Emphasis on the mechanistic aspects of important marine processes including mineral dissolution and formation, electron transfer reactions and the role of metals in biogeochemical reactions. May be cross-listed with CHEM855.
PREREQ: MAST646, aquatic chemistry or physical chemistry.

MAST 851  Marine Sedimentary Geochemistry  3
Fluxes of major, minor, trace, and nutrient elements and radionuclides from marine waters to sediments deposits with emphasis on deposition rates, sedimentary reaction and transport regimes, return fluxes to the overlying waters, and models that may be used to quantify these processes.
PREREQ: MAST646 or CIEG632 or PLSC608 or GEO664.

MAST 852  Isotope Geochemistry  3
Introduction to the field of isotope geochemistry and the application of isotope systematics to the study of geological, geochemical, hydrological, atmospheric and marine cycles. Light stable isotopes, uranium thorium decay series nuclides, and long-lived heavy isotopes are considered.
PREREQ: MAST646.

MAST 853  Oceanography Seminar  1
A review of current oceanographic literature through student presentations.
RESTRICTIONS: May be repeated for credit when topics vary.

MAST 855  Coastal and Estuarine Chemistry  3
Distributions, behavior, and chemical processes in estuarine and coastal waters are examined in this advanced general chemical oceanography course. Greater heterogeneity of physical controls and anthropogenic influences give a unique nature to this coastal corridor in the global flux from land to sea.
PREREQ: MAST646.

MAST 856  Biogeochemical Oceanography  1-4
Modular graduate seminar of individual offerings inspects aspects of marine biogeochemical cycle. Includes such topics as atmospheric and oceanic fluxes, climatic feedback controls involving the ocean, and the role of the marine environment in global change.
RESTRICTIONS: May be repeated for credit when topics vary.

MAST 857  Paleoclimatology  3
Focuses on processes related to climate change from tectonic to millennial timescales based on the marine sedimentary record of the past 65 million years. Topics include light stable isotopes and biogeochemical cycling of elements. Includes lectures and student-led discussion of current literature. May be cross-listed with GEO657.
RESTRICTIONS: Requires permission of instructor.

MAST 868  Research  1-9

MAST 869  Master's Thesis  1-6

MAST 870  Integrated Coastal Management  3
Provides a practical guide to the development, implementation, operation, and evaluation of integrated coastal management (ICM) programs. Examines the evolution of international prescriptions on ICM, and compares and contrasts experiences with integrated coastal management in both developed and developing countries.
PREREQ: MAST670.

MAST 871  Environmental Policy and Administration  3
See POSC818 for course description.

MAST 873  Seminar: Marine Policy  1
Current topics in marine policy based on recent journal articles and active research and policy relevant activities of students, faculty and visitors from other universities and government agencies. Emphasis on research design and formats for oral and written presentation of results.
RESTRICTIONS: May be repeated for credit when topics vary.

MAST 875  Advanced Fishery Economics  3
Theoretical and applied study of the optimal utilization and management of commercial and recreational fisheries with emphasis on equity issues and the difficulty of deriving regulations which are biologically effective and which provide incentives for economic efficiency at reasonable costs. May be cross-listed with ECON675.
PREREQ: MAST675 or ECON675.

MAST 882  Physical Ocean Science and Engineering Seminar  1
A review of the current literature in physical ocean science and engineering through student presentations.

MAST 964  Pre-Candidacy Study  3-12 PF
Research and readings in preparation of dissertation topic and/or qualifying examinations for doctoral students before admission to candidacy but after completion of all required course work.
RESTRICTIONS: Not open to students who have been admitted to candidacy.

MAST 969  Doctoral Dissertation  1-12 PF

MATHEMATICS

MATH 010  Intermediate Algebra  3 R
Review skills necessary for pre-calculus and college mathematics and statistics. Topics include a review of sets, operations with polynomial and rational expressions, solving equations and inequalities, and an introduction to the coordinate plane and functions.
RESTRICTIONS: Requires arithmetic and Algebra I skills.

MATH 012  Concepts of Intermediate Algebra  1-3
Reviews skills necessary for pre-calculus and college mathematics and statistics. Topics (when three credits are completed) include a review of sets, operations with polynomial and rational expressions, solving equations and inequalities, and an introduction to the coordinate plane and functions.
RESTRICTIONS: Requires arithmetic and Algebra I skills.

MATH 113  Contemporary Mathematics  3
Application of scientific methods to investigate phenomena. Solution of various real-world problems using appropriate mathematical methods. Topics include descriptive and inferential statistics, probability, management science, optimization via analysis of models, coding information, social choice and decision making and size and shape.

MATH 114  College Mathematics and Statistics  3
Stresses mathematical concepts and algebraic skills with a strong emphasis on applications in the areas of management, life and social sciences. Topics include various function classes and models, linear programming and statistics including descriptive and inferential statistics.
PREREQ: MATH012 or MATH100.
RESTRICTIONS: Only four credits from any combination of MATH113, MATH114, MATH115, MATH117, MATH127, MATH170 and MATH171 can count toward graduation.

MATH 115  Pre-Calculus  3
The various classes of functions and their graphs are explored. Function classes include linear, quadratic, polynomial, rational, exponential, logarithmic and trigonometric. Skills and concepts needed for calculus (MATH 221) are emphasized.
PREREQ: MATH101 or MATH102.
RESTRICTIONS: Only four credits from any combination of MATH113, MATH114, MATH115, MATH117, MATH127, MATH170 and MATH171 can count toward graduation.

MATH 117  Pre-Calculus for Scientists and Engineers  4
Designed to prepare students for MATH241. All topics included in MATH115 are covered, as well as additional topics in functions, trigonometry, linear systems, nonlinear systems, series and sequences.
PREREQ: MATH100 or MATH102 or 2 years of high school algebra.
RESTRICTIONS: Only four credits from any combination of MATH113, MATH114, MATH115, MATH117, MATH127, MATH170 and MATH171 can count toward graduation.
MATH 127  MATHEMATICS AND QUANTITATIVE REASONING 3  Mathematics driven by typical quantitative reasoning needed in everyday life. Combines critical thinking with basic mathematics in contexts encountered in various areas such as finance, social sciences, politics, the environment, etc. Includes probability and statistics, basic logic, and basic finance. PREREQ: High school algebra. RESTRICTIONS: Only four credits from any combination of MATH113, MATH114, MATH115, MATH117, MATH127, MATH170 and MATH171 can count toward graduation.

MATH 201  INTRODUCTION TO STATISTICAL METHODS I 3  Exploratory analysis, basic probability, discrete and continuous distributions, sampling distributions and confidence intervals, and hypothesis tests on means and proportions. Emphasis on applications in business and economics. Statistical computing is an integral part of this course. PREREQ: College algebra.

MATH 202  INTRODUCTION TO STATISTICAL METHODS II 3  Two-sample tests on means and proportions, chi-square analysis of contingency tables, complete and randomized block designs, factorial experiments, analysis of variance, simple linear and multiple regression, model diagnostics, quality control, time series analysis. Emphasis on applications in business and economics. Statistical computing is an integral part of this course. PREREQ: MATH201.

MATH 205  STATISTICAL METHODS 4  Descriptive statistics, graphical displays, sampling, variation, normal distribution, estimation, hypothesis testing, one-way analysis of variance, simple linear regression and goodness of fit. Laboratory covers use of statistical packages on mainframe and microcomputers. PREREQ: MATH210 or MATH230.

MATH 210  DISCRETE MATHEMATICS I 3  Sets, logic, induction, number systems, counting, introduction to graph theory, sequences and formal power series. COREQ: MATH221 or MATH241 or MATH242.

MATH 217  ALGEBRA FOR MIDDLE SCHOOL TEACHERS 3  Examines algebraic concepts developed in the middle grades, including linearity, meanings and uses of variables, and the representation of situations using functions, graphs, and equations. RESTRICTIONS: Credit is not given for mathematics majors or minors.

MATH 221  CALCULUS I 3  Topics include functions, graphing functions, limits, derivatives, sequences, series, exponential and logarithmic functions, and integration. RESTRICTIONS: Requires two years of high school algebra and one year of geometry. Credit cannot be received for both both MATH221 and MATH241.

MATH 222  CALCULUS II 3  Topics include integration, Taylor polynomials, series, multivariable calculus and trigonometric functions. PREREQ: MATH221. RESTRICTIONS: For students in the behavioral, management and social sciences. Credit cannot be received for both MATH222 and MATH242.

MATH 230  FINITE MATHEMATICS WITH APPLICATIONS 3  Set theory, probability, optimization, linear programming and an introduction to matrix methods. PREREQ: MATH221. RESTRICTIONS: For students in the behavioral, management and social sciences.

MATH 240  GEOMETRY AND MEASUREMENT FOR MIDDLE SCHOOL TEACHERS 3  Explores geometry and measurement topics and how they are developed throughout the middle school curriculum. Topics include properties of 2D and 3D figures, coordinate geometry, transformations, measurement of length, area and volume, and fundamentals of a deductive system. Includes the use of technology. RESTRICTIONS: Open only to students pursuing middle school mathematics teaching certification. Grade of C- or higher in MATH253 or permission of instructor.

MATH 241  ANALYTIC GEOMETRY AND CALCULUS A 4  Functions, limits, continuity, derivatives and definite integrals. RESTRICTIONS: Requires two years of high school algebra, one year of geometry and trigonometry. Credit cannot be received for both MATH241 and MATH221.

MATH 242  ANALYTIC GEOMETRY AND CALCULUS B 4  Exponential and log functions; inverse trig functions; integration techniques; parametric curves; polar coordinates; infinite series. Includes use of the computer package, Maple, to perform symbolic, numerical and graphical analysis. PREREQ: MATH241. RESTRICTIONS: Credit cannot be received for both MATH242 and MATH222.

MATH 243  ANALYTIC GEOMETRY AND CALCULUS C 4  Vectors, operations on vectors, velocity and acceleration, partial derivatives, directional derivatives, optimization of functions of two or more variables, integration over two and three dimensional regions, line integrals, Green's Theorem. Includes use of the computer package, Maple, to perform symbolic, numerical and graphical analysis. PREREQ: MATH242.

MATH 245  AN INTRODUCTION TO PROOF 3  Basic set operations, relations, equivalence relations, functions, inverse functions, cardinality, order properties of real numbers, least upper bound, greatest lower bound, completeness axiom, topology of reals, complex numbers. PREREQ: MATH210 and MATH243.

MATH 251  MATHEMATICS FOR K-8 TEACHERS: NUMBER AND OPERATIONS 3  Explores concept development in numeration systems, base ten system, the meaning of the four operations, number theory, and integers. Emphasis on problem solving and general number sense. RESTRICTIONS: Successfully pass the School of Education Competency Test.

MATH 252  MATHEMATICS FOR K-8 TEACHERS: RATIONAL NUMBERS AND PROBABILITY 3  Explores concept development in rational numbers, operations with rational numbers, proportional reasoning, and probability. PREREQ: MATH251. RESTRICTIONS: Grade of C- or higher in MATH251.

MATH 253  MATHEMATICS FOR K-8 TEACHERS: GEOMETRY, ALGEBRA AND MEASUREMENT 3  Explores concept development in figures, the role of definitions, coordinate geometry, transformations, functions and measurements of length, area and volume. PREREQ: MATH252. RESTRICTIONS: Grade of C- or higher in MATH252.

MATH 268  PERSPECTIVES ON MATHEMATICS 1  Designed for mathematics and other majors to expand students' understanding of contemporary mathematical thought, practice, culture and tools. Features presentations from faculty and invitées on mathematical endeavors and professional activities in an informal atmosphere. PREREQ: MATH241 or equivalent.

MATH 279  PROBLEM SOLVING STRATEGIES I 1  Designed to study a multitude of problem solving strategies such as working backwards, looking for a pattern, etc. Emphasizes the use of these strategies with the content that secondary mathematics teachers normally teach. PREREQ: MATH241.

MATH 302  ORDINARY DIFFERENTIAL EQUATIONS 3  Solutions and applications of ordinary differential equations as well as systems. Considers initial value problems and boundary value problems. Topics include Laplace transform, the phase plane, series solutions and partial differential equations. Includes use of the computer package Maple. COREQ: MATH243 RESTRICTIONS: Credit not given for both MATH302 and either MATH341, MATH342, MATH351 or MATH352.

MATH 303  DIFFERENTIAL EQUATIONS COMPUTING LAB 1  Provides computing experience in differential equations. COREQ: MATH302.

MATH 305  APPLIED MATHEMATICS FOR CHEMICAL ENGINEERING 3  A special applied mathematics course designed for chemical engineering majors. Emphasis is given on the interaction between mathematical theory and its engineering applications. May be cross-listed with CHEG305. PREREQ: A minimum grade of C- in MATH243 and CHEG112. RESTRICTIONS: For chemical engineering majors only.

MATH 308  HISTORICAL DEVELOPMENT OF MATHEMATICAL CONCEPTS AND IDEAS 3  Illustrates the origins of ideas, processes and topics in the history of mathematics. Biographical sketches of the creators, descriptions of their diverse cultures and a writing project are included. PREREQ: MATH241. RESTRICTIONS: Credits cannot be used to satisfy major or minor requirements in mathematics other than the secondary mathematics education program.

MATH 315  DISCRETE MATHEMATICS II 3  Algorithmic graph theory and computational geometry. Topics in graph theory cover shortest path problems, coloring problems, and others. The computational geometry covers Steiner tree, convex hull, design of experiments and selected topics. PREREQ: MATH210.
MATH 341 DIFFERENTIAL EQUATIONS WITH LINEAR ALGEBRA I 3
Topics include first and second order differential equations, systems of algebraic equations, determinants, vector spaces, eigenvalues and eigenvectors of matrices and systems of differential equations. Emphasis on the interaction between these topics and appropriate physical systems.
PREREQ: MATH242.
RESTRICTIONS: Credit not given for both MATH341 and either MATH302, MATH349 or MATH351. Open to majors outside mathematics.

MATH 342 DIFFERENTIAL EQUATIONS WITH LINEAR ALGEBRA II 3
A continuation of MATH341. Topics include series solutions, Laplace transform methods, boundary value problems, orthogonality, higher order equations, difference equations and numerical techniques. Continued emphasis on the interaction between these topics and physical systems.
PREREQ: MATH341.
RESTRICTIONS: Credit not given for both MATH342 and either MATH302, MATH349 or MATH352. Open to majors outside mathematics.

MATH 349 ELEMENTARY LINEAR ALGEBRA 3
PREREQ: MATH230 or MATH242.
RESTRICTIONS: Credit not given for both MATH349 and either MATH302, MATH341, MATH342 or MATH351.

MATH 350 PROBABILITY THEORY AND SIMULATION METHODS 3
Introduces the basic theory in both discrete and continuous aspects of probability theory.
PREREQ: MATH210 or MATH230.
COREQ: MATH243.

MATH 351 ENGINEERING MATHEMATICS I 3
Solutions of linear algebraic equations, Gauss elimination, vector spaces, subspaces, linear dependence, linear ordinary differential equations of 2nd order and higher, initial value and boundary value problems, eigenvalues, coupled linear ordinary differential equations, nonlinear differential equations, with engineering applications.
COREQ: MATH243.
RESTRICTIONS: Credit not given for both MATH351 and either MATH302, MATH341 or MATH349. Open to MEEG and CIEG majors only.

MATH 352 ENGINEERING MATHEMATICS II 3
Laplace transform, application to constant coefficient ordinary differential equations, scalar and vector fields, Laplacian, line integrals, divergence theorem, Stokes' theorem, Fourier series, orthogonality, diffusion equation, Laplace's equation, wave equation, separation of variables, with engineering applications.
PREREQ: MATH351.
RESTRICTIONS: Open to MEEG and CIEG majors only.

MATH 353 ENGINEERING MATHEMATICS III 3
PREREQ: MATH351.
RESTRICTIONS: Open to MEEG and CIEG majors only.

MATH 366 INDEPENDENT STUDY 1-6

MATH 379 PROBLEM SOLVING STRATEGIES 1
Studies a multitude of problem solving strategies such as looking for a pattern, making a model, working backwards, etc.
COREQ: MATH230.
RESTRICTIONS: Requires permission of the Committee on Secondary School Mathematics. Not for major (B.A. or B.S.), or minor credit in mathematics sciences.

MATH 380 APPROACHES TO TEACHING MATH 3
Aims, course planning, instructional strategies, evaluation and selection of materials for teaching mathematics in secondary schools.
COREQ: MATH230.
RESTRICTIONS: Requires permission of the Committee on Secondary School Mathematics. Not for major (B.A. or B.S.), or minor credit in mathematics sciences.

MATH 382 STUDENT TEACHING SEMINAR IN SECONDARY MATH 2 PF
Provides student teachers opportunities to reflect upon and discuss classroom teaching experience. Focuses on classroom management and other professional issues.
PREREQ: MATH380.
COREQ: EDUC400.
MATH 535  **INTRODUCTION TO PARTIAL DIFFERENTIAL EQUATIONS**  3
Theory and applications of parabolic, elliptic and hyperbolic partial differential equations originating from various mathematical physics problems. PREREQ: MATH302 or MATH342 or MATH352.

MATH 540  **COLLEGE GEOMETRY: A HISTORICAL APPROACH**  3
Historical development of the axiomatic systems in geometry, inauguration of deductive reasoning introduced by the Greeks (Euclid) along with the axiomatic developments, extensions, algebraic methods and geometric properties which followed. Plane, analytic, transformational and projective geometries are included. PREREQ: MATH245. RESTRICTIONS: Graduate credit only for teachers.

MATH 549  **CODING THEORY AND CRYPTOGRAPHY**  3
Basic coding theory including correcting and detecting error patterns. Cryptography, including symmetric key encryption, DES, RSA and cryptographic protocols. PREREQ: MATH349.

MATH 581  **ON THE NATURE OF PROOF**  3
Designed for secondary teachers to show how to investigate a problem, develop ideas, test conjectures, and, if appropriate, prove that resulting statements are correct. Problems, including proofs, are chosen from the areas of algebra, pre-calculus, geometry and number theory. PREREQ: BA/BS Math or Math Ed. RESTRICTIONS: Credit to be used only in graduate programs in mathematics education.

MATH 582  **STUDIES IN DISCRETE MATHEMATICS**  3
Designed to show secondary teachers how discrete mathematics underlies the science and technology specific to the computer age. Using the NCTM Standards as a guide, topics include relations, combinatorics, graph theory, sequences, and linear programming, as well as associated algorithms. PREREQ: MATH581. RESTRICTIONS: Credit to be used only in graduate programs in mathematics education.

MATH 583  **PROBABILITY AND STATISTICS FOR EDUCATION**  3
Designed specifically for middle and secondary teachers. Topics emphasized include graphical methods, probability models, statistical inference and study design. Orientation to popular software packages. Applications selected from current literature. PREREQ: Undergraduate statistics course. RESTRICTIONS: Credit to be used only in graduate programs in mathematics education.

MATH 584  **ADVANCED SECONDARY MATHEMATICS METHODS**  3
Designed to develop perspectives, knowledge, and frameworks which an inservice teacher can use to organize, interpret and critique their own teaching experience and that of others. RESTRICTIONS: Requires permission of instructor. Credit to be used only in graduate programs in mathematics education.

MATH 585  **TECHNOLOGY IN SECONDARY MATHEMATICS**  3
Major emphasis on learning how to use computer software to enhance both the teaching and learning of algebra, geometry, statistics, probability and precalculus. Participants get hands-on experience with a function plotter, spreadsheet, geometry package and a statistic/probability package. RESTRICTIONS: Working knowledge of graphing calculators. Credit to be used only in graduate programs in mathematics education.

MATH 586  **MATHEMATICAL PROBLEM SOLVING: THEORIES AND PRACTICES**  3
Designed to offer secondary teachers an opportunity to face and solve nonroutine problems. Teachers become familiar with problem solving strategies used not only with nonroutine problems but also with standard problems in an existing mathematics curriculum. RESTRICTIONS: Requires permission of instructor. Credit to be used only in graduate programs in mathematics education.

MATH 587  **PROPORTIONAL REASONING**  3
Introduces and reinforces the underlying concepts of proportional reasoning and their applications in science. RESTRICTIONS: Restricted to middle school mathematics and science teachers.

MATH 588  **GEOMETRY AND MEASUREMENT FOR MIDDLE SCHOOL TEACHERS**  3
Properties of 2-D and 3-D figures; measurement of length, area and volume; spatial relationships; transformations; connections with coordinate geometry; fundamentals of deductive system; van Hiele model of development of geometric reasoning, and use of Geometer's Sketchpad software to enhance package to enhance both teaching and learning of geometry and measurement. May be cross-listed with EDUC588.

MATH 600  **FUNDAMENTALS OF REAL ANALYSIS I**  3
Rigorous introduction to classical real analysis. Brief review of real numbers and a thorough discussion of the basic topology of metric spaces. Covers in detail the following topics: the analysis of sequences and series; continuity; differentiation and Taylor's theorem; and the analysis of sequences and series of functions. PREREQ: MATH401.

MATH 602  **FUNDAMENTALS OF REAL ANALYSIS II**  3
Riemann integration, an introduction to Lebesque integration, multivariable calculus. PREREQ: MATH600.

MATH 611  **INTRODUCTION TO NUMERICAL ANALYSIS AND SCIENTIFIC COMPUTING**  3

MATH 612  **INTRODUCTION TO NUMERICAL METHODS FOR PARTIAL DIFFERENTIAL EQUATIONS**  3
Basic finite difference schemes for standard model problems. Schemes for integrating time dependent problems (including ordinary differential equations). Curved boundaries. Dispersion and Von Neumann analysis. Lax equivalence theorem and the CFL condition. PREREQ: MATH503 or MEEG863 or PHYS207.

MATH 616  **INTRODUCTION TO APPLIED MATHEMATICS I**  3
Introduction to ideas and techniques used in solving problems arising in a variety of physical settings. Stability of nonlinear systems of ODE's. Sturm-Liouville problems and Green's functions. The wave, heat and Laplace equations. Elementary analysis of some nonlinear PDE's. Special functions, asymptotic expansions and perturbation theory. PREREQ: One semester of advanced calculus.

MATH 617  **INTRODUCTION TO APPLIED MATHEMATICS II**  3
Continuation of MATH616. PREREQ: MATH616.

MATH 630  **PROBABILITY THEORY AND APPLICATIONS**  3
Introduction to probability theory as background for further work in statistics or stochastic processes. Sample spaces and axioms of probability; discrete sample spaces having equally likely events; conditional probability and independence; random variables and describing their distributions; classical discrete and continuous random variables; mathematical expectation and moments of a distribution; the distribution of a function of a random variable; Chebyshev's inequality; the law of large numbers; central limit theorem.

MATH 631  **INTRODUCTION TO STOCHASTIC PROCESSES**  3
Classical stochastic processes with emphasis on their properties which do not involve measure theory. Markov chains in discrete and in continuous time with examples from random walk, birth and death processes, branching processes and queuing theory. Renewal and Markov renewal processes. Basic notions of Brownian motion and second-order processes. PREREQ: MATH630.

MATH 650  **ABSTRACT ALGEBRA**  3
Elementary number theory, polynomial and abstract rings, ideals and quotient rings, PID's and Euclidean rings, groups, cyclic and Abelian groups, direct products, algebraic field extensions, splitting fields, field automorphisms, finite fields. PREREQ: Undergraduate abstract algebra.

MATH 672  **VECTOR SPACES**  3
Vector spaces, linear transformations, decomposition theorems and bilinear forms. PREREQ: MATH349.

MATH 688  **COMBINATORICS AND GRAPH THEORY I**  3
Combinatorial enumeration, designs and geometries, graphs, set systems, partially ordered sets, existence and construction of various combinatorial objects, Ramsey theory. PREREQ: MATH650 or consent of instructor.

MATH 689  **COMBINATORICS AND GRAPH THEORY II**  3
Methods of linear algebra in combinatorics and graph theory, basics of coding theory and associated designs, number theory and cryptography, communication complexity. PREREQ: Knowledge of linear algebra.

MATH 694  **METHODS OF OPTIMIZATION**  3
Review of linear programming, unconstrained and constrained nonlinear programs, numerical methods, Kuhn-Tucker theory, duality and Lagrange multipliers.
MATH 805  REAL ANALYSIS  3
Lebesgue measure and integration, differentiation and absolute continuity, \( L^p \) spaces, distributions and Sobolev spaces. PREREQ: MATH602.

MATH 806  FUNCTIONAL ANALYSIS  3
Fundamental results for normed linear spaces with special emphasis on the theory of Hilbert space, spectral theorems and application to integral and differential equations. PREREQ: MATH602.

MATH 807  COMPLEX ANALYSIS  3
Complex numbers; analytic functions; geometry of elementary functions; integrals; power series; residues and poles. PREREQ: MATH602.

MATH 810  ASYMPTOTIC AND PERTURBATION METHODS  3
Asymptotic expansions of real and complex integrals; singular perturbation theory for ODEs and PDEs, WKB and multiple-scale expansion techniques. Selected applications. PREREQ: MATH617 and knowledge of analytic function theory or consent of instructor.

MATH 812  INVERSE PROBLEMS  3
Ill-posed problems, regularization methods, Tikhonov regularization, the discrepancy principle, regularization by discretization. Selected topics from nonlinear inverse problems. PREREQ: MATH617 and MATH806.

MATH 821  TOPICS IN APPLIED ANALYSIS  3
Topics chosen from ordinary differential equations, harmonic analysis, optimization theory and integral equations. RESTRICTIONS: Requires permission of instructor.

MATH 824  TOPICS IN APPLIED MATHEMATICS  3
Topics chosen from numerical analysis, elasticity, electromagnetic theory, fluid dynamics and other areas. RESTRICTIONS: Requires permission of instructor.

MATH 826  TOPICS IN PURE MATHEMATICS  3
Topics vary and are chosen from a variety of areas in pure mathematics. RESTRICTIONS: Requires permission of instructor.

MATH 827  TOPOLOGY  3
Generation and properties of topological spaces including connectedness and compactness. Continuity, separation and countability properties; convergence of nets and filters.

MATH 835  PARTIAL DIFFERENTIAL EQUATIONS I  3
Methods of analysis and solution for partial differential equations, both initial and boundary value problems. Brings mathematical techniques to vital and current systems of equations arising in many fields. Topics include elliptic, hyperbolic and parabolic systems from a classical and variational perspective. PREREQ: MATH617.

MATH 836  PARTIAL DIFFERENTIAL EQUATIONS II  3
Cauchy's problem and initial boundary value problems for hyperbolic and parabolic equations and systems. Boundary value problems for elliptic equations and systems. Sobolev space and semigroup methods will be emphasized. PREREQ: MATH806 and a course on partial differential equations.

MATH 838  NUMERICAL METHODS FOR PARTIAL DIFFERENTIAL EQUATIONS  3
Introduces concepts of consistency, stability and convergence of numerical schemes. Finite element and finite difference schemes and their applications to fundamental partial differential equations are emphasized. PREREQ: MATH612 or equivalent.

MATH 845  GROUPS AND THEIR APPLICATIONS  3
Review of elementary group theory, permutation groups, group actions, Sylow theorems, semi-direct and wreath products, classical matrix groups, automorphism groups of combinatorial structures, Polya enumeration. May also include representation theory, free groups, finite groups of isometries of Euclidean spaces. PREREQ: MATH650 or consent of instructor.

MATH 850  THEORY OF PROBABILITY  3
Mathematically rigorous treatment of probability theory with emphasis on methods and tools for applications. Axioms of probability and independence. An introduction to large deviation theory and Martingale theory. Probabilistic methods in combinatorics and analysis. PREREQ: MATH602 or consent of instructor.

MATH 868  RESEARCH  1-6

MATH 869  MASTER'S THESIS  1-6

MATH 870  READING IN MATHEMATICS  1-6

MATH 884  FINITE GEOMETRIES AND DESIGNS  3
Classical projective and affine spaces, non-desarguesian planes, coordinate systems, spreads and packings, nets and unital, collineation groups and Singer cycles. Further topics chosen from related geometrical designs, associated codes and algebraic surfaces/varieties. PREREQ: MATH688 and MATH845.

MATH 885  EXTREMAL COMBINATORICS  3
Topics from extremal graph theory, extremal set theory and combinatorial geometry. Algebraic, geometric and probabilistic methods are used. PREREQ: MATH688 and MATH689.

MATH 964  PRE-CANDIDACY STUDY  3-12 PF
Research and readings in preparation of dissertation topic and/or qualifying examinations for doctoral students before admission to candidacy but after completion of all required course work.

RESTRICTIONS: Not open to students who have been admitted to candidacy.

MATH 969  DOCTORAL DISSERTATION  1-12 PF

MEDICAL TECHNOLOGY

MEDT 100  INTRODUCTION TO MEDICAL TECHNOLOGY  1
Orientation to the profession of medical technology with overview of clinical laboratory science areas. Discussion of the laboratory's critical role in healthcare delivery and the diversity of employment and career opportunities.

MEDT 210  INFORMATION TECHNOLOGIES AND COMMUNICATION SKILLS  2
Focuses on the use of computer and education technology such as Powerpoint, Word, Excel, WWW browsers and e-mail as tools to achieve effective communication necessary for success in the biomedical sciences.

RESTRICTIONS: Open to sophomores, juniors and seniors. Requires permission of instructor.

MEDT 366  INDEPENDENT STUDY  1-6

MEDT 370  PHLEBOTOMY PRACTICUM  1
Introduction to the theory and performance of phlebotomy. Supervised clinical experience in the application of laboratory theory and techniques in phlebotomy.

RESTRICTIONS: Open to medical technology majors only.

MEDT 372  DIAGNOSTIC PARASITOLOGY  2
Study of human parasites, emphasizing detection and identification of diagnostic forms.

RESTRICTIONS: Open to medical technology majors only.

MEDT 375  CLINICAL LABORATORY PRINCIPLES AND STATISTICS  2
Basic laboratory principles including solution preparation, mathematics, safety, quality assurance and spectrophotometry. Introductory statistics including applications to laboratory information systems and research.

RESTRICTIONS: Requires permission of instructor.

MEDT 380  CLINICAL IMMUNOLOGY AND MEDICAL VIROLOGY  4
Introductory immunology concepts and the use of immunological assays, such as complement fixation, enzyme immunoassays, and fluorescent antibody assays, for the diagnosis of infectious diseases and immunological disorders. Study of viruses, diseases they cause, and the methods used to diagnose viral infections.

PREREQ: BISC208, BISC300, and CHEM213 or CHEM321.

RESTRICTIONS: Requires permission of instructor.

MEDT 390  INTRODUCTION TO MOLECULAR DIAGNOSTICS  2
Introduction to molecular biology principles and techniques used in the clinical laboratory for diagnosis, prognosis and treatment of disease. Topics include isolation of DNA, RNA, and proteins from biological fluids, electrophoresis, PCR, viral load testing and DNA sequencing.

PREREQ: BISC208, and CHEM213 or CHEM321.

RESTRICTIONS: Requires permission of instructor.

MEDT 391  INTRODUCTION TO MOLECULAR DIAGNOSTICS LABORATORY  1
Laboratory exercises that correlate with MEDT390. Techniques include isolation of nucleic acids from biological fluids, electrophoresis, PCR, viral load testing and DNA sequencing.

PREREQ: BISC208, and CHEM213 or CHEM321.

RESTRICTIONS: Requires permission of instructor.

MEDT 400  URINALYSIS AND BODY FLUIDS  2
The study of routine urinalysis examination, renal function and body fluid testing procedures.

RESTRICTIONS: Open to medical technology majors only.
MEEG 215  MECHANICS OF SOLIDS  4
Analytical study of stresses and deformations and their application to the design of
machine and structural elements under axial, torsional, bending and lateral loads.
Buckling and energy methods are discussed.
PREREQ: MEEG112.

MEEG 301  MACHINE DESIGN-KINEMATICS & KINETICS  3
Kinematic analysis of mechanisms and machines, kinematic synthesis, cam design,
gear train analysis and machine dynamics.
PREREQ: MEEG211.

MEEG 304  MACHINE DESIGN-ELEMENTS  3
Aspects of machine design: statistical nature, theories of failure and design for
strength and design of machine elements.
PREREQ: MEEG215, MEEG301 and MEEG321.
RESTRICTIONS: Open to majors only.

MEEG 311  VIBRATION AND CONTROL  4
Modeling and simulation of single and multi-degree-of-freedom systems, nonlinear
models, linearization, transient and steady state response. Controller designs: root
PREREQ: MEEG211.

MEEG 321  MATERIALS ENGINEERING  3
Mechanical properties and materials behavior under static and dynamic loading;
fatigue, creep, wear and corrosion; properties and applications of metals, ceramics, polymers and composites, forming and joining of materials; practical examples of materials selection in design and the use of materials data bases.
PREREQ: MEEG215 and MSEG302.

MEEG 331  FLUID MECHANICS I  4
Incompressible fluid mechanics: fluid statics, control volume analysis for mass, momentum and energy; differential analysis of viscous and inviscid flow; dimensional analysis; experiments in fluid mechanics.
PREREQ: MEEG112 and MATH351.
RESTRICTIONS: Open to majors only.

MEEG 332  FLUID MECHANICS II  3
Compressible flows, isentropic flow, shock waves; lift and drag; inviscid flows, potential and stream functions, elementary wing theory; boundary layers; computational fluid dynamics.
PREREQ: MEEG331.

MEEG 342  HEAT TRANSFER  3
PREREQ: PHYS310.

MEEG 344  THERMODYNAMICS  3
PREREQ: PHYS310.

MEEG 346  THERMAL LAB  1
Introduction to experimental and measurement techniques related to thermodynamics and heat transfer. Designed to complement MEEG342 and MEEG344.
PREREQ: PHYS310.
COREQ: MEEG342 and MEEG344.

MEEG 361  APPLIED ENGINEERING ANALYSIS  3
Linear algebra; vector field theory; Fourier series and partial differential equations. Engineering applications.
PREREQ: MATH302.

MEEG 366  INDEPENDENT STUDY  1-6
MEEG 401  SENIOR DESIGN  6
Capstone engineering practice where teams develop real engineering system designs; discover customer requirements; benchmark best practices; develop engineering specifications; generate concepts; and justify specific concept. Design, fabricate, assemble, test and improve an actual prototype.
PREREQ: MEEG304.
RESTRICTIONS: Majors only.

MEEG 411  STRUCUTRAL MECHANICS FOR MECHANICAL AND
AEROSPACE ENGINEERING  3
Introduction to theory of plates and shells, including analysis of stresses and deformations, vibrations, stability and thermal response of structures typical of modern aerospace and underwater vehicles, pressure vessels and other continuous structures.
PREREQ: MEEG211 and MEEG215.

MEEG 415  FINITE ELEMENT ANALYSIS  3
Introduction to the finite element method with applications to structural engineering problems. Direct and variational approaches to element formulation; interpolation functions and isoparametric elements.
PREREQ: MEEG215.

MEEG 419  MECHANICAL BEHAVIOR OF MATERIALS AND STRUCTURES  3
Discuss how material properties influence structural response and failure mechanisms under the influence of external loads. Includes plasticity; thermal stresses; fracture and damage mechanics; and buckling. Problem solving based on both analytical methods and computational mechanics.
PREREQ: MEEG 215.

MEEG 423  VIBRATIONS  3
Introduction to mechanical vibrations and structural dynamics. Analysis and
synthesis by matrix and energy methods. Applications to machine design, vehicle dynamics and shock and vibration isolation.
PREREQ: MEEG211.

MEEG 424  VEHICLE DYNAMICS  3
Theory of the dynamics of ground vehicles. Topics include tire adhesion, slip angle, suspension analysis and design, chassis design and aerodynamics with downforce generation.
PREREQ: MEEG112 and MEEG211. MEEG311 is recommended.

MEEG 425  AUTOMOTIVE POWERTRAIN THEORY  3
Analysis and design of automotive powertrain design with emphasis on competition and efficiency optimization.
PREREQ: MEEG301, PHYS310.

MEEG 432  AERODYNAMICS  3
PREREQ: MEEG 331.

MEEG 433  BIOMEDICAL FLUIDS AND TRANSPORT  3
Anatomy and physiology of pulmonary, cardiac, genitourinary, cerebrospinal and synovial systems. Application of fluid, heat and mass transport fundamentals to analysis of these biological systems.
PREREQ: MEEG332 and MEEG342.

MEEG 434  AIR POLLUTION PROCESSES  3
Physical, chemical, and meteorological processes that govern the photochemistry and transport of gas-phase and aerosol-phase air pollutants in the atmosphere. Topics include air quality, pollutant emissions, gas-phase and liquid-phase chemistry, aerosol dynamics, plumes, turbulent transport in geophysical flows, meteorology, and deposition.
RESTRICTIONS: Requires upper division status in engineering.

MEEG 442  INTRODUCTION TO FUEL CELLS  3
Basic principles of fuel cells, fuel cell types and their applications, fuel processing and hydrogen storage.
PREREQ: MEEG331, MEEG342, MEEG344, or equivalent.

MEEG 445  SENIOR RESEARCH I  3
Investigation of an experimental nature to be carried out and reported upon by each student.
RESTRICTIONS: Open to seniors only.

MEEG 446  SENIOR RESEARCH II  3
Investigation of an experimental nature to be carried out and reported upon by each student.
RESTRICTIONS: Open to seniors only.

MEEG 453  MANUFACTURING PROCESSES AND SYSTEMS  3
Explains key concepts and elements of basic processes (metal cutting, forming, plastic molding, more), technologies (robotics, ergonomics, material handling, quality management, machine vision, more), industries/systems (pharmaceutical, automotive, packaging, food, more) and current Advances (lean mfg., just-in-time, more).
PREREQ: MEEG321 or consent of instructor.

MEEG 466  INDEPENDENT STUDY  1-6
MEEG 481  COMPUTER SOLUTION OF ENGINEERING PROBLEMS  3
Overview of numerical modelings in continuum mechanics. Case studies in fluid and solid mechanics using commercially available software packages. Overview of common features, capabilities and limitations of commercial codes.

MEEG 482  CLINICAL BIOMECHANICS  3
The biomechanics and patho-mechanics of various human musculoskeletal joint systems. Normal joint anatomy and biomechanics; the mechanical effects of pathology and the goals of surgical repairs to counteract them explored through in vitro, in vivo and mathematical modeling studies of joint system mechanics.
MEENG 483 Orthopedic Biomechanics 3
Anatomy and physiology including microanatomy and mechanics of bone, cartilage, tendon and muscle. Mechanical modeling of body including joint loads, motion analysis, muscle forces and interaction with orthopedic devices. PREREQ: MEEG211 and MEEG215.

MEENG 484 Biomaterials and Tissue Engineering 3
Biomaterials for mechanical replacement of Orthopedic tissues: bone, cartilage, ligament, tendon and whole joint systems. Topics include normal tissue mechanics and biocompatibility, mechanical behavior, degradation and host response to biomaterials. Experimental methods to assess biomaterials along with design and manufacturing considerations for joint and tissue replacements.

MEENG 600 Seminar 1 PF

MEENG 610 Intermediate Solid Mechanics 3
Indicial notation, tensors; displacement, strain, compatibility; traction and stress, equations of motion; constitutive description of an elastic material; solutions to boundary value problems including torsion, bending, plate problems in elasticity (Airy stress function) and elements of linear elastic fracture mechanics.

MEENG 611 Sandwich Structures 3
Composite and isotropic sandwich structures are studied for stresses, deformations, buckling loads, natural frequencies and dynamic response under mechanical and environmental loads, involving honeycomb, solid, foam, web and trusscore sandwich comprising beam, plate, ring and shell structures. Design and minimum weight optimization are treated.

MEENG 612 Biomechanics of Human Movement 3
Mechanics of the musculoskeletal system with an emphasis on the control of human movement. Topics include how the nervous system activates muscles, the mechanical properties of skeletal muscle and mechanisms for controlling limb movement. Applications include gait analysis, sports biomechanics and hand trajectory formation. Involves computer modeling of musculoskeletal systems. PREREQ: MEEG112 and MEEG211.

MEENG 615 Mechanical Properties of Materials 3
See MSEG615 for course description.

MEENG 616 Composite Materials Structures 3
Introduction to composite materials; anisotropic elasticity and laminate theory; plates and panels of composite materials; beams, columns and rods; composite material shell structures; energy methods; strength and failure theories; adhesive bonding and mechanical fastening; hydrothermal effects; stress analysis, buckling, vibrations and impact.

MEENG 617 Composite Materials 3
Fiber and matrix materials, fiber-matrix interface, polymer, metal, ceramic and carbon matrix composites, geometric aspects, elastic properties, laminate theory, strength of unidirectional composites, strength of laminates, durability, hybrid composites, flexible composites and textile structural composites.

MEENG 618 Fracture of Solids 3
Introduction to the field of fracture mechanics, covering both theoretical approaches and practical applications. Examines fundamentals of linear elastic and elastoplastic fracture mechanics, and offers a short introduction to the basic premises and approaches for the treatment of dynamic fracture mechanics. May be cross-listed with MSEG618.

MEENG 619 Mechanical Behavior of Materials and Structures 3
Examines how material properties influence structural response and failure mechanisms under the influence of external loads. Includes plasticity, thermal stresses; fracture and damage mechanics; and buckling. Problem solving based on both analytical methods and computational mechanics. May be cross-listed with CIEG619. PREREQ: MEEG610 or similar.

MEENG 620 Intermediate Dynamics 3
Reference frames, angular velocity, linear velocity, angular acceleration, linear acceleration, multibody systems, inertia properties, kinetic energy, equations of motion, generalized d'Alembert's principles, numerical integration, computer simulation.

MEENG 621 Optimization of Dynamic Systems 3
Static optimization, numerical methods for static optimization, calculus of variations. Dynamic optimization: basic results, direct solution, indirect solution. Linear systems: finite time optimal control, steady state optimal control, multi-degree-of-freedom mechanical systems. RESTRICTIONS: Undergraduates require permission of instructor.

MEENG 622 Nonlinear Dynamics and Chaos 3
Nonlinear dynamics and chaotic phenomenon as applied to natural and engineering systems. Geometric and computational techniques, analytical methods for the qualitative analysis of dynamical systems modeled by differential equations and iterated maps. Planar and non-planar phase space analysis, local and global bifurcation analysis, catastrophes, resonances. PREREQ: MATH351 or equivalent.

MEENG 624 Control of Dynamic Systems 3

MEENG 630 Intermediate Fluid Mechanics 3

MEENG 633 Biomechanical Fluids and Transport 3
Anatomy and physiology of pulmonary, cardiac, genitourinary, cerebrospinal and synovial systems. Application of fluid, heat and mass transport fundamentals to analysis of these biological systems.

MEENG 634 Air Pollution Processes 3
Physical, chemical, and meteorological processes that govern the photochemistry and transport of gas-phase and aerosol-phase air pollutants in the atmosphere. Topics include air quality, pollutant emissions, gas-phase and liquid-phase chemistry, aerosol dynamics, plumes, turbulent transport in geophysical flows, meteorology, and deposition. RESTRICTIONS: Requires graduate standing in engineering.

MEENG 636 Fluid Mechanics Measurements 3
Point-wise velocity measurement including differential pressure measurement, hot wire anemometry, and laser-Doppler anemometry. Global measurement techniques based on particle imaging and digital image processing. Signal processing, statistics and uncertainty analysis.

MEENG 637 Two-Phase Flow and Particle Technology 3
Modeling mass, momentum, heat transfer, and mixing in particle-laden flows, slurry, and bubbly flows. Issues in particle process industry such as particle separation, dispersion, agglomeration, transport and handling. Particle measurements and characterization. PREREQ: MEEG331.

MEENG 640 Intermediate Heat Transfer 3
Theory and equations of heat conduction, boundary conditions, steady and transient heat conduction, theory of convection, forced convection in laminar flows, derivation of conservation equations, numerical methods.

MEENG 642 Introduction to Fuel Cells 3
Basic principles of fuel cells, fuel cell types and their applications, fuel processing and hydrogen storage. PREREQ: MEEG331, MEEG342, MEEG344.

MEENG 652 Flow of Viscous Materials 3
Applied fluid dynamics with an emphasis on flow processes dominated by viscous effects. Flow phenomena in polymeric, ceramic and composite materials. Modeling of flows in processing and manufacturing and its application to the design of molds and machinery.

MEENG 653 Manufacturing Processes and Systems 3
Explains key elements and concepts of basic processes, technologies, process systems and industries, current advances. Processes: packaging, plastic molding, food, pharmaceutical, metal cutting, forming, Technologies: robotics, numerical control, just-in-time inventory, ergonomics, material handling, quality management. PREREQ: MEEG321 or consent of instructor.

MEENG 655 Principles of Composites Manufacturing 3
Fundamental principles involved in composites manufacturing are introduced. Modeling of such processes emphasized with applications of injection molding, compression molding, filament winding, pultrusion and resin transfer molding. PREREQ: MEEG332 and MEEG342.

MEENG 658 Metals and Alloys 3
MEEG 663  COMPUTER-AIDED DESIGN  3
Essentials of computer-aided design for engineers: specific topics include theory and application of computer graphics, introduction to data structures, numerical methods for curve and surface fitting and generation, and solid modeling. PREREQ: MATH352.

MEEG 671  INTRODUCTION TO ROBOTICS  3
Topics include: rigid motions and transformations, forward kinematics, Denavit-Hartenberg representations, inverse kinematics, velocity kinematics, dynamics, independent joint control, multivariable control, force control. PREREQ: Requires familiarity with kinematics and basic dynamics. RESTRICTIONS: Recommended for seniors and graduate students.

MEEG 681  COMPUTER SOLUTIONS OF ENGINEERING PROBLEMS  3
Overview of numerical methods in continuum mechanics. Case studies in fluid and solid mechanics using commercially available software packages. Overview of common features, capabilities and limitations of consumer codes.

MEEG 682  CLINICAL BIOMECHANICS  3
The biomechanics and patho-mechanics of various human musculoskeletal joint systems. Normal joint anatomy and biomechanics; the mechanical effects of pathology and the goals of surgical repairs to counteract them are explored through in vitro, in vivo and mathematical modeling studies of joint system mechanics.

MEEG 683  ORTHOPEDIC BIOMECHANICS  3
Anatomy and physiology including microanatomy and mechanics of bone, cartilage, tendon and muscle. Mechanical modeling of body including joint loads, motion analysis, muscle forces and interaction with orthopedic devices. PREREQ: MEEG211 and MEEG215.

MEEG 684  BIOMATERIALS AND TISSUE ENGINEERING  3
Biomaterials for mechanical replacement of orthopaedic tissues; bone, cartilage, ligament, tendon and whole joint systems. Topics include normal tissue mechanics and biocompatibility, mechanical behavior, degradation and host response to biomaterials. Experimental methods to assess biomaterials along with design and manufacturing considerations for joint and tissue replacements.

MEEG 690  INTERMEDIATE ENGINEERING MATHEMATICS  3

MEEG 801  ADVANCED THERMODYNAMICS  3
Critical examination of thermodynamic principles, equations of state for liquids, gases and mixtures. Interpretation of thermodynamic functions and applications to processes, reactions and equilibrium states.

MEEG 803  CONVECTION HEAT TRANSFER  3
Forced convection heat transfer in laminar and turbulent boundary layers including viscous dissipation effects. Forced convection heat transfer in pipes and external boundary layers. Free convection boundary layers. PREREQ: MATH352.

MEEG 805  SPECIAL TOPICS IN THERMODYNAMICS  3
Selection of topics that may include thermodynamics of irreversible processes, statistical mechanics, nonequilibrium statistical mechanics, thermodynamics of materials with memory, etc.

MEEG 811  SANDWICH STRUCTURES  3
Composite and isotropic sandwich structures are studied for stresses, deformations, buckling loads, natural frequencies and dynamic response under mechanical and environmental loads, involving honeycomb, solid, foam, web and truss core sandwich comprising beam, plate, ring and shell structures. Design and minimum weight optimization are treated.

MEEG 813  THEORY OF ELASTICITY  3

MEEG 814  THEORY OF PLASTICITY  3

MEEG 816  ADVANCED CONTINuum MECHANICS  3
A rigorous study of kinematics of finite deformation and the field equations of mechanics and thermodynamics of continua. Tensor analysis employed throughout.

MEEG 817  COMPOSITE MATERIALS  3
Introduction, thermoelastic behavior of laminated composites, statistical strength theories of continuous-fiber composites, short-fiber composites, hybrid composites, two-dimensional textile structural composites, three-dimensional textile structural composites, flexible composites, and nonlinear elastic finite deformation of flexible composites. May be cross-listed with MSEG817. PREREQ: MEEG610 or MEEG616 or MEEG617.

MEEG 818  PLATES AND SHELLS IN AEROSPACE STRUCTURES I  3

MEEG 819  PLATES AND SHELLS IN AEROSPACE STRUCTURES II  3
General theory of thin shells from three-dimensional equations of elasticity; shells of revolution under axially symmetric loads; asymmetric loads; thermoelastic effects; general bending theory, membrane theory, inextensional theory; D'onnell equations; edge load solutions; orthotropic shells, laminated shells.

MEEG 821  ADVANCED DYNAMICS  3
General principles of spatial dynamics. Lagrangian and Hamiltonian methods. Application to engineering problems.

MEEG 823  VIBRATION ANALYSIS  3
Engineering analysis of the vibrations of machines and structures. Free, forced and random vibrations with emphasis on linear, multidegree-of-freedom systems by matrix and energy methods. Introduction to the Lagrangian method and normal coordinate analysis of complex systems.

MEEG 824  STRUCTURAL DYNAMICS AND CONTROL  3
Reviews vibration analysis of uniform/composite beams, plates and shells. Introduces analysis of structural sound radiation into enclosures and open field. Structural vibration controls and feedback strategies including modal, natural and optimal controls and uniform damping. Reduction of structural sound radiation by adaptive feedback structural controls. PREREQ: MEEG211, MEEG311 and MATH352.

MEEG 830  SPECIAL TOPICS IN FLUID MECHANICS  3
Offered occasionally and with varying subject matter. Topics may include turbulence, plasma kinetic theory, stability, etc.

MEEG 831  FLUID DYNAMICS  3
Bodies, configurations and motions. Kinematics and basic laws. Constitutive theory, simple fluids, viscometric motion. Differential, rate type and integral models. Navier-Stokes stability theory, uniqueness. PREREQ: MATH630, MEEG690, or permission of instructor.

MEEG 832  FLUID DYNAMICS II  3
Rotational and irrotational flows, potential theory, airfoils, creeping motion, lubrication theory, wave motion, compressibility, supersonic flow and shock waves, and hydrodynamic stability.

MEEG 840  SPECIAL TOPICS IN CONTINUUM MECHANICS  3
Study of advanced principles of continuum mechanics in one or more special fields. Topics selected by instructor. Special subjects may include the general theory of constitutive equations, hyperelasticity, electroelasticity, hypoelasticity, simple and nonsimple fluids, and solutions of special problems in these areas.

MEEG 855  PRINCIPLES OF COMPOSITES MANUFACTURING  3
Fundamental principles and an application involving composites manufacturing are introduced. Modeling of such processes is emphasized and a specific project is required. Assignments include open-ended problems. Areas of manufacturing include: injection molding, compression molding, filament winding, pulltrusion and resin transfer molding.

MEEG 856  NANOCRYSTALLINE AND NANOCOMPOSITE MATERIALS  3
Covers developments in polymer, ceramic and metal nano systems, current applications, major processing routes, and the novel mechanical and physical properties of nanocomposites.

MEEG 862  ADVANCED ENGINEERING ANALYSIS  3
Emphasis on asymptotic and perturbation methods. Topics from among the following: steepest descent and stationary phase, phase plane; asymptotic analysis of ODEs and PDEs using such methods as WKB, matched asymptotic expansions, Padé approximants, straining, and multiple scales; similarity methods; catastrophe theory; and chaos. Engineering applications.
MEEG 869  MASTER’S THESIS  1-6
Experimental investigation conducted for the purpose of contributing new useful data and theory in some field of mechanical engineering. Although supervised, investigation in independent in character to encourage development of initiative.

MEEG 871  RANDOM VIBRATIONS  3
PREREQ: CIEG311 (for CIEG students), MEEG311 (for MEEG students). Knowledge of MEEG624 is desirable but not required.

MEEG 872  PLANNING AND OPTIMIZATION OF DYNAMIC SYSTEMS  3
Overview of cutting edge research methods in planning, control and optimization of dynamic systems that integrate tools from nonlinear systems theory, motion planning and functional optimization.
REstrictions: Permission of instructor required.

MEEG 873  APPLIED NONLINEAR CONTROL  3
PREREQ: MEEG624 or equivalent, MEEG690, and permission of instructor.

MEEG 881  ADVANCED MUSCULOSKELETAL BIOMECHANICS  3
Examines current topics in biomechanics research including musculoskeletal modeling, muscle physiology, anthropometric analysis, biomedical imaging techniques, neural control of movement and/or clinical biomechanics.
PREREQ: MEEG612 and MEEG683.

MEEG 891  ADVANCED ENGINEERING MATHEMATICS  3
Integral transform and Green’s Function Solution of Partial Differential Equations, complex variables, variational calculus and introduction to perturbation methods.
PREREQ: MEEG690.

MEEG 964  PRE-CANDIDACY STUDY  3-12 PF
Research and readings in preparation of dissertation topic and/or qualifying examinations for doctoral students before admission to candidacy but after completion of all required course work.
RESTRICTIONS: Not open to students who have been admitted to candidacy.

MEEG 969  DOCTORAL DISSERTATION  1-12 PF

MILITARY SCIENCE

MLSC 105  INTRODUCTION TO LEADERSHIP I  1
Introduction to leadership principles using case studies, historical perspectives and hands-on leadership opportunities. Learn to rappel, use a map and compass, understand the basics of physical fitness and familiarize with Army traditions and ceremonies. No military obligation associated with this course.

MLSC 106  INTRODUCTION TO LEADERSHIP II  1
Continues to build on the basics of MLSC105. Provides additional leadership opportunities and expands upon leadership theory. Learn basic rifle marksmanship, develop public presentation abilities and continue physical fitness development. No military obligation associated with this course.

MLSC 205  BASIC LEADERSHIP I  1
Enhances understanding of human behavior, leadership techniques and management and planning structures. Builds leadership competencies through leadership opportunities with structured evaluations and feedback. Learn about the various branches and job opportunities in the Army. No military obligation associated with this course.

MLSC 206  BASIC LEADERSHIP II  1
Continues to build on the basics of MLSC205. Learn small unit tactics, how to handle up to ten people in stressful situations with feedback on performance. Further develop skills with map and compass, weapons safety and emergency first aid techniques for basic life saving. No military obligation associated with this course.

MLSC 215  LEADER DEVELOPMENT  4
An introductory six week off-campus, hands-on leadership education and assessment course. Real life individual and collective leadership challenges and opportunities. All expenses paid. Multiple scholarship opportunities.
RESTRICTIONS: Permission of instructor required.

MLSC 305  APPLIED LEADERSHIP I  2
Advanced training in military leadership. One of two courses designed to prepare cadets for the ROTC Advanced Camp/Nurse Summer Training Program. Focuses on leadership development through multiple, small unit leadership opportunities and counseling. Fine tunes skills learned in the previous two years of Military Science, ROTC Basic Camp or prior military service, especially marksmanship, land navigation, drill and ceremonies and physical fitness. Commitment to military service required.
RESTRICTIONS: Requires permission of instructor.

MLSC 306  APPLIED LEADERSHIP II  2
Continues to build on the basics of MLSC305. Completes preparation for Advanced Camp/Nurse Summer Training Program and focuses on leadership at the platoon and company level. Small unit tactics and training are emphasized. Information is provided to help the student make wise decisions about military service options. Commitment to military service required.
PREREQ: MLSC305.

MLSC 315  LEADER EVALUATION  4
An advanced six week off-campus, hands-on leadership education and assessment course. Real life individual and collective leadership challenges and opportunities. All expenses paid.
PREREQ: MLSC305 and MLSC306.
RESTRICTIONS: Requires permission of instructor.

MLSC 365  MILITARY HISTORY STUDIES  3
Selected topics in American military history, current military trends and future military requirements.

MLSC 366  INDEPENDENT STUDY  1-3

MLSC 405  ADVANCED LEADERSHIP I  2
Prepares cadets for commissioning by refining professional skills and leadership ability. Students assigned leadership positions and function as commanders and staff officers in planning and executing cadet battalion activities. Focuses on technical skills needed to accomplish assigned missions and other topics which expand cadet knowledge of Army systems and procedures. Commitment to military service required.
PREREQ: MLSC306.

MLSC 406  ADVANCED LEADERSHIP II  2
Builds on leadership skills from MLSC405 and helps complete the transition from cadet to lieutenant. Cadets are assigned leadership positions to broaden their leadership experience. Focuses on officer professional development subjects needed to manage a military career and personal affairs. Commitment to military service required.
PREREQ: MLSC306.

MLSC 466  INDEPENDENT STUDY  1-3

MATERIALS SCIENCE

MSEG 302  MATERIALS SCIENCE FOR ENGINEERS  3
Crystal binding and structure; energetics and structure of lattice defects; elasticity, plasticity, and fracture; phase equilibria and transformations; relations of structure and treatment to properties; structures of inorganic and organic polymers; and electronic and magnetic properties.

MSEG 366  INDEPENDENT STUDY  1-6

MSEG 406  CORROSION AND PROTECTION  3
PREREQ: CHEM103/104 or equivalent, MSEG302 or consent of instructor. Physical chemistry helpful.

MSEG 410  EXPERIMENTAL MECHANICS OF COMPOSITE MATERIALS  3
Study of the micromechanical and thermomechanical response of composite materials. Execution and assessment of experiments conducted to investigate strength and stiffness characteristics of composite materials. May be cross-listed with CIEG410.

MSEG 420  CAREER SURVIVAL OUTSIDE THE UNIVERSITY  1
Provides mechanisms to overcome cultural barriers existing between university and industrial cultures. Topics include leadership vs. management, professional and cultural ethics, individual responsibility vs. teamwork, and networking and mentorship in accomplishing career goals. Includes guest speakers from local industries, technical writing and oral communication exercises.
MSEG 446  SENIOR RESEARCH  1-6
Research general areas of materials science and/or engineering under the direction of a member of the materials science faculty or other faculty in science or engineering subject to the approval of the materials science chair.
RESTRICTIONS: Open to seniors only. Science background required.

MSEG 466  INDEPENDENT STUDY  1-6
MSEG 601  STRUCTURE AND PROPERTIES OF POLYMER MATERIALS  3
Measurement and control of the microstructure and properties of solid polymers. Structure generation, structure-property models and effects of processing on properties. May be cross-listed with CHEG601. PREREQ: MSEG302.

MSEG 602  STRUCTURE OF MATERIALS  3

MSEG 603  ANALYTICAL TECHNIQUES IN MATERIALS SCIENCE  3

MSEG 604  PHASE TRANSFORMATIONS  3

MSEG 606  CORROSION AND PROTECTION  3
Degradation of structural materials through interaction with their environment. Electrochemical attack on alloys and its relation to metallurgical structure. Forms of corrosion including high temperature oxidation and biological effects. Corrosion monitoring and deterioration of polymers, concrete and advanced materials. Emphasis on materials selection and corrosion control methods. PREREQ: CHEM103/104 or equivalent, MSEG302 or consent of instructor. Physical chemistry helpful.

MSEG 607  PHYSICAL PROPERTIES OF MATERIALS I  3
Basic models of electrical, magnetic optical and thermal properties of solid materials. Introduction to quantum physics to describe electronic structure of atoms, atomic bonds and crystals. Electronic, magnetic and optical effects in metals, semiconductors, ceramics, polymers and amorphous materials. Operation of basic electronic devices and semiconductor. PREREQ: MSEG302 and PHYS208.

MSEG 610  EXPERIMENTAL MECHANICS OF COMPOSITE MATERIALS  3
Study of the micromechanical and theromechanical response of composite materials. Execution and assessment of experiments conducted to investigate strength and stiffness characteristics of composite materials. May be cross-listed with CIEG610.

MSEG 615  MECHANICAL PROPERTIES OF MATERIALS  3

MSEG 616  CHEMISTRY AND PHYSICS OF SURFACES AND INTERFACES  3
See CHEG616 for course description.

MSEG 618  FRACTURE OF SOLIDS  3
See MEEG618 for course description.

MSEG 620  CAREER SURVIVAL OUTSIDE THE UNIVERSITY  1
Provides mechanisms to overcome cultural barriers existing between university and industrial cultures. Topics include leadership vs. management, professional and cultural ethics, individual responsibility vs. teamwork, and networking and mentorship in accomplishing career goals. Includes guest speakers from local industries, technical writing and oral communication exercises.

MSEG 624  PRACTICAL ELECTRON MICROSCOPY  3
Basic theories and in-depth practical aspects of scanning electron microscopy, transmission electron microscopy, elemental analysis, and sample preparation techniques. Hands-on oriented. For some lab assignments, students can be accommodated to prepare and analyze real samples from their own research.

MSEG 630  INTRODUCTION TO SCIENCE AND ENGINEERING OF POLYMER SYSTEMS  3
Provides an understanding of the science and engineering of macromolecules from a structure/property perspective. Topics include polymerization, chain structure and configuration, polymer size and shape, phase separation behavior, amorphous and crystalline state, glassy-rubber transition, cross linking/rubber elasticity, viscoelasticity, rheology polymer processing and mechanical behavior.

MSEG 632  PRINCIPLES OF POLYMERIZATION  3
Provides background in the theoretical and synthetic considerations of polymer synthesis. Topics include theoretical descriptions of molecular weight distributions, step growth polymerizations, chain growth polymerizations, living polymerizations, as well as chemical strategies for the production of various polymers. Specialized topics in the current polymer chemistry literature may also be discussed. PREREQ: MSEG630 to be taken as a prerequisite or corequisite.

MSEG 633  POLYMER SYNTHESIS AND CHARACTERIZATION LAB  3
Provides direct laboratory experience with the synthesis of a variety of conventional polymers via step growth, radical, and ionic polymerization methods. Polymers synthesized are also characterized via common polymer characterization methods such as IR spectroscopy, gel permeation chromatography, differential scanning calorimetry, and NMR spectroscopy. PREREQ: MSEG632 to be taken as a prerequisite or corequisite.

MSEG 635  PRINCIPLES TO POLYMER PHYSICS  3
Chain statistics, thermodynamics, and kinetics are discussed in the context of modern polymer physics characterization techniques, such as dynamic and static light scattering and elastic/metal neutron scattering.

MSEG 666  SPECIAL PROBLEM  1-12

MSEG 803  EQUILIBRIA IN MATERIAL SYSTEMS  3

MSEG 804  KINETICS IN MATERIAL SYSTEMS  3

MSEG 806  PHYSICAL PROPERTIES OF SOLIDS  3

MSEG 807  PHYSICAL PROPERTIES OF MATERIALS II  3
Continuation of MSEG607 with emphasis on the electrical transport properties of material. Topics include electronic structure and energy band diagrams of semiconductors, metals and insulators; Fermi surfaces; dynamics of electrons; Semiconductor materials and devices; band structure and transport properties of selected semiconductors; band-gap engineering; novel materials systems; electron emission; particularly field emission. PREREQ: MSEG607.

MSEG 811  ADVANCED TOPICS IN MATERIALS  1-3
Discussion of a topic of current interest in the science or engineering of materials.

MSEG 817  COMPOSITE MATERIALS  3
See MEEG817 for course description.

MSEG 821  DIFFRACTION OF RADIATION BY MATTER  3
Theory and analysis of diffraction from ideal and imperfect crystals, gases and liquids, and other atomic aggregations.

MSEG 823  TRANSMISSION ELECTRON MICROSCOPY IN MATERIALS SCIENCE  3

MSEG 866  SPECIAL PROBLEM  1-12

MSEG 868  RESEARCH  1-9
**MUSEUM STUDIES**

**MSST 205**  **SCIENCE AND THE DETECTION OF ART FORGERIES**  3
Concepts from many scientific disciplines are useful for interpreting works of art. Analytical techniques based on those concepts often reveal art forgeries. Case studies will use basic scientific principles to investigate a wide variety of known or alleged art forgeries. May be cross-listed with ARTH205.

**MSST 215**  **QUEER SEXUAL IMAGERY IN THE VISUAL ARTS**  3
Introduction to the diversities of representation of the human body in western visual art with an emphasis on coded as well as explicit images of queer sexuality. May be cross-listed with WOMS215.

**MSST 403**  **HISTORY, PHILOSOPHY, FUNCTIONS AND FUTURE OF MUSEUMS**  3
Introduction to philosophy, purposes, structure, historical development and future of museums, and botanical and zoological gardens. Examines functions of collection, conservation, research, exhibition/interpretation, and social/cultural services; museum field growth. May be cross-listed with ART403 and/or HIST403.

**MSST 408**  **PUBLIC HISTORY: RESOURCES, RESEARCH AND PRACTICE**  3
See HIST408 for course description.

**MSST 444**  **TECHNOLOGY OF CULTURAL MATERIALS: CERAMICS AND GLASS**  3
Nature of raw materials, processing methods, chemistry and structure of finished products, deterioration mechanisms and effects, scientific methods of analysis, and case studies of ancient and historic ceramic and glass objects from the point of view of technology, aesthetics and function. Case studies from a wide variety of cultural traditions. May be cross-listed with ANTH444 and/or ARTC444.

**MSST 445**  **TECHNOLOGY OF CULTURAL MATERIALS: METALS**  3
Nature of raw materials, processing methods, chemistry and structure of finished products, deterioration mechanisms and effects, scientific methods of analysis, and case studies of ancient and historic metal objects from the point of view of technology, aesthetics and functions. Case studies from a wide variety of cultural traditions. May be cross-listed with ANTH445 and/or ARTC445.

**MSST 463**  **HISTORICAL ARCHEOLOGY AND THE PUBLIC**  3
See ANTH463 for course description.

**MSST 464**  **MUSEUM STUDIES INTERNSHIP**  3
Internship practicum supplementing theoretical and methodological background in administration, collections management, exhibition, research, interpretation, and public programming and services of museums. Students intern at the University museum or other acceptable museum, related institution or organization in the United States. PREREQ: MSST403.

**MSST 480**  **STUDIO IN THE MATERIALS AND TECHNIQUES OF DRAWING IN THE WEST**  3
Lecture-studio presentation on materials and tools, supports and techniques of wet and dry media drawing in the West from about the year 1400 to the present. Topics include the development and manufacture of paper, pens, brushes, inks, watercolor paint, charcoal, metal points, graphite pencils, natural and fabricated chalks, crayons, pastels, erasers and fixatives. Studio reconstructions of masterworks, lectures and library research. May be cross-listed with ART424, ARTC480 and/or ARTH480. RESTRICTIONS: Requires permission of instructor.

**MSST 485**  **COLOR MIXING AND MATCHING**  3
Lecture-studio presentation covering analytical and practical aspects of mixing and matching colorants without instrumentation. Pigments, dyes and the manufacture of paint studied. Major topics include color interaction and the Munsell system of color description. May be cross-listed with ART426 and/or ARTC485. RESTRICTIONS: Requires permission of instructor.

**MSST 488**  **STUDIO MATERIALS AND TECHNIQUES OF PAINTING I**  3
Major masters and the materials, tools, supports and techniques of architectural painting and panel painting in tempera from about 1500 BC to AD 1500. Topics include true fresco and egg tempera painting. Studio reconstructions, lectures and library research. May be cross-listed with ART427, ARTC488 and/or ARTH488. RESTRICTIONS: Requires permission of instructor.

**MSST 489**  **STUDIO MATERIALS AND TECHNIQUES OF PAINTING II**  3
Major masters and the materials, tools and techniques of indirect and direct oil painting. Time frame: 1500 to the present. Major topics include the development of canvas, brushes, oil paint, mediums, varnishes, solvents and the complex relationship between indirect and direct techniques. Includes studio reconstructions of masterworks, lectures and library research. May be cross-listed with ART428, ARTC489 and/or ARTH489. RESTRICTIONS: Requires permission of instructor.

**MSST 490**  **STUDIO IN THE MATERIALS AND TECHNIQUES OF PRINTMAKING I**  3
Major masters and the materials, tools and techniques of relief, planographic and intaglio printmaking. Time frame: ca. 1400-1920. Major topics include woodcut, copperplate engraving, etching, drypoint, aquatint, mezzotint, lithograph and wood engraving. Studio reconstructions, lectures and library research. May be cross-listed with ART429, ARTC490 and/or ARTH490. RESTRICTIONS: Requires permission of instructor.

**MSST 606**  **ISSUES IN AMERICAN MATERIAL CULTURE**  3
See EAA660 for course description. RESTRICTIONS: Requires permission of instructor.

**MSST 608**  **PUBLIC HISTORY: RESOURCES, RESEARCH, AND PRACTICE**  3
See HIST608 for course description.

**MSST 629**  **THEORY AND PRACTICE OF HISTORICAL PRESERVATION PLANNING**  3
See UAPP629 for course description.

**MSST 644**  **TECHNOLOGY OF CULTURAL MATERIALS: CERAMICS AND GLASS**  3
Nature of raw materials, processing methods, chemistry and structure of finished products, deterioration mechanisms and effects, scientific methods of analysis, and case studies of ancient and historic ceramic and glass objects from the point of view of technology, aesthetics and function. Case studies from a wide variety of cultural traditions. May be cross-listed with ANTH644 and/or ARTC644.

**MSST 645**  **TECHNOLOGY OF CULTURAL MATERIALS: METALS**  3
Nature of raw materials, processing methods, chemistry and structure of finished products, deterioration mechanisms and effects, scientific methods of analysis, and case studies of ancient and historic metal objects from the point of view of technology, aesthetics and functions. Case studies from a wide variety of cultural traditions. May be cross-listed with ANTH645 and/or ARTC645.

**MSST 654**  **VERNACULAR ARCHITECTURE**  3
See HIST654 for course description.

**MSST 663**  **HISTORICAL ARCHEOLOGY AND THE PUBLIC**  3
See ANTH663 for course description.

**MSST 680**  **STUDIO IN THE MATERIALS AND TECHNIQUES OF DRAWING IN THE WEST**  3
Lecture-studio presentation on materials and tools, supports and techniques of wet and dry media drawing in the West from about the year 1400 to the present. Topics include: the development and manufacture of paper, pens, brushes, inks, watercolor paint, charcoal, metal points, graphite pencils, natural and fabricated chalks, crayons, pastels, erasers and fixatives. Studio reconstructions of masterworks, lectures and library research. May be cross-listed with ART682, ARTC680 and/or ARTH680. RESTRICTIONS: Requires permission of instructor.

**MSST 681**  **MATERIALS AND TECHNIQUES OF THE CONTEMPORARY PAINTER AND DRAFTSMAN**  3
Twentieth-century artist's materials. Topics: acrylic emulsion and acrylic solution alkyd resin, PVA paints: collage-assembly; solvent photo transfer; synthetic fiber canvas, paper, panels, oil pastels, pastel sticks, felt-tip markers, colored inks and pencils: airbrush spray gun; and non-art materials. Potential health hazards. Conservation topics: pH, lightfastness, adhesion and storage environments. May be cross-listed with ART681, ARTC681 and/or ARTH681.
MSST 685  COLOR MIXING AND MATCHING  3
Lecture-studio presentation covering analytical and practical aspects of mixing and matching colorants without instrumentation. Pigments, dyes and the manufacture of paint studied. Major topics include color interaction, and the Munsell system of color description. May be crosslisted with ART685 and/or ARTC685.
REQUIREMENTS: Requires permission of instructor.

MSST 688  STUDIO MATERIALS AND TECHNIQUES OF PAINTING I  3
Major masters and the materials, tools, supports and techniques of architectural and panel painting in tempera from about 1500 BC to AD 1500. Topics include true fresco and egg tempera painting. Studio reconstructions, lectures and library research. May be crosslisted with ART688, ARTC688 and/or ARTH688.
REQUIREMENTS: Requires permission of instructor.

MSST 689  STUDIO MATERIALS AND TECHNIQUES OF PAINTING II  3
Major masters and the materials, tools and techniques of indirect and direct oil painting. Time frame: 1500 to the present. Topics include the development of canvas, brushes, oil paint, mediums, varnishes, solvents and the complex relationship between indirect and direct techniques. Includes studio reconstruction of masterworks, lectures and library research. May be crosslisted with ART689, ARTC689 and/or ARTH689.
REQUIREMENTS: Requires permission of instructor.

MSST 690  STUDIO IN THE MATERIALS AND TECHNIQUES OF PRINTMAKING  3
Major masters and the materials, tools, and techniques of relief, planographic and intaglio printmaking. Time frame: ca. 1400-1920. Major topics include woodcut, copperplate engraving, etching, drypoint, aquatint, mezzotint, lithograph and wood engraving. Studio reconstructions, lectures and library research. May be crosslisted with ART690, ARTC690 and/or ARTH690.
REQUIREMENTS: Requires permission of instructor.

MSST 801  MUSEUM CURATORSHIP: COLLECTIONS MANAGEMENT  3
Collections management theory and practices that focus on the administration, handling, physical care, recording and study of museum collections. Combines classroom instruction, demonstrations and field trips with "hands on" projects in the University Gallery and other area museums.
REQUIREMENTS: Open to graduate students only.

MSST 802  LEADERSHIP AND MANAGEMENT OF MUSEUMS  3
Treats governance and administrative operations of museums, highlighting planning, legal and organizational structure, trustees and directors, personnel management, finance, development, marketing, merchandising, maintenance and security, libraries and archives, publishing, computer applications, public programming, cultural tourism and professional standards and ethics.
REQUIREMENTS: Open to graduate students only. Includes field trips and team task force project.

MSST 803  MUSEUMS AND MODERN TECHNOLOGY  3
Examines the use of digital technology in museums. Topics include communication strategies, digital image processing, collections databases, geographic information systems, CAD, animation, exhibitions, and web design. Students will plan and prepare a web site that deals with a museum-related topic.

MSST 804  MUSEUM INTERNSHIP  3
Internship practice in administration, collections management, exhibition and interpretation at museums and related institutions. Students spend ten full weeks, or the equivalent, at the University museum, Winterthur Museum, Hagley Museum, Longwood Gardens or other acceptable institution. May be crosslisted with HIS804.
REQUIREMENTS: Open to graduate students only. Requires at least one semester course in museum studies and permission of instructor.

MSST 805  HISTORICAL PROPERTIES  3
Administration and interpretation of historical properties, including historic site surveys, preservation research, building restoration, conservation techniques and the establishment and attainment of interpretive objectives. Field trips to area historic sites. Combines classroom instruction and work projects at area historic sites.
REQUIREMENTS: Open to graduate students only.

MSST 807  MUSEUM CURATORSHIP: TEMPORARY AND ECONOMICAL EXHIBITS  3
Focuses on the planning, designing and fabrication of economical museum exhibits for changing exhibition rooms and alternative spaces. Emphasizes time-, money- and labor-saving techniques. Students design and produce a temporary exhibit in the University Gallery or in a local museum.
REQUIREMENTS: Open to graduate students only.

MSST 808  MUSEUM EDUCATION AND INTERPRETATION  3
The theory, strategies, practices, evaluation and administration of learning in a museum environment with emphasis on interpretation of collections through a variety of instructional means. Lectures, discussions, field trips, program planning, curriculum development, proposal writing, audience studies, practice teaching and special project work with area museums.
REQUIREMENTS: Open to graduate students only.

MSST 810  ENVIRONMENTAL INSTITUTION MANAGEMENT  6
Seminars at Delaware Nature Society headquarters with staff and guest lecturers including attorneys, investment counselors, University faculty and museum lecturers. Experiences at area environmental institutions. Covers goal definition, long-range planning, building/grounds management, programming, fund raising, financial management, personnel policies, ethics, volunteers, publicity and publications, legal considerations and conservation/preservation roles.
REQUIREMENTS: Open to graduate students only. Permission of instructor required.

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### Music

**MUSC 100 Recital Attendance** 0 PF  
A recital experience; see Department of Music Student Handbook for details.  
**RESTRICTIONS:** May be repeated. Offered in fall and spring semesters.

**MUSC 101 Appreciation of Music** 3  
Introduction to Western music literature through a nontechnical presentation of various musical styles and forms.  
**RESTRICTIONS:** Open to nonmusic majors. Offered in fall and spring semesters.

**MUSC 102 Appreciation of Music** 3  
Music literature through a nontechnical presentation of various musical styles and forms. Continuation of MUSC101 with emphasis on the larger forms - symphonies, operas, oratorios, concertos - and the 20th century.  
**PREREQ:** MUSC101 or permission of instructor.

**MUSC 103 Introduction to Italian Opera** 3  
Explores the world of opera including categories of singers; types of operas, e.g., opera seria and opera buffa; and the roles of the chorus. Includes experience seeing an opera performed live.  
**RESTRICTIONS:** Offered in fall semester only.

**MUSC 104 Introduction to Opera** 3  
Introduction to opera, concentrating on opera comique, singspiel, operetta, baroque opera, seria, and Wagnerian music drama. Explores philosophies associated with music in the context of opera. Time span covered is 1607 to the present.  
**RESTRICTIONS:** Offered in spring semester only.

**MUSC 105 Fundamentals of Music I** 3  
Introduction into the elements of music theory including ear training, music reading and harmony with keyboard application.  
**RESTRICTIONS:** Designed for nonmusic majors.

**MUSC 106 Fundamentals of Music II** 3  
Continuation of MUSC105. Survey and analytical approach to music styles. Composing original works for voice and instruments.  
**PREREQ:** MUSC-105  
**RESTRICTIONS:** Open to nonmusic majors.

**MUSC 107 History of Rock** 3  
The study of various styles of rock music. Introduction to folk, country, blues, and jazz as predecessors to rock. Intended for the non-music major. No music reading skills required.  
**RESTRICTIONS:** May be cross-listed with BAMS107.

**MUSC 108 University Singers** 0-1  
Members enter by audition. A chorus of sopranos and altos that performs its own concerts and may also perform with other choirs.  
**RESTRICTIONS:** May be repeated for credit. Offered in fall and spring semesters. Students may sign up for 0-credit only if they have reached the 17-credit limit. Music majors and minors must be enrolled for credit in at least one departmentally approved ensemble during each semester of private study.

**MUSC 109 Schola Cantorum** 0-1  
Members enter by audition. A chorus of 100+ voices that rehearses en masse on Monday nights and performs large-scale choral works. Smaller sections perform independently as well.  
**RESTRICTIONS:** May be repeated for credit. Offered in fall and spring semesters. Students may sign up for 0-credit only if they have reached the 17-credit limit. Music majors and minors must be enrolled for credit in at least one departmentally approved ensemble during each semester of private study.

**MUSC 110 Chorale** 0-1  
Members enter by audition. Chorale is the university’s most select chorus of mixed voices.  
**RESTRICTIONS:** May be repeated for credit. Offered in fall and spring semesters. Students may sign up for 0-credit only if they have reached the 17-credit limit. Music majors and minors must be enrolled for credit in at least one departmentally approved ensemble during each semester of private study.

**MUSC 113 Marching Band** 1  
RESTRICTIONS: Contact the Director for detailed information. All interested percussionists, colorguard and twirlers must audition. May be repeated for credit. Offered in fall semester only.

**MUSC 114 Symphonic Band** 0-1  
The ensemble performs standard concert literature as well as new compositions. During fall semester the ensemble meets one day a week and performs one full concert. The ensemble participates in the Department of Music’s CALLOP concert.  
**RESTRICTIONS:** Requires audition. May be repeated for credit. Offered in fall and spring semesters. Students may sign up for 0-credit only if they have reached the 17-credit limit. Music majors and minors must be enrolled for credit in at least one departmentally approved ensemble during each semester of private study.

**MUSC 115 Wind Ensemble: Orchestral Winds and Percussion** 0-1  
A select 45-member group of woodwind, brass and percussion players that performs original band music, chamber music and transcriptions. The Orchestral Winds and Percussion consists of select players from the Wind Ensemble, who form the wind and percussion sections of the University Orchestra.  
**RESTRICTIONS:** Requires audition and may be repeated for credit. Offered in fall and spring semesters. Students may sign up for 0-credit only if they have reached the 17-credit limit. Music majors and minors must be enrolled for credit in at least one departmentally approved ensemble during each semester of private study.

**MUSC 116 Jazz Ensemble** 0-1  
Study and performance of the diverse styles characteristic of the medium.  
**RESTRICTIONS:** May be repeated for credit. Offered in fall and spring semesters. Students may sign up for 0-credit only if they have reached the 17-credit limit. Music majors and minors must be enrolled for credit in at least one departmentally approved ensemble during each semester of private study.

**MUSC 117 University Orchestra** 0-1  
Plays at least four public programs per year, drawn from music masterworks in all styles and periods from Baroque to Contemporary. Featured are faculty, professional soloists, conductors and collaborations with other University ensembles.  
**RESTRICTIONS:** Requires audition. May be repeated for credit. Offered in fall and spring semesters. Students may sign up for 0-credit only if they have reached the 17-credit limit. Music majors and minors must be enrolled for credit in at least one departmentally approved ensemble during each semester of private study.

**MUSC 118 Percussion Ensemble** 0-1  
Study and performance of works for percussion instruments.  
**RESTRICTIONS:** Requires audition. May be repeated for credit. Offered in fall and spring semesters. Students may sign up for 0-credit only if they have reached the 17-credit limit. Music majors and minors must be enrolled for credit in at least one departmentally approved ensemble during each semester of private study.

**MUSC 120 Pep Band** 0-1  
Attends all home basketball games performing a variety of pop, rock and jazz selections. Performs at select games during Winter Session. Attendance at these games is mandatory.  
**RESTRICTIONS:** May be repeated for credit. Offered in spring semester only. Students may sign up for 0-credit only if they have reached the 17-credit limit. Music majors and minors must be enrolled for credit in at least one departmentally approved ensemble during each semester of private study.

**MUSC 123 Steel Band** 0-1  
Teaches music and theory through rote learning, reading, and improvisation to students with no musical training. Students perform in a traditional Caribbean Steel Drum Band.  
**RESTRICTIONS:** May be repeated for credit. Offered in fall and spring semesters. Students may sign up for 0-credit only if they have reached the 17-credit limit. Music majors and minors must be enrolled for credit in at least one departmentally approved ensemble during each semester of private study.

**MUSC 124 Steel Band: Advanced Ensemble** 0-1  
Traditional Caribbean Steel Drum ensemble. Students rehearse and perform music of the Caribbean tradition.  
**PREREQ:** MUSC123 or permission of instructor.  
**RESTRICTIONS:** Permission of instructor. Students may sign up for 0-credit only if they have reached the 17-credit limit. Music majors and minors must be enrolled for credit in at least one departmentally approved ensemble during each semester of private study.

**MUSC 125 Collegium Musicum** 0-1  
Ensemble for the performance of instrumental and vocal music of the Medieval, Renaissance and Early Baroque periods. Size, instrumentation and repertoire for the group varies from semester to semester dependent upon resources at hand, players’ skills and other factors.  
**PREREQ:** Audition.  
**RESTRICTIONS:** May be repeated for credit. Offered in fall and spring semesters. Students may sign up for 0-credit only if they have reached the 17-credit limit. Music majors and minors must be enrolled for credit in at least one departmentally approved ensemble during each semester of private study.
MUSC 150 FRESHMAN HONORS PRIVATE STUDY
Private study for qualified freshman honors students. The student adds to the course title the branch of study elected: piano, organ, voice, or an orchestral instrument. Includes a one-hour studio class.
PREREQ: Requires audition.
RESTRICTIONS: Restricted to Honors students only. May be repeated for credit. Offered in fall and spring semesters.

MUSC 151 PRIVATE STUDY FOR BACHELOR OF MUSIC I
Private study for freshman Bachelor of Music students. The student adds to the course title the branch of study elected: piano, organ, voice, or an orchestral instrument. Includes a one-hour studio class.
PREREQ: Audition and acceptance into bachelor of music program.
RESTRICTIONS: For bachelor of music students only. Offered in fall and spring semesters.

MUSC 152 PRIVATE STUDY FOR BACHELOR OF MUSIC II
Continuing private study for freshman Bachelor of Music students. The student adds to the course title the branch of study elected: piano, organ, voice, or an orchestral instrument. Includes a one-hour studio class.
PREREQ: MUSC151 with a grade of C- or better.
RESTRICTIONS: For bachelor of music students only. Offered in fall and spring semesters.

MUSC 153 PRIVATE STUDY FOR BACHELOR OF ARTS AND MINORS I
Private study for bachelor of arts (music) students and music minors. The student adds to the course title the branch of study elected: piano, organ, voice, or an orchestral instrument. Includes a one-hour studio class.
PREREQ: Audition and acceptance into bachelor of arts (Music) or music minor.
RESTRICTIONS: For bachelor of arts music students and music minors only. Offered in fall and spring semesters.

MUSC 154 PRIVATE STUDY FOR MUSIC BACHELOR OF ARTS AND MINORS II
Continuing private study for bachelor of arts (music) students and music minors. The student adds to the course title the branch of study elected: piano, organ, voice, or an orchestral instrument. Includes a one-hour studio class.
PREREQ: MUSC153 with a grade of C- or better.
RESTRICTIONS: For bachelor of arts (music) students and music minors only. Offered in fall and spring semesters.

MUSC 155 PRIVATE STUDY FOR SECONDARY AND MERIT I
Private study for music majors pursuing a secondary area, and qualified students not enrolled in a music degree program. Student adds to course title the branch of study elected: piano, organ, voice, or an orchestral instrument. Includes a one-hour studio class. May be repeated for credit.
RESTRICTIONS: Requires permission of instructor. Offered in fall and spring semesters.

MUSC 156 DICTATION: ENGLISH AND ITALIAN
Study of pronunciation rules for singing in English and Italian. Includes practicum.
RESTRICTIONS: Restricted to applied music-voice majors.

MUSC 173 CLASS VOICE
Fundamentals and techniques of singing.
RESTRICTIONS: For nonmusic majors.

MUSC 174 CLASS VOICE: BEGINNING
Fundamentals of singing for the nonvocal music major. Study of basic technique, repertoire and function of vocal mechanism.
PREREQ: Requires one semester of University vocal experience.
RESTRICTIONS: Requires permission of instructor for nonmajors. Offered in spring semester only.

MUSC 175 CLASS PIANO: ELEMENTARY I
Beginning piano primarily for the vocal or instrumental music major. Basic techniques, reading, transposition and playing by ear.
RESTRICTIONS: Preference for enrollment given to music majors and minors. Nonmusic majors require permission of instructor.

MUSC 176 CLASS PIANO: ELEMENTARY II
A continuation of MUSC175. Scale and arpeggio playing, keyboard harmony, repertoire of pieces appropriate to technical ability.
PREREQ: MUSC175 and MUSC195 with grades of C- or better.
RESTRICTIONS: Preference for enrollment given to music majors and minors. Nonmusic majors require permission of instructor.

MUSC 177 CLASS GUITAR I
Introduction to the fundamentals of guitar technique and note reading for nonmusic majors. Topics include guitar history, repertoire, scales and exercises with a emphasis on classical as well as folk music. Music Education majors may also find this course particularly useful for classroom teaching.
RESTRICTIONS: Offered in fall and spring semesters.

MUSC 178 CLASS GUITAR II
A continuation of Class Guitar I with a stronger emphasis on ensemble playing and development of a repertoire.
PREREQ: MUSC177 with a grade of C- or better.
RESTRICTIONS: Offered in spring semester only.

MUSC 179 ORGAN CLASS
Students learn the basic techniques needed to play the organ. Students apply these skills in a class setting, focusing on introductory organ literature and hymn playing.
RESTRICTIONS: Requires permission of instructor.

MUSC 181 PRIVATE STUDY FOR APPLIED JAZZ STYLES AND TECHNIQUES
Private studio instruction covering improvisational techniques and interpretation used in jazz performance. Examines a cross-section of styles and repertoire.
RESTRICTIONS: Requires audition and permission of instructor. Offered in fall and spring semesters.

MUSC 182 PRIVATE STUDY FOR APPLIED JAZZ STYLES AND TECHNIQUES
Private studio instruction covering improvisational techniques and interpretation used in jazz performance. Examines a cross-section of styles and repertoire.
RESTRICTIONS: Requires audition and permission of instructor. Offered in fall and spring semesters.

MUSC 185 EAR TRAINING AND SIGHT SINGING I
Techniques of sight singing and music reading skills. Development of ability in the aural recognition of melody, harmony and rhythm.
COREQ: MUSC195.
RESTRICTIONS: Open to music majors and minors only. Offered in fall and spring semesters.

MUSC 186 EAR TRAINING AND SIGHT SINGING II
Techniques of sight singing and music reading skills. Development of ability in the aural recognition of melody, harmony and rhythm.
COREQ: MUSC196.
RESTRICTIONS: Open to music majors and minors only. Offered in spring semester.

MUSC 193 SIGHT READING AT THE KEYBOARD I
Techniques for improving coordination and musical comprehension when playing from sight at the keyboard.
RESTRICTIONS: For keyboard majors. Offered in fall and spring semesters.

MUSC 194 SIGHT READING AT THE KEYBOARD II
Continuation of MUSC193.
PREREQ: MUSC193 with a grade of C- or better.
RESTRICTIONS: For keyboard majors. Offered in fall and spring semesters.

MUSC 195 HARMONY I
COREQ: MUSC185.
RESTRICTIONS: Open to music majors and minors only. Offered in fall semester.

MUSC 196 HARMONY II
Continuation of harmony: diatonic through chromatic harmony with keyboard application. Chord structures and functional relationships. Basic melodic and contrapuntal compositional techniques. Writing, playing and analysis.
PREREQ: MUSC185 and MUSC195 with grades of C- or better.
COREQ: MUSC186.
RESTRICTIONS: Open to music majors and minors only. Offered in spring semester.

MUSC 197 JAZZ HARMONY
Study of elementary aspects of melody, harmony, texture, dynamics, rhythm and form in selected jazz and American popular literature; development of elementary aural-perceptual and compositional skills related to jazz and American popular music.
PREREQ: MUSC105 with a grade of C- or better.
RESTRICTIONS: Offered in odd numbered years, fall semesters only.

MUSC 205 MUSIC OF THE NON-WESTERN WORLD
Survey of non-Western world musical cultures utilizing textbook, reprinted reserve articles, films and in-class performance/demonstrations. Goal is the understanding and appreciation of various world musics.
MUSC 206  Music of China, Korea and Japan  
Systematically examines the origin and historical development of the musical cultures of the Far East. Studies how the musical and cultural influence of Chinese musical culture has had an enormous impact on the development of such cultures in Korea and Japan.

MUSC 207  History of Jazz  
Chronological study of the style changes in jazz from the late 19th century to the present. Emphasis on the sociological, economic and technological influences of the period and on the principal personalities who have been primarily responsible for change. May be cross-listed with BAMS207.
PREREQ: MUSC105 with a C- or better.
RESTRICTIONS: Offered in spring semester only.

MUSC 209  History of Spanish Music  
Covers the most outstanding traditions of Spanish music, including Arab-influenced Andalusian music, 13th century music, schools of the "Renacimiento", 17th century court music, the "Zarzuela", 19th century Nationalism, and the most modern tendencies of the 20th century.
RESTRICTIONS: Taught abroad only.

MUSC 210  Music of Britain  
Chronological study of music of Britain with emphasis on English music from 1485 to present. Includes music for various media (including choral, instrumental, opera) and principal British composers, relating the development of musical styles to events in British history. When taught as part of UD London Semester, will include attendance at variety of London performances.
RESTRICTIONS: Requires permission of instructor.

MUSC 211  Introduction to Music History  
Survey of selected works in music history with emphasis on selected basic terminology, forms and style changes, through score reading and listening.
PREREQ: MUSC195 with a grade of C- or better.
RESTRICTIONS: Offered in fall semester only.

MUSC 212  History of Liturgy and Hymns  
Study of the evolution, structure and content of historic liturgies and of the hymnody which developed within them. Includes an examination of Jewish and Eastern elements while focusing on the texts and music of the services and hymns of various traditions within the Western Church.

MUSC 213  French Musical Culture  
Explores the contributions of French culture to the history of Western Music. Special focus on major trends in music written and performed in Paris from the Middle Ages through the 20th century, and on the musical institutions that made Paris a world capital of music.
RESTRICTIONS: Taught abroad only.

MUSC 214  Stringed Instruments Class: Violin, Viola, Cello, Bass  
Development of performing and teaching skills.
RESTRICTIONS: Open only to music education and theory/composition majors. Offered in fall and spring semesters.

MUSC 215  High Brass Instruments Class  
Development of performing and teaching skills.
RESTRICTIONS: MUSC215 and MUSC216 to be taken consecutively in one academic year. Open only to sophomore music education and theory/composition majors. Offered in fall semester.

MUSC 216  Low Brass Instruments Class  
Development of performing and teaching skills.
RESTRICTIONS: MUSC215 and MUSC216 to be taken consecutively in one academic year. Open only to sophomore music education and theory/composition majors. Offered in spring semester.

MUSC 217  Woodwind Instruments Class I  
Development of performing and teaching skills.
RESTRICTIONS: MUSC217 and MUSC218 to be taken consecutively in one academic year. Open only to freshman music education and theory/composition majors. Offered in fall semester.

MUSC 218  Woodwind Instruments Class II  
Development of performing and teaching skills.
RESTRICTIONS: MUSC217 and MUSC218 to be taken consecutively in one academic year. Open only to sophomore music education and theory/composition majors. Offered in spring semester.

MUSC 219  Percussion Instruments  
Development of performing and teaching skills.
RESTRICTIONS: Open only to music education and theory/composition majors. Offered in spring semester.

MUSC 220  Marching Band Techniques  
Focuses on designing and charting a show of the complete contemporary marching band. Overview of history and development of the marching band, as well as "hands-on" sessions in marching percussion and color guard.
PREREQ: MUSC113 with a grade of C- or better.
RESTRICTIONS: Offered spring semester only.

MUSC 221  Marching Percussion Techniques  
Focuses on advancing skills on the marching snare drum, multi-tenors, bass drum, cymbals or front ensemble. Emphasizes techniques through an opportunity to learn basic arranging skills. Open to students of all skill levels.
RESTRICTIONS: Offered spring semester only.

MUSC 241  Accompanying Chamber Music: Piano  
Accompanying vocalists and instrumentalists in the performance of chamber music with keyboard.
PREREQ: Sight-Reading Placement Test.
RESTRICTIONS: Requires permission of instructor. Offered fall and spring semesters. May be repeated 4 times for credit.

MUSC 251  Private Study for Bachelor of Music III  
Continuing private study for sophomore bachelor of music students. The student adds to the course title the branch of study elected: piano, organ, voice, or an orchestral instrument. Includes a one-hour studio class.
PREREQ: MUSC108 with a grade of C- or better.
RESTRICTIONS: For Bachelor of Music students only. Offered fall and spring semesters.

MUSC 252  Private Study for Bachelor of Music IV  
Continuing private study for sophomore bachelor of music students. The student adds to the course title the branch of study elected: piano, organ, voice, or an orchestral instrument. Includes a one-hour studio class. In lieu of a jury, the student performs a Sophomore Review which must be passed in order to continue on to Junior-level private study (see student handbook for details).
PREREQ: MUSC251 with a grade of C- or better.
RESTRICTIONS: For Bachelor of Music students only. Offered fall and spring semesters.

MUSC 253  Private Study for Bachelor of Arts and Minors III  
Continuing private study for bachelor of arts (music) students and music minors. The student adds to the course title the branch of study elected: piano, organ, voice, or an orchestral instrument. Includes a one-hour studio class.
PREREQ: MUSC251 with a grade of C- or better.
RESTRICTIONS: For Bachelor of Arts (music) students and music minors only. Offered fall and spring semesters.

MUSC 254  Private Study for Music Bachelor of Arts and Minors IV  
Continuing private study for bachelor of arts (music) students and music minors. The student adds to the course title the branch of study elected: piano, organ, voice, or an orchestral instrument. Includes a one-hour studio class.
PREREQ: MUSC253 with a grade of C- or better.
RESTRICTIONS: For Bachelor of Arts (music) students and music minors only. Offered fall and spring semesters only.

MUSC 257  Diction: German  
A study of pronunciation rules for singing in German. Includes practical.
COREQ: Enrollment in applied study.
RESTRICTIONS: Offered fall semester only.

MUSC 258  Diction: French  
A study of pronunciation rules for singing in French. Includes practical.
COREQ: Enrollment in applied study.
RESTRICTIONS: Offered spring semester only.

MUSC 275  Class Piano: Intermediate I  
Piano techniques applicable to the levels and needs of the students; a continuation of reading and transposition; and improvisation and repertory of grade two pieces.
PREREQ: MUSC176 and MUSC196 with grades of C- or better.
RESTRICTIONS: Restricted to bachelor of music majors, or permission of instructor. Offered in fall semester.

MUSC 276  Class Piano: Intermediate II  
A continuation of MUSC275.
PREREQ: MUSC275 with a grade of C- or higher.
RESTRICTIONS: Restricted to bachelor of music majors and music minors, or permission of instructor. Offered in spring semester.

MUSC 279  Introduction to the Organ  
Designed to provide information about the organ: its history, use and literature as well as tonal and mechanical aspects of its design.
MUSC 281 Private Study for Applied Jazz Styles and Techniques 2
Private studio instruction covering improvisational techniques and interpretation used in jazz performance. Examines a cross-section of styles and repertoire. PREREQ: MUSC182 with a grade of C- or better. RESTRICTIONS: Requires permission of instructor. Offered fall and spring semesters.

MUSC 282 Private Study for Applied Jazz Styles and Techniques 2
Private studio instruction covering improvisational techniques and interpretations used in jazz performance. Examines a cross-section of styles and repertoire. PREREQ: MUSC281 with a grade of C- or better. RESTRICTIONS: Requires permission of instructor. Offered fall and spring semesters.

MUSC 283 Private Study for Applied Jazz Styles and Techniques 2
Private studio instruction covering improvisational techniques and interpretations used in jazz performance. Examines a cross-section of styles and repertoire. PREREQ: MUSC282 with a grade of C- or better. RESTRICTIONS: Requires permission of instructor. Offered in fall and spring semesters.

MUSC 285 Advanced Ear Training and Sight Singing I 2
Continuation of MUSC185 and MUSC196. PREREQ: MUSC186 and MUSC196 with grades of C- or better. COREQ: MUSC295. RESTRICTIONS: Open to music majors and music minors, or by permission of instructor. Offered in fall semester only.

MUSC 286 Advanced Ear Training and Sight Singing II 2
Continuation of MUSC185, MUSC186 and MUSC285. PREREQ: MUSC285 and MUSC295 with grades of C- or better. COREQ: MUSC296. RESTRICTIONS: Open to music majors and music minors, or by permission of instructor. Offered in spring semester only.

MUSC 287 Music Technology 3
Overview and experience with commercially-available music-related hardware and software. Hardware includes IBM and Macintosh microcomputers, electronic keyboards and tone generators incorporating Musical Instrument Digital Interface (MIDI), digital recording systems, CD-ROM and videodisc. Software includes sequencers, notation packages, interactive composers, educational programs and hypermedia applications. PREREQ: MUSC105 or MUSC195 with a grade of C- or better. RESTRICTIONS: Offered fall and spring semesters.

MUSC 291 Practicum in Church Music 1
Introduces a variety of skills, techniques and information needed in the practice of church music. Students will learn to apply these skills through in-class experience with various instruments and resources.

MUSC 292 Organ Improvisation and Service Playing 2
Student learns and applies skills used in improvising at the organ and playing for church services. A basic conducting component is included. RESTRICTIONS: Offered spring semester only.

MUSC 295 Advanced Harmony I 3
Review of chromatic harmony. Study, writing and analysis of 18th century counterpoint. Introduction to instrumentation. Introduction to form and analysis. Eighteenth and nineteenth century harmony, techniques and styles. Original compositions. PREREQ: MUSC186 and MUSC196 with grades of C- or better. COREQ: MUSC285. RESTRICTIONS: Open to music majors and music minors, or by permission of instructor. Offered in fall semester only.

MUSC 296 Advanced Harmony II 3
Continuation of MUSC295. Study of late 19th and 20th century harmony, techniques and styles. Continuation of instrumentation. Original compositions. PREREQ: MUSC285 and MUSC295 with grades of C- or better. COREQ: MUSC286. RESTRICTIONS: Open to music majors and music minors, or by permission of instructor. Offered in spring semester only.

MUSC 298 Beginning Music Composition 1
Private study in beginning composition. Creative writing in vocal and instrumental media. RESTRICTIONS: Open to theory/composition majors only. May be repeated for up to 4 credits. Offered fall and spring semesters.

MUSC 301 Junior Recital 0 PF
A 30-minute public recital. COREQ: MUSC351, 352, 357 or 358. RESTRICTIONS: Offered in fall and spring semesters.

MUSC 302 Women in Music: An Alternate Survey 3
Survey of women's contributions to Western art music traditions from 12th century to present day through the study of women as composers, performers, patrons, and as the subject of musical expression. Explores cultural systems that have alternately encouraged and suppressed women's creativity. May be cross-listed with WOMS302.

MUSC 309 Patterns of Patronage 3
Examines the creation, performance and transmission of music within broader context of the economic, political, social and technological environment. Emphasizes interdependency of musical activity and its patrons, including traditional functions of state, church, civic, mercantile, private; also contemporary interaction with public, private, and third sectors. RESTRICTIONS: Open to juniors and seniors.

MUSC 310 Churches and Cathedrals of London 3
A study of ecclesiastical architecture of the 12th-20th centuries, noting structure, architectural style & historical role, as well as the way in which music, liturgy and the visual arts unfold within each building. RESTRICTIONS: Taught in London only.

MUSC 311 Music History: 400 through 1600 3
The history of musical style and theory in the Middle Ages (5th through 14th centuries) and the Renaissance (15th and 16th centuries). PREREQ: MUSC211 with a grade of C- or better, or permission of instructor. RESTRICTIONS: Offered spring semester only.

MUSC 312 Music History: 1600 through 1827 3
The history of musical style and theory during the Baroque period (1600-1750), and the Classic period through the death of Beethoven (1827). PREREQ: MUSC211 or MUSC101 with a grade of C- or better. RESTRICTIONS: Offered fall semester only.

MUSC 313 Music History: 1827 to the Present 3
The Romantic era, Impressionism and the 20th century. Musical thought and style from 1827 to the present. PREREQ: MUSC211 or MUSC101 with a grade of C- or better. RESTRICTIONS: Offered spring semester only.

MUSC 321 Ensemble: Instrumental, Piano, or Vocal 0-1
Performance of chamber literature for instrument, piano or voice. RESTRICTIONS: May be repeated for credit. Offered fall and spring semesters. Students may sign up for 0-credit only if they have reached the 17-credit limit. Music majors and minors must be enrolled for credit in at least one departmentally approved ensemble during each semester of private study.

MUSC 328 Choral Literature 2
Study of style, structure and interpretations of representative choral works, including large and small forms composed since 1500. PREREQ: MUSC211 with a grade of C- or better. RESTRICTIONS: Offered fall semester only.

MUSC 333 Basic Conducting 2
The principles of conducting and score reading. PREREQ: MUSC286 and MUSC296 with grades of C- or better. RESTRICTIONS: Offered fall semester only.

MUSC 339 Viennese Composers 3
Selected Viennese composers including Mozart, Beethoven, Schubert and the Strausses. Emphasis on Viennese music. A combination of music history and music appreciation. RESTRICTIONS: Taught in Semester in Vienna program only.

MUSC 345 History of Theatre: American Musical Theatre 3
Musical-dramatic forms of the 18th, 19th and 20th centuries in the United States and their impact on the modern musical theatre. Complete works read and compared to a series of criteria that are found in successful modern shows. RESTRICTIONS: Offered in spring semester only. May be cross-listed with THEA345.

MUSC 351 Private Study for Music Education V 2
Continuing private study for junior music education majors. The student adds to the course title the branch of study elected: piano, organ, voice, or an orchestral instrument. Includes a one-hour studio class. PREREQ: MUSC252 with a grade of C- or better. COREQ: One of MUSC108, 109, 110, 113, 114, 115, 116, 117, 118, 321. RESTRICTIONS: For music education majors only. Offered fall and spring semesters.
MUSC 353  PRIVATE STUDY FOR MUSIC EDUCATION VI  2
Continuing private study for music education majors. The student adds to the course title the branch of study elected: piano, organ, voice, or an orchestral instrument. Includes a one-hour studio class.
PREREQ: MUSC351 with a grade of C- or better.
RESTRICTIONS: For music education majors only. Offered fall and spring semesters.

MUSC 353  PRIVATE STUDY FOR BACHELOR OF ARTS AND MINORS V  2
Continuing private study for bachelor of arts [music] students and music minors. The student adds to the course title the branch of study elected: piano, organ, voice, or an orchestral instrument. Includes a one-hour studio class.
PREREQ: MUSC254 with a grade of C- or better and permission of instructor.
RESTRICTIONS: For bachelor of arts [music] students and music minors, or permission of instructor. Does not count toward bachelor of arts degree credit.
Offered fall and spring semesters.

MUSC 354  PRIVATE STUDY FOR MUSIC BACHELOR OF ARTS AND MINORS VI  2
Continuing private study for bachelor of arts [music] students and music minors. The student adds to the course title the branch of study elected: piano, organ, voice, or an orchestral instrument. Includes a one-hour studio class.
PREREQ: MUSC353 with a grade of C- or better and permission of instructor.
RESTRICTIONS: For bachelor of arts [music] students and music minors, or permission of instructor. Does not count toward bachelor of arts degree credit.
Offered fall and spring semesters.

MUSC 357  PRIVATE STUDY FOR APPLIED MUSIC V  3
Continuing private study for junior applied music majors, including preparation for Junior Recital. The student adds to the course title the branch of study elected: piano, organ, voice, or an orchestral instrument. Includes a one-hour studio class.
PREREQ: MUSC252 with a grade of C- or better.
RESTRICTIONS: For applied music majors only. Offered in fall and spring semesters.

MUSC 358  PRIVATE STUDY FOR APPLIED MUSIC VI  3
Continuing private study for junior applied music majors, including preparation for Junior Recital. The student adds to the course title the branch of study elected: piano, organ, voice, or an orchestral instrument. Includes a one-hour studio class.
PREREQ: MUSC357 with a grade of C- or better.
RESTRICTIONS: For applied music majors only. Offered in fall and spring semesters.

MUSC 363  KEYBOARD LITERATURE  3
Style, structure and technical performance of keyboard music from the 17th century to the present.
PREREQ: MUSC252 or MUSC254 with a grade of C- or better.

MUSC 366  INDEPENDENT STUDY  1-3

MUSC 387  MUSIC TECHNOLOGY II  3
Explores intermediate to advanced applications of music technology including professional level implementation of MIDI hardware and software. Topics include multiport interfaces, synchronization, MIDI sequencing and notation techniques, multimedia, and music related Internet services. Additional topics may be examined depending on student experience.
PREREQ: MUSC287 with a grade of C- or better.

MUSC 389  ELEMENTS OF MUSIC MANAGEMENT  3
Introduces principles involved in planning and management for performing arts organizations. Includes basic concepts of project development and implementation, production issues for public performances, communication skills and marketing techniques, utilization of new technologies, and aspects of resource planning and advocacy.
RESTRICTIONS: Open to juniors and seniors.

MUSC 390  HONORS COLLOQUIUM  3

MUSC 392  CONTRAPUNTAL WRITING  2
Contrapuntal techniques with emphasis on 16th- and 18th-century styles and forms.
PREREQ: MUSC295 with a grade of C- or better.
RESTRICTIONS: Offered in odd numbered years, spring semesters only.

MUSC 393  KEYBOARD HARMONY  2
A practical course for the development of facility in applying knowledge of harmony to the keyboard. Emphasis on melody harmonization and improvisation.
PREREQ: MUSC296 and 276 with grades of C- or better.
RESTRICTIONS: Requires two years of class or private piano. Offered in even numbered years, spring semesters only.

MUSC 395  FORM ANALYSIS  3
Structure of homophonic and polyphonic music representing different periods of musical history.
PREREQ: MUSC296 with a grade of C- or better.
RESTRICTIONS: Offered in even numbered years, spring semesters only.

MUSC 400  INTERNSHIP IN CHURCH MUSIC 1-3
Capstone course for Church Music minor providing students with opportunities to gain skills and knowledge through practical application while working under the supervision of professional musicians.
PREREQ: MUSC179, MUSC212, MUSC291 and MUSC292 with grades of C- or better in each.
RESTRICTIONS: Requires permission of instructor.

MUSC 401  SENIOR RECITAL 0 PF
A 60-minute public recital.
COREQ: MUSC457 or MUSC458.
RESTRICTIONS: Requires senior status. Offered in fall and spring semesters.

MUSC 403  CHAMBER MUSIC LITERATURE  3
Survey of chamber music literature from the 17th century to the present.
PREREQ: MUSC312 and MUSC313 with grades of C- or better.
RESTRICTIONS: Requires permission of instructor. Offered in even numbered years, in spring semesters only.

MUSC 405  SYMPHONIC LITERATURE  3
Historical and structural analysis of major symphonic works from the 18th century to the present.
PREREQ: MUSC312 and MUSC313 with grades of C- or better.
RESTRICTIONS: Requires permission of instructor. Offered in odd numbered years, in spring semesters only.

MUSC 407  CONTEMPORARY MUSIC LITERATURE  3
Analysis of styles and techniques of contemporary composers beginning with compositions of the late 1950's.
PREREQ: MUSC419 with a grade of C- or better, or permission of instructor.
RESTRICTIONS: Offered in fall semester only.

MUSC 419  MUSIC THEORY RESEARCH  3
Designed to prepare the music theory major for MUSC 421. The student learns how to do research in music theory, does a survey of the literature appropriate to his/her area of interest, and focuses on the thesis to be written while taking MUSC 421.
RESTRICTIONS: Permission of Instructor.

MUSC 420  PRIVATE STUDY FOR ADVANCED COMPOSITION  3
Creative writing in vocal and instrumental media.
PREREQ: MUSC298 with a grade of C- or better.
RESTRICTIONS: May be repeated for up to six credit hours. Offered in fall and spring semesters.

MUSC 421  SPECIAL PROJECTS IN MUSIC THEORY  3
Theory majors do research and study under guidance of a faculty advisor on an approved topic for a formal paper to be presented at a public lecture.
PREREQ: MUSC419 with a grade of C- or better.
RESTRICTIONS: Offered in fall and spring semesters.

MUSC 426  GERMAN LIEDER  2
Literature survey of the standard vocal repertoire of the German tradition. Includes examples of the works of such composers as Schubert, Brahms, Schumann, Wolf and Strauss.
RESTRICTIONS: Requires junior or seniors status. Offered every third spring semester, in rotation with MUSC427 and MUSC428.

MUSC 427  FRENCH ART SONG  2
A literature survey of the standard vocal repertoire of the French tradition. Includes examples of the works of such composers as Fauré, Debussy, Duparc and Poulenc.
RESTRICTIONS: Requires junior or senior status. Offered every third spring semester, in rotation with MUSC426 and MUSC428.

MUSC 428  TWENTIETH-CENTURY ART SONG  2
A literature survey of the standard vocal repertoire of the 20th Century. Includes examples of the works of such composers as Barber, Britten, Schonberg, Ives, Vaughan Williams and Rorem.
RESTRICTIONS: Requires junior or senior status. Offered every third spring semester, in rotation with MUSC426 and MUSC427.
MUSC 431 ORCHESTRATION 2
Advanced orchestral and band arranging, review of instrumental ranges and colors; scoring for small ensembles, special problems in scoring accompaniments. Final arrangement performed by a University Ensemble. PREREQ: MUSC296 with a grade of C- or better. RESTRICTIONS: Requires permission of instructor. Offered in spring semester only.

MUSC 441 ACCOMPANYING CHAMBER MUSIC: PIANO 1
Accompanying vocalists and instrumentalists and experiences with piano, chamber and large ensembles, and degree recitals. PREREQ: MUSC241 with a grade of C- or better. RESTRICTIONS: Requires permission of instructor. Offered fall and spring semesters. May be repeated 1 time for credit.

MUSC 451 PRIVATE STUDY FOR MUSIC EDUCATION VII 2
Continuing private study for senior music education majors. The student adds to the course title the branch of study elected: piano, organ, voice, or an orchestral instrument. Includes a one-hour studio class. PREREQ: MUSC352 with a grade of C- or better. COREQ: One of MUSC108, 109, 110, 113, 114, 115, 116, 117, 118, 321. RESTRICTIONS: For music education majors only. Offered fall and spring semesters.

MUSC 452 PRIVATE STUDY FOR MUSIC EDUCATION VIII 2
Optional continuing private study for senior music education majors. The student adds to the course title the branch of study elected: piano, organ, voice, or an orchestral instrument. Includes a one-hour studio class. PREREQ: MUSC451 with a grade of C- or better. COREQ: One of MUSC108, 109, 110, 113, 114, 115, 116, 117, 118, 321. RESTRICTIONS: For music education majors only by permission of instructor. Offered in fall and spring semesters.

MUSC 453 PRIVATE STUDY FOR BACHELOR OF ARTS AND MINORS VII 2
Continuing private study for bachelor of arts (music) students and music minors. The student adds to the course title the branch of study elected: piano, organ, voice, or an orchestral instrument. Includes a one-hour studio class. PREREQ: MUSC354 with a grade of C- or better and permission of instructor. COREQ: One of MUSC108, 109, 110, 113, 114, 115, 116, 117, 118, 321. RESTRICTIONS: For bachelor of arts (music) students and music minors only. Does not count for bachelor of arts degree credit. Offered fall and spring semesters.

MUSC 454 PRIVATE STUDY FOR BACHELOR OF ARTS AND MINORS VIII 2
Continuing private study for bachelor of arts (music) students and music minors. The student adds to the course title the branch of study elected: piano, organ, voice, or an orchestral instrument. Includes a one-hour studio class. PREREQ: MUSC453 with a grade of C- or better and permission of instructor. COREQ: One of MUSC108, 109, 110, 113, 114, 115, 116, 117, 118, 321. RESTRICTIONS: For bachelor of arts (music) students and music minors only. Does not count for bachelor of arts degree credit. Offered fall and spring semesters.

MUSC 457 PRIVATE STUDY FOR APPLIED MUSIC VII 4
Continuing private study for senior applied music majors, including preparation for Senior Recital. The student adds to the course title the branch of study elected: piano, organ, voice, or an orchestral instrument. Includes a one-hour studio class. PREREQ: MUSC358 with a grade of C- or better. COREQ: One of MUSC108, 109, 110, 113, 114, 115, 116, 117, 118, 321. RESTRICTIONS: For applied music majors only. Offered in fall and spring semesters.

MUSC 458 PRIVATE STUDY FOR APPLIED MUSIC VIII 4
Continuing private study for senior applied music majors, including preparation for Senior Recital. The student adds to the course title the branch of study elected: piano, organ, voice, or an orchestral instrument. Includes a one-hour studio class. PREREQ: MUSC457 with a grade of C- or better. COREQ: One of MUSC108, 109, 110, 113, 114, 115, 116, 117, 118, 321. RESTRICTIONS: For applied music majors only. Offered in fall and spring semesters.

MUSC 464 INTERNSHIP 1-3
Field experience with nonprofit performing arts organizations or commercial music businesses relevant to the student's area of interest. RESTRICTIONS: Open to music management studies majors and minors only. Offered fall and spring semesters.

MUSC 466 INDEPENDENT STUDY 1-3

MUSC 480 VOCAL PEDAGOGY 3
Designed for those who plan to work with the singing voice. Includes vocal research, comparative pedagogy, observation of teaching and practical teaching experience. RESTRICTIONS: Offered fall semester only.

MUSC 481 PEDAGOGY AND LITERATURE 3
The study of teaching methods and literature (music scores, books, and other media). Shows teaching skills needed at the secondary level and lower. RESTRICTIONS: Requires permission of instructor.

MUSC 484 RECORDING TECHNIQUES 3
Covers three parameters: history of recording and recording technology; recording techniques with hands-on experiences; and aesthetics of recording and its impact on music through the 20th and 21st centuries. PREREQ: MUSC105. RESTRICTIONS: Requires permission of instructor.

MUSC 488 PRINCIPLES OF MUSIC INDUSTRY PRACTICE 3
Offers an understanding of the fundamental workings of the music industry. Examines theory/practice of core principles, focusing on provisions of copyright law, standard agreements, and professional organization influences. Emphasis on framework for interaction among writers, artists, performers, publishers, record companies, producers. RESTRICTIONS: Requires permission of instructor.

MUSC 489 OPERA WORKSHOP 0-3
Dramatic and musical preparation of operatic roles through the production of a complete opera/operetta. RESTRICTIONS: Admission by audition, with permission of private instructor, and preference given to vocal performance majors. Offered fall and spring semesters. Students may sign up for 0 credit only if they have reached the 17-credit limit. Music majors and minors must be enrolled for credit in at least one departmentally approved ensemble during each semester of private study.

MUSC 561 NON-DEGREE PRIVATE STUDY 1-2
Continuing private study for all music majors. The student adds to the course title the branch of study elected: piano, organ, voice, or an orchestral instrument. Includes a one-hour studio class. PREREQ: MUSC452, MUSC454, or MUSC458, with C- or better and permission of instructor. COREQ: One of MUSC108, 109, 110, 113, 114, 115, 116, 117, 118, 321. RESTRICTIONS: Music majors only. May be repeated for credit.

MUSC 600 MASTER'S PERFORMANCE IN Conducting 2 PF
Reflects the culmination of student performances as a conductor with one or more large ensembles in the Department of Music. PREREQ: MUSC662. RESTRICTIONS: For students in the Master of Music degree, Performance Concentration (Conducting).

MUSC 601 MASTER'S RECITAL 2 PF
A sixty-minute public recital. COREQ: MUSC663.

MUSC 602 ADVANCED KEYBOARD LITERATURE 3
An historical survey of selected keyboard works from various style periods, including structural analysis and performance implications. RESTRICTIONS: Requires permission of instructor.

MUSC 603 CHAMBER MUSIC LITERATURE 3
Survey of chamber music literature from the 17th century to the present. RESTRICTIONS: Requires permission of instructor. Offered in even numbered years, in spring semester only.

MUSC 604 STRING QUARTET LITERATURE 3
A survey of music for the string quartet from Haydn through the present day. RESTRICTIONS: Requires permission of instructor.

MUSC 605 SYMPHONIC LITERATURE 3
Historical and structural analysis of major symphonic works from the 18th century to the present. RESTRICTIONS: Requires permission of instructor. Offered in odd numbered years, in spring semester only.

MUSC 606 WIND LITERATURE 3
History of the wind band and its music from the Renaissance to the present, with emphasis on the wind music from the 19th and 20th centuries for wind ensemble and concert band. Examines wind literature suitable for secondary school and college-level performing groups. RESTRICTIONS: Requires permission of instructor.

MUSC 607 CONTEMPORARY MUSIC LITERATURE 3
Analysis of styles and techniques of contemporary composers beginning with compositions of the late 1950s. RESTRICTIONS: Requires permission of instructor. Offered in fall semester only.

MUSC 608 VOCAL MUSIC LITERATURE 3
A survey of important literature for solo voice. Area of emphasis varies by year and includes German Lieder, French Art Song, and twentieth-century Art Song. RESTRICTIONS: Requires permission of instructor. May be repeated when topics vary.
MUSC 609 CHORAL MUSIC LITERATURE I 3
Study of style, structure and interpretations of representative choral works, including large and small forms composed since 1450. Particular emphasis on current research as related to the use of primary source material as applied to the modern edition.
REQUIREMENTS: Requires permission of instructor.

MUSC 610 CHORAL MUSIC LITERATURE II 3
Survey of the development of major choral genres (e.g. mass, motet, requiem) from 1500 to the present. The evolution of musical style and structure is examined through analysis and discussion regarding performance practice.
REQUIREMENTS: Requires permission of instructor.

MUSC 611 STUDIES IN MUSIC HISTORY 3
A survey of representative compositions from various periods of music history. Includes a study of the relationship of music to the socio-cultural background of each epoch and discussions of performance practice problems. Topics of study may change with each time of offering.
REQUIREMENTS: Offered in spring semester only.

MUSC 620 LARGE ENSEMBLE 1
Participation as a performer in a large ensemble.
REQUIREMENTS: Entry audition required.

MUSC 621 CHAMBER ENSEMBLE 1
Participation as a performer in a chamber ensemble.
REQUIREMENTS: Entry audition required.

MUSC 622 MATERIALS AND METHODS OF RESEARCH 3
Examines the major materials used in research in the areas of music history, theory, performance and education, as well as the methods of conducting research in these fields.
REQUIREMENTS: Requires permission of instructor. Offered in fall semester only.

MUSC 631 ADVANCED ARRANGING 3
Advanced arranging for chamber, choral and orchestral ensembles, concert band and marching band percussion section.
PREREQ: MUSC296.
REQUIREMENTS: Enrollment by permission of instructor.

MUSC 632 ADVANCED INSTRUMENTAL CONDUCTING 3
Advanced conducting techniques for directors of instrumental performing groups.
REQUIREMENTS: Requires permission of instructor.

MUSC 636 HISTORY AND PHILOSOPHY OF MUSIC EDUCATION 3
Topics include philosophical issues concerning the role of arts in education, intrinsic and extrinsic rationales for music in the schools, and arts advocacy at the local, state, and national levels. Also includes the history and philosophy of music education in the United States from the colonial period to the present.
REQUIREMENTS: Requires permission of instructor.

MUSC 643 ADVANCED CHAMBER MUSIC PERFORMANCE 1
In-depth survey of chamber music literature through performance. Emphasis is placed on the development of advanced ensemble skills while exploring music from the Baroque Period through the present day. Open to both majors and non-majors and open to voice, string, piano, and wind players.

MUSC 661 ADVANCED PRIVATE STUDY 3-4
Advanced instruction in voice, instrument, composition or conducting. The student adds to course title the branch of study elected: piano, organ, voice or an orchestral instrument, conducting, or composition e.g., Advanced Private Study (Piano).
REQUIREMENTS: Requires audition.

MUSC 662 ADVANCED PRIVATE STUDY 3-4
Advanced instruction in voice, instrument, composition or conducting. The student adds to course title the branch of study elected: piano, organ, voice, orchestral instrument, composition or conducting e.g., Advanced Private Study (Piano).
PREREQ: MUSC661.
REQUIREMENTS: Requires permission of instructor.

MUSC 663 ADVANCED PRIVATE STUDY 3
Advanced instruction in voice, instrument, composition or conducting. The student adds to course title the branch of study elected: piano, organ, voice, orchestral instrument, composition, or conducting e.g., Advanced Private Study (Piano).
PREREQ: MUSC662.
REQUIREMENTS: Requires permission of instructor.

MUSC 675 GENERAL MUSIC K-12 3
Learning strategies to develop listening, performing, creating and literacy skills in a general music curriculum. Recommended for directors of performing ensembles.
REQUIREMENTS: Requires permission of instructor.

MUSC 676 SEMINAR IN MUSIC EDUCATION 3
Advanced topics in music education.
REQUIREMENTS: Requires permission of instructor.

MUSC 679 PROFESSIONAL IMPROVEMENT PROJECT I 3
Development of a portfolio to include unit plans based on synthesis of content from prior courses.
REQUIREMENTS: Requires permission of instructor. Taken in sequence with MUSC680 as an alternative to thesis option.

MUSC 680 PROFESSIONAL IMPROVEMENT PROJECT II 3
Implementation of the portfolio developed in MUSC679.
PREREQ: MUSC679.
REQUIREMENTS: Taken in sequence with MUSC679 as an alternative to thesis option.

MUSC 681 PEDAGOGY AND LITERATURE 3
The study of teaching methods and literature (music scores, books and other media). Shows teaching skills needed at the university level and lower.

MUSC 684 ADVANCED RECORDING TECHNIQUES 3
Covers advanced aspects of the following parameters: history of recording and recording technology; recording techniques with hands-on experiences; and aesthetics of recording and its impact on music through the 20th and 21st centuries.
PREREQ: MUSC105.
REQUIREMENTS: Enrollment by permission of instructor.

MUSC 688 ADVANCED PRINCIPLES OF MUSIC INDUSTRY PRACTICE 3
Offers an advanced understanding of the fundamental workings of the music industry. Emphasis on the advanced aspects of the theory/practice of core principles, with a focus on provisions of copyright law, standard agreements, professional organization influences, and the framework for interaction among writers, artists, performers, publishers, record companies, and producers.
REQUIREMENTS: Enrollment is by permission of instructor.

MUSC 695 ADVANCED ANALYTICAL TECHNIQUES 3
Examination of structural, melodic, rhythmic, harmonic and textural aspects of selected music literature and their significance in artistic performance.
REQUIREMENTS: Requires satisfactory score on music theory graduate placement exam. Offered in fall semester only.

MUSC 697 ADVANCED JAZZ HARMONY 3
Study of advanced aspects of melody, harmony, texture, dynamics, rhythm and form in selected jazz and American popular literature; development of advanced aural-perceptual and compositional skills related to jazz and American popular music.
REQUIREMENTS: Enrollment by permission of instructor.

MUSC 689 MASTER’S THESIS 1-6
NTDT 250  INTRODUCTION TO THE NUTRITION CARE PROCESS  
Introduction to skills and competencies of the clinical dietitian based on the Nutrition Care Process (assessment, intervention, diagnosis, treatment, monitoring, and evaluation). Evidence-based practice is promoted with emphasis on state-of-the-science and state-of-the-art of dietetics practice.  
PREREQ: NTDT200.  
RESTRICTIONS: Not available for credit to students who have taken NTDT450.

NTDT 255  MULTICULTURAL FOOD HABITS  
Food habits of diverse cultural groups. Determinants of traditional and current food habits, historical and cultural context. Emphasis on ethnic population groups in the United States. Contribution of selected dietary patterns to knowledge of health and disease prevention. Impact of migration to different cultural settings.  
PREREQ: NTDT200 and BISC106 or BISC276.

NTDT 256  MULTICULTURAL FOODS LABORATORY  
Sampling of foods of diverse cultural groups utilizing demonstrations by restauranteurs and individuals as well as class preparation. Field trips to markets and ethnic food stores.  
COREQ: NTDT255.

NTDT 268  SOPHOMORE SPECIAL TOPICS  
Sophomore level independent study.  
PREREQ: NTDT200 and a course in biology.

NTDT 305  NUTRITION IN THE LIFESPAN  
Nutrition and health during the different stages of life: pregnancy, lactation, infancy, preschool years, middle childhood, adolescence, adulthood and later maturity.  
PREREQ: NTDT200 and a course in biology.

NTDT 310  NUTRITION AND ACTIVITY  
Energy and nutrient needs for activity with emphasis on particular physical and athletic activities; common myths and fallacies concerning diet and athletic performance; and appropriate dietary approaches for specific activities and active people.  
PREREQ: NTDT200 and a physiology course.

NTDT 321  QUANTITY FOOD PRODUCTION AND SERVICE  
Principles of quantity food production and delivery systems; menu planning and purchasing design; safety, sanitation and technical operations in a food service system.  
PREREQ: NTDT200 and NTDT201.

NTDT 322  MANAGEMENT OF FOOD AND NUTRITION SERVICES  
Organization and administration of not-for-profit and entrepreneurial services. Functions and responsibilities related to these products including planning, marketing, total quality and human resource management, and food and labor cost accounting.  
PREREQ: NTDT200 and NTDT201.

NTDT 326  ONSITE FOOD PRODUCTION  
Laboratory experience in quantity food production and delivery with emphasis on equipment, production methods, quality standards and controls and environmental issues. Development of food production design considering material flow, functional areas and utility requirements. Food safety certification.  
COREQ: NTDT321.

NTDT 328  FOOD SERVICE FACILITY DESIGN  
Development of quantity food production kitchen design. Considerations include material flow, equipment requirements, functional areas, sanitation, and energy and water resources.  
PREREQ: NTDT325.  
COREQ: NTDT321.

NTDT 330  NUTRITION COUNSELING  
Theories, skills and techniques of nutrition interviewing and counseling applied to changing food behaviors.  
PREREQ: NTDT200, NTDT250.

NTDT 350  NUTRITION AND OLDER ADULTS  
Discussion of the physiology of aging on fundamental nutrition processes, food and nutrient requirements and intake, assessment of nutritional status, and nutrition related problems of older adults.  
PREREQ: NTDT200, and BISC106 or BISC276.

NTDT 366  INDEPENDENT STUDY  
1-6 PF  
NTDT 368  JUNIOR SPECIAL TOPICS  
1-6  
Junior level independent study.

NTDT 400  MACRONUTRIENTS  
Metabolism of carbohydrates, proteins and fats in human nutrition, interdependence and relation to energy metabolism/balance, scientific bases of macronutrient requirement during the life cycle.  
PREREQ: NTDT200, CHEM214 and CHEM216.

NTDT 401  MICRONUTRIENTS  
Mechanisms and interactions of vitamins and minerals in cellular metabolism, scientific bases of nutrient requirements during the life cycle.  
PREREQ: NTDT400.

NTDT 403  DIETETICS SEMINAR  
1 PF  
Provides direction for career decisions, including self-assessment, resume development, and interview preparation. Focuses on the post-baccalaureate career pathways of employment, graduate study, and the supervised practice experience. Explores registration, specialty certification and licensure for dietitians.  
RESTRICTIONS: Open only to senior dietetics majors.

NTDT 410  OVERWEIGHT/Obesity PREVENTION and MANAGEMENT  
PREREQ: NTDT200.

NTDT 420  MATERNAL AND INFANT NUTRITION  
Maternal physiological adjustments in pregnancy and their relationship to nutritional needs; effect of maternal nutrition on fetal growth and development; physiology of lactation and maternal nutrient needs; and neonatal nutritional needs and current infant feeding practices.  
PREREQ: NTDT400 and BISC276.

NTDT 421  NUTRITIONAL ASSESSMENT METHODS  
Nutritional screening and assessment methods and techniques including evaluation of dietary intake, anthropometric measurements, biochemical tests and clinical assessment. Overview of the methodologies involved in nutrition research.  
PREREQ: NTDT400 and a course in statistics.

NTDT 430  NUTRITION CLINIC PRACTICUM  
1-3  
Experience in ongoing activities of the University of Delaware Nutrition Clinic including client counseling, group presentations, nutrition education materials development and research activities.  
PREREQ: NTDT330.  
RESTRICTIONS: Requires permission of instructor.

NTDT 435  PEER NUTRITION MENTORING  
Preparation of upper division students to become peer mentors for an introductory nutrition course. Internet discussion forums used to increase interaction in a large class setting. Offers pre-professional practice opportunities for nutrition majors.  
PREREQ: NTDT400.

NTDT 445  TEACHING METHODS: NUTRITION/FOODS  
Needs assessment; writing instructional objectives; selecting appropriate methods, materials and resources for audiences varying in age, literacy and ethnicity; planning, implementing and evaluating education programs related to food and nutrition.  
PREREQ: NTDT200.

NTDT 450  MEDICAL NUTRITION THERAPY I  
PREREQ: NTDT250, NTDT400, BISC276.

NTDT 451  MEDICAL NUTRITION THERAPY II  
Continuation of Medical Nutrition Therapy I. Pathophysiology, diet and disease relationships and diet therapy for diseases: liver, renal, cancer, AIDS, inborn errors of metabolism. Critical care nutrition, nutritional management of physiological stress and trauma.  
PREREQ: NTDT250, NTDT400, BISC276.

NTDT 452  TOPICS IN NUTRITION AND DIETETICS  
In-depth analysis of a specific topic in an area of nutrition and dietetics.  
RESTRICTIONS: Junior-level NTDT course(s) relating to the specific topic required.

NTDT 460  COMMUNITY NUTRITION  
Nutritional care as part of health maintenance and health care delivery; the relationship of community resources, structure and dynamics to an individual’s ability to be well fed. Nutritional needs and programs. Means of affecting change in nutrition knowledge and practice.  
PREREQ: NTDT400 and NTDT321.

NTDT 464  COMMUNITY NUTRITION FIELD EXPERIENCE  
Direct client contact through delivery of nutritional services in community health maintenance and health care delivery facilities. First-hand experience with the nutritional management of clients in a community nutrition program.  
PREREQ: NTDT332.  
COREQ: NTDT460.
NTDT 466  INDEPENDENT STUDY  1-6 PF
NTDT 468  SENIOR SPECIAL TOPICS  1-6
Senior level independent study.

NTDT 475  TRANSCULTURAL FOODS AND CUISINE  3-5
Travel study of transcultural food habits: attitudes, beliefs, customs and taboos. Visits to major food industries and health organizations and interaction with indigenous population. PREREQ: NTDT200.

NTDT 550  DIETETICS PRACTICUM I  4 PF
Introduces supervised practice experiences for incorporation and application of skills, knowledge, and attitudes with special emphasis on current dietetic issues facing the health professional in public health nutrition. COREQ: NTDT650. RESTRICTIONS: Open to dietetic internship students only.

NTDT 551  DIETETICS PRACTICUM II  4 PF
Continued supervised practice experiences for incorporation and application of skills, knowledge, and attitudes, focusing on entry-level competence with special emphasis on current dietetic issues facing the health professional. PREREQ: NTDT550. COREQ: NTDT650. RESTRICTIONS: Open to dietetic internship students only.

NTDT 611  ADVANCED NUTRITION  3
Metabolism and its relation to human nutrition; current literature; methods and techniques of nutrition research. PREREQ: NTDT400 or NTDT610.

NTDT 615  ADVANCED NUTRITION AND PHYSICAL ACTIVITY  3
Critical analysis of current research on effects of nutrition, food and diet on physical activity and optimal athletic performance. Develops specific topics and interests through independent projects. PREREQ: Undergraduate nutrition and physiology courses.

NTDT 620  MATERNAL AND INFANT NUTRITION  3
Maternal physiological adjustments in pregnancy and their relationship to nutritional needs; effect of maternal nutrition on fetal growth and development; physiology of lactation and maternal nutrient needs; neonatal nutritional needs and current infant feeding practices. PREREQ: NTDT400 and BISC106 or BISC406.

NTDT 621  NUTRITIONAL ASSESSMENT METHODS  3
Nutritional screening and assessment methods and techniques including evaluation of dietary intake, anthropometric measurements, biochemical tests and clinical assessment. Overview of the methodologies involved in nutrition research. PREREQ: Upper-division course work in nutrition, biochemistry and physiology.

NTDT 630  TRACE MINERALS AND VITAMINS  3
Recent advances in knowledge of the nutritional significance of trace minerals and vitamins; their physiological function(s); factors affecting needs and utilization; assessment of requirements; occurrence in food supply; and current issues and concerns. Primary focus on human nutrition with comparative aspects in other living systems utilized to illustrate significant similarities and/or differences. May be cross-listed with ANSC630. PREREQ: Junior-level course work in human or animal nutrition, biochemistry or biological sciences.

NTDT 640  NUTRITION AND AGING  3
Addresses topics related to the effects of aging on fundamental nutrition processes, food and nutrient requirements, nutrition screening and assessment of nutritional status, nutrition intervention and food assistance programs and nutrition related disorders of older adults. PREREQ: NTDT310 or NTDT400 or NTDT401.

NTDT 645  TEACHING METHODS/NUTRITION/FOODS  3
Teaches assessment, writing instructional objectives, selecting appropriate methods, materials and resources for audiences varying in age, literacy and ethnicity; planning, implementing and evaluating education programs related to food and nutrition. PREREQ: NTDT200.

NTDT 650  CURRENT PERSPECTIVES IN DIETETICS I  2
Introduces exploration of roles and responsibilities of today's dietitian in food service management, clinical and community dietetics. Emphasis on concepts relevant to evolving therapies and technologies in the profession and issues that influence ethical, legal and professional responsibilities of dietitians.

NTDT 651  CURRENT PERSPECTIVES IN DIETETICS II  2
Continued exploration of roles and responsibilities of today's dietitian in clinical, community and food service management dietetics. Emphasis on concepts relevant to evolving therapies and technologies in the profession and issues that influence ethical, legal and professional responsibilities of dietitians.

NTDT 652  TOPICS IN NUTRITION AND DIETETICS  1-3
Analysis of a specific topic in an area of nutrition and dietetics. RESTRICTIONS: Requires permission of instructor.

NTDT 654  ADVANCED RUMINANT NUTRITION  3
See ANSC654 for course description.

NTDT 660  COMMUNITY NUTRITION  3
Nutritional care as a part of health maintenance and health care delivery; the relationship of community resources, structure and dynamics to an individual's ability to be well fed. Nutritional needs and programs. Nutrition program planning and evaluation; community assessment techniques. RESTRICTIONS: Advanced nutrition course required.

NTDT 665  SEMINAR  1-3 PF

NTDT 668  RESEARCH  1-6

NTDT 669  FIELD PROJECT OR THEORETICAL PAPER  1-6
Development, preparation and defense of written report of field project observations or theoretical analysis. RESTRICTIONS: Requires permission of instructor.

NTDT 675  TRANSCULTURAL FOOD HABITS  5
Travel study of transcultural food habits: attitudes, beliefs, customs and taboos. Visits to major food industries and health organizations and interaction with indigenous population. PREREQ: NTDT200. RESTRICTIONS: Only three credit hours may count toward graduation for majors.

NTDT 680  EXERCISE, NUTRITION AND BONE HEALTH  3
Role of exercise and diet in the development and maintenance of the skeleton, including exercise protocols, nutrients, exercise nutrient interactions and assessment tools. May be cross-listed with HESC680. PREREQ: BISC276 or equivalent and NTDT200 or equivalent.

NTDT 868  RESEARCH  1-6

NTDT 869  MASTER’S THESIS  1-6
NURS 222  PHARMACOLOGY  3
Focuses on the therapeutic and adverse biological, psychological and social reactions to pharmacological agents. Drug use and medication abuse, client teaching, lab data and current research are discussed. Nursing responsibilities and clinical applications are emphasized.
PREREQ: NURS220.
COREQ: NURS230, NURS240.
RESTRICTIONS: Open to nursing majors only.

NURS 230  FOUNDATIONS OF NURSING  2
Examines the health continuum with an emphasis on wellness, health promotion across the lifespan, the aging process, and an introduction to community-based nursing. Clients are discussed as individuals, members of families, and as parts of cultural and global communities.
PREREQ: BISC207, CHEM105, CHEM106, and a course in anatomy.
COREQ: NURS220.
RESTRICTIONS: Open to accelerated nursing majors only.

NURS 231  HEALTH PROMOTION ACROSS THE LIFESPAN  2
Explores the continuum of healthcare with a focus on prevention, wellness initiatives and health promotion across the lifespan. Emphasizes the nurse's teaching role. Examines types of health promotion for individuals, families and communities.
PREREQ: NURS110.
RESTRICTIONS: Open to nursing majors only.

NURS 232  CARE OF VULNERABLE POPULATIONS  2
Focuses on population-based healthcare. Examines community level nursing care. Explores vulnerability as it relates to pediatric, older adult, rural and disadvantaged, and culturally diverse populations within the American healthcare system.
PREREQ: NURS110.
RESTRICTIONS: Open to nursing majors only.

NURS 241  SCIENTIFIC BASIS OF NURSING  3
Examines pathophysiological concepts as a scientific basis of disease processes. Focuses on major body systems, including immune, endocrine, neurological and psychological. Emphasizes concepts of cancer, pain and infection.
COREQ: BISC276 or BISC300.
RESTRICTIONS: Open to nursing majors only.

NURS 242  SCIENTIFIC BASIS OF NURSING  2
Examines pathophysiological concepts as a scientific basis of disease processes. Focuses on major body systems, including cardiovascular, respiratory, gastrointestinal and renal. Emphasizes concepts of fluids and electrolytes.
COREQ: BISC276 or BISC300.
RESTRICTIONS: Open to nursing majors only.

NURS 250  HEALTH ASSESSMENT ACROSS THE LIFESPAN  2
Introduces and develops clinical skills of physical health assessment across the lifespan. Field experiences develop physical assessment skills.
PREREQ: NURS110, NURS200.
COREQ: BISC276, BISC300, NTD120, IFST201.
RESTRICTIONS: Open to nursing majors only.

NURS 312  PATHOPHYSIOLOGY  3-4
Focuses on biological processes leading to alterations of body structure and functions. Emphasis on identification of etiology and pathogenesis of selected diseases.
PREREQ: BISC276, BISC300, IFST201, NTD120, PSYC100 and STAT200.
RESTRICTIONS: Open to nursing majors only. Nursing majors must take three credits; BRN majors must take four credits.

NURS 335  BACCALAUREATE FOR THE REGISTERED NURSE ORIENTATION  1 PF
Provides an orientation to the on-line BRN major including a hands-on technology component. Includes initial preparation for the BRN Practicum. Emphasizes resources essential for successful program completion.
RESTRICTIONS: Must be taken prior to any other BRN nursing course. Open to BRN majors only.

NURS 345  CONCEPTUAL FOUNDATIONS FOR NURSING PRACTICE  3
Introduces conceptual foundations for practice within a pluralistic society. Provides overview of nursing education, practice, research, informatics and evolving technologies. Focuses on healthcare needs within diverse practice settings, emphasizing emerging ethical responsibilities, and economic and sociocultural influences.
PREREQ: NURS335.
RESTRICTIONS: Open to BRN majors only. To be taken immediately following completion of NURS335.

NURS 350  WELLNESS AND HEALTH ASSESSMENT  3
Explores selected concepts, theories and skills utilized in health promotion and disease prevention of individuals from socioculturally diverse populations within the context of family, community and healthcare systems. Key elements include a health history, physical, and psychosocial assessment.
PREREQ: NURS335, NURS345.
RESTRICTIONS: Open to BRN majors only. Course sequence alteration requires permission of instructor.

NURS 352  ADULT HEALTH NURSING  3
Examines selected concepts and theories related to restoring and maintaining optimal health in adult populations. Focuses on major body systems, including immune, endocrine, renal and gastrointestinal; also discusses concepts of cancer. Selected laboratory and field experiences are included to enhance concepts.
PREREQ: BISC276, BISC300, all required 200 level nursing courses.
RESTRICTIONS: Open to nursing majors only.

NURS 354  PSYCHOSOCIAL NURSING  3
Presents selected concepts and theories related to the nursing care of infants, children and adolescents and their families. Selected laboratory and field experiences are included to enhance concepts.
PREREQ: All 200 level required nursing courses.
RESTRICTIONS: Open to nursing majors only.

NURS 356  CARE OF CHILDREN AND FAMILIES  3
Presents selected concepts and theories related to the nursing care of children and their families. Selected laboratory and field experiences are included to enhance concepts.
PREREQ: All 200 level required nursing courses.
RESTRICTIONS: Open to nursing majors only.

NURS 358  WOMEN'S HEALTH NURSING  3
Presents selected concepts and theories related to the nursing care of the childbearing family and major women's health issues. Selected laboratory and field experiences are included to enhance concepts.
PREREQ: All 200 level required nursing courses.
RESTRICTIONS: Open to nursing majors only.

NURS 362  RESEARCH CONCEPTS IN HEALTHCARE  3
Application of the research process and the research utilization process to healthcare practice.
PREREQ: NURS200, STAT200.
RESTRICTIONS: Open to nursing and health studies majors only.

NURS 366  INDEPENDENT STUDY  1-6
NURS 372  ADULT HEALTH NURSING  3
Examines selected concepts and theories related to restoring and maintaining optimal health in adult populations. Focuses on major body systems, including cardiovascular, respiratory, and neurological.
PREREQ: All 200 level required nursing courses.
RESTRICTIONS: Open to nursing majors only.

NURS 382  COMMUNITIES AND HEALTH POLICY  2
Examines the nurse's role in community health and health policy. Major issues affecting healthcare and current political issues are examined. Issues of bioterrorism, environment, and occupational health are included.
PREREQ: All 200 level required nursing courses.
RESTRICTIONS: Open to nursing majors only.

NURS 390  CLINICAL WORK EXPERIENCES  1-2 PF
Students receive credit for approved healthcare-related work/volunteer experience. Students must work/volunteer in an appropriate healthcare-related position and credit will be given based on hours worked.
PREREQ: NURS200.
RESTRICTIONS: Open to nursing majors only.

NURS 411  TOPICS IN HEALTHCARE DELIVERY  1-6
A consideration of selected issues and problems of nursing practice within the healthcare delivery system. Exploration of some topics may include a laboratory or clinical component. Variable topics.
RESTRICTIONS: Open to nursing and health studies majors, or by permission of professor. May be repeated for up to six credit hours.

NURS 412  MULTICULTURAL TOPICS IN HEALTHCARE DELIVERY  1-6
Presents a cultural consideration of selected issues and problems of nursing practice within the global healthcare delivery system. Exploration of some topics may include a laboratory or clinical component. Variable topics.
COREQ: NURS362 or permission of instructor.
RESTRICTIONS: Open to nursing and health studies majors, or by permission of professor. May be repeated for up to six credit hours.
NURS 425  LEADERSHIP AND MANAGEMENT IN HEALTH ORGANIZATIONS  3
Introduces the principles of leadership and management and their application in health systems where nursing care is delivered. Focuses on the roles of nurse leaders and managers across practice settings.
PREREQ: All 300-level BRN nursing courses.
RESTRICTIONS: Open to BRN majors only. Course sequence alteration requires permission of instructor.

NURS 442  COMMUNITY HEALTH NURSING  3
Focuses on conceptual foundations for community health nursing practice with the community, family and individual as clients. Diversity in nursing roles and practice is related to community health promotion and community health problems.
PREREQ: All 300-level BRN nursing courses.

NURS 443  BRN ROLE PRACTICUM  3
A preceptored clinical experience focused upon the integration of concepts learned in baccalaureate nursing education.
PREREQ: NURS442.

NURS 450  SYNTHESIS OF PROFESSIONAL NURSING PRACTICE  1 PF
Provides opportunities to bring key aspects of professional nursing practice together utilizing a systems framework. Includes student presentation of projects related to NURS443.
PREREQ: All other courses in BRN program.
RESTRICTIONS: Open to BRN majors only. Course sequence alteration requires permission of instructor.

NURS 453  CLINICAL APPLICATIONS ADULT HEALTH NURSING I  3 PF
Clinical application of science and nursing theories of care for adult clients in hospitals.
PREREQ: All 300-level required nursing courses.
RESTRICTIONS: Open to nursing majors only.

NURS 457  CLINICAL APPLICATIONS: MATERNAL CHILD NURSING  3 PF
Clinical application of science and nursing theories of care for infants, children, adolescents and childbearing families.
PREREQ: All 300-level required nursing courses.
RESTRICTIONS: Open to nursing majors only.

NURS 459  CLINICAL APPLICATIONS: PSYCHOSOCIAL NURSING  3 PF
Clinical application of science and nursing theories of care for clients with acute and chronic psychiatric healthcare needs.
PREREQ: All 300-level required nursing courses.
RESTRICTIONS: Open to nursing majors only.

NURS 460  CLINICAL INTEGRATION SEMINAR I  2
Using a seminar format, students discuss major issues identified in clinical nursing care. Assists students in integrating scientific and theoretical knowledge into clinical practice. Focuses on legal and ethical issues, nursing roles, leadership, and nursing licensure issues that arise from clinical experiences.
PREREQ: All 300-level required nursing courses.
COREQ: NURS443, NURS457, NURS459.
RESTRICTIONS: Open to nursing majors only.

NURS 464  TEACHING ASSISTANTSHIP IN NURSING  1-2 PF
Allows junior and senior nursing students to develop professional teaching, peer leadership, and communication skills while enhancing their knowledge base in course content. Must have a 3.0 GPA, have completed the course for which they TA in good standing, and be available the entire semester. Students must work at least 28 hours throughout the semester to receive 1 credit or 56 hours to receive 2 credits.

NURS 466  INDEPENDENT STUDY  1-6

NURS 473  CLINICAL APPLICATIONS: ADULT HEALTH NURSING II  3 PF
Advanced clinical application of science and nursing theories in acute care health settings. Builds upon clinical practice skills of NURS453.
PREREQ: NURS453, NURS477, NURS479 and NURS480.
RESTRICTIONS: Open to nursing majors only.

NURS 477  CLINICAL APPLICATIONS: CARE OF POPULATIONS  3 PF
Clinical application of science and nursing theories in community health settings. Local, national, and global issues are addressed.
PREREQ: NURS453, NURS457, NURS459, NURS460.
COREQ: NURS479, NURS480.
RESTRICTIONS: Open to nursing majors only.

NURS 479  CLINICAL PRECEPTORSHIP  3 PF
Clinical application of science and nursing theories in student-selected clinical settings. Provides a transition from student-faculty relationships to mentor-to-new graduate relationships. Students are mentored by a nurse preceptor.
PREREQ: NURS453, NURS459, NURS460. For accelerated students, NURS473 must precede NURS 479.
COREQ: NURS473, NURS477, NURS480.
RESTRICTIONS: Open to nursing majors only.

NURS 480  CLINICAL INTEGRATION SEMINAR II  2
Discussion of major issues identified in clinical nursing care. Assists students in integrating scientific and theoretical knowledge into clinical practice. Focuses on legal and ethical issues, nursing roles, leadership, and nursing licensure issues that arise from clinical experiences. Provides a transition to new graduate nurse experiences.
PREREQ: NURS460.
COREQ: NURS473, NURS477, NURS479.
RESTRICTIONS: Open to nursing majors only.

NURS 604  ADVANCED PRACTICE ROLES FOR HEALTHCARE PROVIDERS  3
See HSAD604 for course description.
RESTRICTIONS: Permission required from department.

NURS 609  NURSING SCIENCE: THEORY AND RESEARCH  4
Examines the science of nursing from theoretical and research perspectives and emphasizes theory as the foundation for research and practice.
RESTRICTIONS: Open to majors only. Permission required from department. First clinical course and EDUC655 required as prerequisites or corequisites.

NURS 610  CROSSCULTURAL HEALTHCARE  3
An in-depth study of cultural diversity, delineating ethnocultural congruent healthcare practices in a pluralistic society. Assessment, planning and interventions for health promotion, illness and disease prevention, health restoration and health policy legislation are explored.
RESTRICTIONS: Open to only to graduate students or by permission of instructor.

NURS 612  NURSING INFORMATICS  3
Addresses the current utilization of evolving technologies in nursing/client education, practice, administration and research.
RESTRICTIONS: BSN or bachelor's degree in another discipline, or by permission of instructor.

NURS 613  DEATH EDUCATION  3
Focuses on the field of death education, its relevance to everyday life and most specifically to the professional practice of practitioners providing support to the dying and bereaved.
RESTRICTIONS: Admission to BRN major or BSN degree or bachelor's degree in another discipline.

NURS 616  PRIMARY CARE IN COMMUNITY HEALTH  3
Focuses on community based primary care issues in relation to the individual, family, and community health. Clinical component includes health promotion and disease prevention activities.
RESTRICTIONS: Open to majors only. Permission required from department. NURS620 required as either a prerequisite or prerequisite.

NURS 617  PRECEPTORSHIP I  3
Focuses on clinical topics in primary care relevant to each practitioner concentration.
PREREQ: All required clinical courses except NURS627.
RESTRICTIONS: Open to nursing majors only. Permission of department required.

NURS 619  FINANCIAL MANAGEMENT IN HEALTH SERVICES ORGANIZATIONS  3
See HSAD619 for course description.
RESTRICTIONS: Permission of department required.

NURS 620  ADVANCED HEALTH ASSESSMENT  3
Assists graduate students in acquiring advanced knowledge and proficiency in performing health assessments. Includes eliciting a complete health history and performing a comprehensive examination.
RESTRICTIONS: Permission of department required.

NURS 621  ADVANCED PATHOPHYSIOLOGY  3
Presents the pathogenesis of common conditions affecting children and adults as a basis for clinical management.
RESTRICTIONS: Permission of department required.

NURS 622  ADVANCED PHARMACOLOGY  3
Applies principles of pharmacology to the therapeutic management of the client. Emphasizes prescribing, monitoring drug regimens, identifying adverse reactions, and anticipating changes inherent in self medication.
RESTRICTIONS: Permission of department required.
NURS 623 Management of Women's Healthcare 3
Focuses on gynecological and reproductive primary healthcare. Emphasizes management of gynecologic health needs and the normal reproductive cycle.
RESTRICTIONS: NURS604 and NURS622 are required as either corequisites or prerequisites.

NURS 624 Management of Children's Health 3
Focuses on delivery of primary healthcare to children and adolescents. Emphasizes physical and developmental variations and management of acute and episodic illness.
PREREQ: NURS620 and NURS621.
RESTRICTIONS: NURS604 and NURS622 required as prerequisites or corequisites.

NURS 625 Management of Adult Episodic Health Needs and Problems 3
Focuses on delivery of primary care to adults and the elderly with acute episodic health problems. Emphasizes the clinical decision making necessary to serve as a foundation for planning primary healthcare services.
PREREQ: NURS620 and NURS621.
RESTRICTIONS: NURS604 and NURS622 required as prerequisites or corequisites.

NURS 626 Management of Adult Chronic Health Needs and Problems 3
Focuses on delivery of primary care to adults and the elderly with chronic health problems. Emphasizes management of ongoing needs.
PREREQ: NURS620 and NURS621.
RESTRICTIONS: NURS604 and NURS622 required as prerequisites or corequisites.

NURS 627 Preceptorship II 3
Emphasizes clinical decision making in an interdisciplinary environment with the nurse practitioner as the principal provider of primary care.
RESTRICTIONS: NURS617 required as either a corequisite or prerequisite.

NURS 635 Health Administration Theories 3
See HSAD635 for course description.
RESTRICTIONS: HSAD604 required as prerequisite or corequisite.

NURS 636 Adult Health I 4
Provides the conceptual foundation and practical knowledge base needed to develop the essential characteristics of the clinical nurse specialist in adult health. Core content is characterized around three spheres of influence: patient, families and communities; nursing and healthcare personnel; and organizations and networks; with a primary focus on patients, families and communities. Areas of emphasis include assessment skills, therapeutic interventions, education, evidence-based practice and issues and trends in healthcare.
PREREQ: NURS636.
RESTRICTIONS: Open to clinical nurse specialist students only.

NURS 637 Health Planning Strategies 3
See HSAD637 for course description.
RESTRICTIONS: HSAD604 required as prerequisite or corequisite.

NURS 638 Health Services Evaluation 3
See HSAD638 for course description.
RESTRICTIONS: HSAD604 required as prerequisite or corequisite.

NURS 646 Adult Health II 4
Provides opportunities to develop advanced skills inherent to the clinical nurse specialist role as determined by the National Association of Clinical Nurse Specialists. Content organized around the three spheres of influence with emphasis on nursing and healthcare personnel and builds upon CNS content in previous courses. Areas of emphasis include leadership, collaboration, citizenship, cost effective care, innovation in practice, and mentorship.
PREREQ: NURS636.
RESTRICTIONS: Open to graduate clinical nurse specialist students only.

NURS 654 Nursing of Children I 4
Explores the scientific basis for the routine healthcare guidance required by children and their families. Focuses primarily on the acutely ill child.
RESTRICTIONS: NURS604 and NURS621 required as prerequisites or corequisites.

NURS 655 Nursing of Children II 4
Explores the biopsychosocial needs of children with chronic conditions and their families. Emphasizes the interventions of the advanced practice nurse to assist these children to attain, maintain or regain health.
PREREQ: NURS654.
RESTRICTIONS: Open to matriculated graduate nursing students only.

NURS 664 Nursing Practicum 1-3
In conjunction with the faculty advisor and based on the student's individualized long range goals, the student selects a preceptor and healthcare setting in which to apply didactic contact in real life settings. Requires 135 hours of on-site experience, which can be taken in one semester or divided over three semesters.
RESTRICTIONS: NURS635, NURS637, or NURS638 is required as a corequisite or prerequisite.

NURS 671 Psychiatric Mental Health Nursing I 4
Emphasizes theory and research related to assessment, diagnosis, clinical management and psychopharmacological intervention in mental illness. Didactic and clinical components allow for the development of subspecialization.
PREREQ: Graduate psychopathology course.
RESTRICTIONS: Open to matriculated students only.

NURS 672 Psychiatric Mental Health Nursing II 4
Focuses on the development of two modalities of psychiatric skills and treatment. Core concepts of cognitive and group therapy are integrated with specific strategies for behavioral change.
PREREQ: NURS671.
RESTRICTIONS: Open to matriculated graduate nursing students only.

NURS 686 Clinical Nurse Specialist Role Integration 4
Integration of theories and concepts related to roles of the clinical nurse specialist. Emphasizes advanced practice roles within the broad context of healthcare.
PREREQ: All required clinical courses.

NURS 687 Nursing Science: Research Application 3
Focuses on the application of research to nursing practice. Includes critical analysis of research through an organized critique process, examination of data, and examination of factors and barriers to research/research utilization, models of research utilization, and methods of quality management.
PREREQ: NURS609.
RESTRICTIONS: Open to majors only. Permission required from department.

NURS 690 Colloquium: Nursing 0 PF
Lectures by faculty and visiting researchers provide a broad overview of the scope as well as significant results of current research in nursing sciences.

NURS 688 Research: Scholarly Project 1-3
Investigation of a problem in clinical settings related to finance, administration, personnel management, public policy or education, resulting in completion of a scholarly project.

NURS 869 Master's Thesis 1-6

Operations Research

ORES 401 Introduction to Operations Research 3
Introduction to the methodologies of operations research with particular focus on their application in areas such as agriculture, environmental systems, health care, manufacturing and transportation. Case studies and applied problem solving are emphasized.
PREREQ: MATH241 and MATH242.

ORES 601 Survey Operations Research I 3
Covers various deterministic mathematical programming methods (LP, integer dynamic), network models and basic inventory models.
PREREQ: Linear algebra.

ORES 602 Survey Operations Research II 3
Covers various stochastic operations research models including decision theory, game theory, project planning, inventory models, simulation, markov decision processes and Queuing models.
PREREQ: Linear algebra and MATH630.

ORES 603 Simulation Modeling and Analysis 3
Instructors from hard sciences and social sciences introduce real-world Operations Research case studies based on their expertise. Students implement proposed solution methodologies using a variety of available computer software packages.
PREREQ: ORES601 and permission of director/instructor.
COREQ: ORES602.

ORES 613 Advanced Prices and Statistics 3
See FREC615 for course description.

ORES 650 Urban Transportation Systems 3
See CIEG650 for course description.
PHILOSOPHY

PHIL 100  PHILosophies of Life  3
Survey of selected past and present philosophies that people strive to live by, typically including individualistic, group-oriented, religious and nonreligious positions.

PHIL 101  GREAT WEstERN PHilosophers  3
Survey of the key ideas of great Western philosophers concerning the nature of reality and how it is known. Focus on individual philosophers such as Plato, Aristotle, Descartes, Kant, Hegel, James and Wittgenstein.

PHIL 102  INTRODUCTION TO PHILOSOPHY  3
An examination of such central philosophical problems as ethics, theories of knowledge, the nature of reality, philosophy of religion and political philosophy.

PHIL 105  CRITICAL THINKING  3
Emphasis on developing skill at logical criticism of arguments. Topics include informal fallacies, deceiving with statistics, the role of definitions in reasoning, the importance of evidence and confirmation.

PHIL 109  MODERN RELIGIOUS ISSUES  3
The biblical world view and modern science, controversies over the nature of Scripture, doctrines of religious authority, the nature of theological language and existentialist interpretations and myth.

PHIL 125  TOPICS: PHILOSOPHY IN POPULAR CULTURE  1-4
Philosophical ideas expressed in popular media such as science fiction or fantasy literature, films and music. Topics are variable.

PHIL 200  BUSINESS ETHICS  3
Ethical theory applied to moral problems in business. Corporate social responsibility, and ethical issues in advertising, personnel and investment.

PHIL 201  SOCIAL AND POLITICAL PHILOSOPHY  3
Classical and contemporary views on such problems as the proper scope and functions of government, on what a just distribution of wealth is, and on the extent of an individual’s rights, liberties and obligation to obey the law.

PHIL 202  CONTEMPORARY MORAL PROBLEMS  3
The application of philosophical techniques to contemporary moral problems such as abortion, punishment, biomedical ethics, reverse discrimination and sexual morality. May be cross-listed with WOMS203.

PHIL 203  ETHICS  3
Study of moral value, moral obligation and moral virtue through comparison of notable schools of ethical theory, including utilitarianism, existentialism, Kantianism, classical Greek eudaimonism, pragmatism and Thomism.

PHIL 204  WORLD RELIGIONS  3
Varieties of religious belief and practice from diverse cultures, including representative Asian and Western traditions, studied mainly in terms of their historical development and importance.

PHIL 205  LOGIC  3
Concepts and techniques of elementary symbolic logic: truth and consistency of sentences, validity and soundness of arguments; translation of English sentences into a formal language, construction of truth tables and the use of a system of natural deduction to prove the validity of deductive arguments.

PHIL 206  RESEARCH TECHNIQUES AND PROCEDURES  3
See FREC806 for course description.

PHIL 207  SCIENTIFIC REASONING  3
Critical survey of basic concepts and forms of inductive reasoning. Applications to the physical, social and biomedical sciences. Topics include: interpretations of probability, probabilistic fallacies, methods of statistical induction, logic of hypothesis testing, judging correlations, criteria of causation, experimental design and definitions of confirmation.

PHIL 208  INTRODUCTION TO JEWISH PHILOSOPHY  3
Fundamental issues in philosophy of religion reflecting both general theological approaches to resolving the tension between philosophy and religion and the uniquely Jewish attempt to do so. Topics include: God, miracles, good and evil, divine commandments and free will. May be cross-listed with JWST208.

PHIL 209  PHILOSOPHY OF RELIGION  3
Religious experience, proofs for God’s existence, religious language and critiques of religion. Selected special topics such as mysticism, evil, atheism, miracles, immortality and myth.

PHIL 210  WOMEN AND RELIGION  3
See WOMS210 for course description.

PHIL 211  BASIC DECISION THEORY  3

PHIL 216  INTRODUCTION TO FEMINIST THEORY  3
The concepts of love, marriage, sexuality, family, work, power and equality of women. Theories of women and their position in society, including classical Marxism, the status politics of the suffragettes, radical feminism and socialist feminism. May be cross-listed with WOMS216.

PHIL 226  MIND, ESP AND SURVIVAL  3
An exploration of major philosophical conceptions of the relation of mind (soul) and brain. Implications for the nature of mind from the literature of psychic research and immortality.

PHIL 241  ETHICAL ISSUES IN HEALTHCARE  3
Interdisciplinary study of basic ethical thought and its application to contemporary biomedicine in such moral and ethical issues as care for the terminally ill, abortion and experimentation with human subjects.

PHIL 244  PHILOSOPHY OF ART  3
An introduction to main philosophic problems concerning art: the nature, evaluation and value of art.

PHIL 246  PHILOSOPHICAL PERSPECTIVES OF MEDICINE  3
Ethical and epistemological foundations of medicine, medicine as a way of knowing about the world compared with other ways.
PHIL 301  ANTIQUE PHILOSOPHY 3
Beginnings of Western science and philosophy. The pre-Socratics, Sophists, Socrates, Plato, Aristotle, the Epicureans, Stoics and Skeptics.

PHIL 303  MODERN PHILOSOPHY 3
Skepticism and the birth of Modernity. Bacon and scientific experimentalism; Hobbes materialism, Descartes, Spinoza and Leibniz; Locke, Berkeley, Hume and Kant; and the Age of Enlightenment and its impact on philosophy, science and religion.

PHIL 304  NINETEENTH-CENTURY PHILOSOPHY 3
Major philosophies of the 19th century with special emphasis on Hegel and Nietzsche.

PHIL 305  TWENTIETH-CENTURY PHILOSOPHY 3
Major philosophical movements from the 20th century to the present. Includes logical empiricism and the recent criticism of this movement.

PHIL 306  PHILOSOPHY OF SCIENCE 3
A survey of central topics in the philosophy of science which may include the distinction between science (astronomy) and pseudo-science (astrology), the role of values in science, scientific realism, scientific reductionism, as well as the nature of scientific theories, explanations, and confirmation.

PHIL 307  BLACK THOUGHT AND PHILOSOPHY 3
See BAM307 for course description.

PHIL 308  TOPICS IN JEWISH THEOLOGY 3
Critical evaluation of the theological views of major branches of Judaism on such topics as: the significance of Israel, the status of Jewish law, the meaning of Jewish ritual and the mission of the Jewish people. May be crosslisted with JWST308. PREREQ: PHIL208 recommended.

PHIL 309  INDIAN RELIGION AND PHILOSOPHY 3
The Vedas, Upanishads, and Bhagavad-Gita; Sankhya, Yoga, Nyaya, Vaishesika and Mimamsa; Jainism and Indian Hinayana and Mahayana Buddhism; Vedanta and modern developments such as Aurobindo.

PHIL 310  CHINESE RELIGION AND PHILOSOPHY 3

PHIL 311  EARLY MEDIEVAL PHILOSOPHY 3
Examines the attempt to synthesize Greek philosophy with biblical religion in the late classical and early medieval period. Covers Plotinus, Augustine, Anselm and Abelard among others, on topics including God, scepticism, evil, the happy life, universals and more.

PHIL 312  LATE MEDIEVAL PHILOSOPHY 3
The rediscovery of Aristotle by the Islamic philosophers (10th-12th centuries) through Ockham (14th century) and includes Avicenna, Alghazali, Averroes, Maminones, Aquinas, and more. Topics include science and religion, divine command theory, talking about God, among others.

PHIL 313  KILLING AND LETTING DIE 3
Examines the moral basis for condemning killing while allowing, or even applauding, letting die.

PHIL 315  METAPHYSICS 3
Examination of central issues in metaphysics. Sample topics: universals and particulars, possibility and necessity, identity over time, free will, causality, and the philosophy of time. PREREQ: One philosophy course.

PHIL 316  TIME TRAVEL 3
Through philosophy applied to physics and science fiction, explores the connections of time travel to traditional philisophic issues concerning the nature of time, God, free will and personal identity.

PHIL 317  AMERICAN PHILOSOPHY 3
Classical American philosophers, including Emerson, Th oreau, Peirce, James and Dewey. Includes ethics, epistemology and social and political theory.

PHIL 320  THEORY OF KNOWLEDGE 3
An examination of some central issues in epistemology: classical and contemporary analyses of empirical knowledge; the nature of justification and rationality; implications for science, religion and metaphysics.

PHIL 321  PHILOSOPHY OF BIOLOGY 3
Examines philosophical issues raised by the theory of evolution. Topics may include the challenge of scientific creationism, the units of selection problem, the debate about adaptationism, human sociobiology and evolutionary ethics.
PHIL 466  INDEPENDENT STUDY  1-6
PHIL 648  ENVIRONMENTAL ETHICS  3
Ethical problems associated with environmental protection, local, national, and international. Relations to social and political movements. Seminar format. May be cross-listed with MAL564E and/or UAPP648.

PHIL 650  RECENT TOPICS IN THE PHILOSOPHY OF MIND  3
Recent topics in the philosophy of mind such as theory of mind, nativized semantics, animal cognition, evolution of language. May be cross-listed with CGSC650.

PHIL 868  RESEARCH  1-3
A detailed study of certain philosophical problems with special reference to research problems under way in the department.

PHYSICS AND ASTRONOMY

PHYS 104  ELEMENTARY PHYSICS  3
Overview of the principles of physics and their applications. Designed for beginners with no previous exposure to physics. RESTRICTIONS: Requires working knowledge of algebra and the use of scientific notation. Only one course among PHYS104, PHYS201, PHYS207 and SCEN101 can count toward graduation.

PHYS 133  INTRODUCTION TO ASTRONOMY  4
Objects of the universe from the earth to galaxies. How the universal laws that govern them; e.g., gravity and electromagnetic radiation, permit us to learn their nature from quantitative observations. Telescopic observations, visual and electronic, included in the laboratory.

PHYS 139  STAR AND CONSTELLATION IDENTIFICATION  1
Familiarity with the sky, its changing aspects, constellations, mythology, bright stars, and planets. Topics include use of sky maps and coordinates, how to estimate directions and time from knowledge of the sky, and the use of binoculars and small telescopes.

PHYS 140  GREAT CONCEPTS OF PHYSICS  3
Designed for non-science majors, concentrates on understanding both the content and impact of five great concepts of physics: the Newtonian Universe, Conservation of Energy, Entropy, Relativity, and Wave-Particle Duality. The influence of these concepts in other areas of human concern, e.g., philosophy, art, history, politics, medicine, etc. will be an important feature.

PHYS 141  LIGHT, LASERS, CAMERAS, PERCEPTION  3
Introduction to the phenomena of light, optics and perception for non-science majors. Topics include: nature of light, sources of light and shadows, rainbows, mirages and other atmospheric phenomena, cameras, telescopes, microscopes, color creation and observation, physics influences in art, the human eye and perception.

PHYS 143  ENERGY TECHNOLOGY AND SOCIETY  3
Basic principles of physics are applied to discuss forms of energy (mechanical, thermal, chemical, electrical and nuclear), and how energy is derived from sources such as coal, petroleum, solar, nuclear fission and fusion. Environmental consequences of energy use are treated. PREREQ: College algebra.

PHYS 144  CONCEPTS OF THE UNIVERSE  3
Survey of astronomy emphasizing early and modern concepts. Stars, planets, galaxies, cosmic evolution and intelligent life are studied in the context of physical principles which describe the dynamics of the universe. Scientific process is used to interpret observations that shape our perceptions of the cosmos. RESTRICTIONS: Not for credit to students who have taken PHYS133.

PHYS 145  BLACK HOLES AND COSMIC EVOLUTION  3
Geared toward a general audience and focuses on topics such as finding black holes in space; the nature of space, time and black holes; the origin of the Universe; and the development of complex life here on Earth.

PHYS 146  QUARKS, GLUONS, AND THE BIG BANG: PARTICLES AND COSMOLOGY  3
Non-mathematical course focusing on the elementary particles and their influence on the early evolution of the universe. Major topics are quarks and the forces they feel, Einstein's theory of relativity, Quantum Mechanics made fairly simple, and the Inflationary Universe. RESTRICTIONS: Requires high school algebra.

PHYS 147  ATOMS FOR EVERYONE  3
Elementary but earnest inquiry into the sources of our knowledge that these completely invisible building blocks of ordinary matter exist as discrete entities, and exist to the exclusion of all other possibilities. RESTRICTIONS: Requires high school algebra.

PHYS 169  PERSPECTIVES ON PHYSICS AND ASTRONOMY  1
First year seminar providing an introduction to the practice of physics and astronomy. Topics include research, education, careers, and the relation of physics to society. RESTRICTIONS: Priority given to first year students. Intended for science majors.

PHYS 199  EXPLORING PHYSICS CONCEPTS I  3
Exploration of physics concepts for first year students with no prior physics background. Emphasis on physics of light, color, electrical circuits and structure of matter. RESTRICTIONS: Open to first year students only and to university studies majors.

PHYS 201  INTRODUCTORY PHYSICS I  4
First course in a sequence with PHYS202 that provides an introduction to physics for students in the life and environmental sciences. Emphasis on topics including mechanics, fluid dynamics, optics and thermodynamics. PREREQ: MATH115.
RESTRICTIONS: Requires a strong mathematics background in geometry, algebra and trigonometry. Only one course among PHYS104, PHYS201, PHYS207 and SCEN101 can count toward graduation.

PHYS 202  INTRODUCTORY PHYSICS II  4
Final course in a sequence with PHYS201 that provides an introduction to physics for students in the life and environmental sciences. Topics include rotation and oscillatory motion, waves, electricity and magnetism, structure and properties of nuclei, atoms, molecules and solids. PREREQ: PHYS201.
RESTRICTIONS: Only one course from PHYS202 and PHYS208 can count toward graduation.

PHYS 207  FUNDAMENTALS OF PHYSICS I  4
First course in a sequence with PHYS208 that provides an introduction to physics for those in the physical sciences and engineering. Emphasis is on Newton's laws of motion, force laws, and conservation principles. Integrates conceptual understanding with extensive problem solving and laboratory experience. COREQ: MATH241.
RESTRICTIONS: One year of high school calculus is recommended. Only one course from PHYS104, PHYS207 and SCEN101 can count toward graduation.

PHYS 208  FUNDAMENTALS OF PHYSICS II  4
Second course in a sequence with PHYS207 that provides an introduction to physics for those in the physical sciences and engineering. The emphasis is on electricity and magnetism force laws, fields and electrical circuits. PREREQ: PHYS207.
COREQ: MATH242.

PHYS 245  INTRODUCTION TO ELECTRICITY AND ELECTRONICS  4
Fundamentals of electricity and magnetism specific to DC and AC circuit analysis, transient circuit behavior and rotating machinery. Fundamentals of analog and digital electronics, with emphasis on applications in engineering, integrated circuits and operational amplifiers. PREREQ: PHYS207.
COREQ: MATH243.
RESTRICTIONS: Not for major credit.

PHYS 309  PHYSICS OF THE TWENTIETH AND TWENTY FIRST CENTURIES  3
Fundamentals in physics that help form a modern understanding of science and technology. Intended for physical science and engineering majors, the emphasis is on electromagnetic radiation, quantum mechanics, nuclear reactions, Bohr atom, solid state physics and devices, and relativity. PREREQ: PHYS208.
COREQ: MATH243 suggested.

PHYS 310  INTRODUCTION TO THERMAL PHYSICS  3
Basic concepts of thermodynamics including properties of substance, first and second law analysis of systems and control volumes, entropy and availability. Power and refrigeration cycles. PREREQ: PHYS207.

PHYS 313  PHYSICAL OPTICS  4
A detailed treatment of optics at an intermediate level appropriate for physics, engineering and other students with a physical science background. Emphasis is on physical concepts and analysis of geometric optics, wave optics and applications of optics. COREQ: MATH243.

PHYS 333  FUNDAMENTALS OF ASTROPHYSICS  3
A quantitative approach to astronomy and astrophysics. Treatment of stars, the interstellar medium, galaxies, and cosmology. PREREQ: PHYS208, MATH243.

PHYS 366  INDEPENDENT STUDY  1-3
PHYS 419  **CLASSICAL MECHANICS I**  3  
Emphasizes the fundamental principles of classical mechanics. Treats in detail and with mathematical rigor, particle mechanics, conservation laws, harmonic oscillation, motion under central force, rigid body dynamics, and moving coordinate systems.  
**COREQ:** MATH302.

PHYS 424  **QUANTUM MECHANICS**  3  
Introduces quantum mechanical concepts by reviewing experiments which cannot be explained by classical physics. The Schrödinger equation is solved for simple cases such as free-particle motion, the simple harmonic oscillator and the hydrogen atom, with a basic treatment of angular momentum. May be cross-listed with CHEM424 and/or ELEG424.  
**PREREQ:** PHYS309, MATH302 and MATH349.

PHYS 431  **ACOUSTICS**  3  
Vibrations of particles, strings and membranes; acoustic waves; radiation of sound; room acoustics; and acoustic measurements.  
**PREREQ:** MATH243 and PHYS207.

PHYS 445  **ELECTRONICS FOR SCIENTISTS**  3  
Fundamentals of analog and digital electronics, with emphasis on applications in science. Circuit analysis, operational amplifiers, filters, gates, flip-flops, counters, analog to digital and digital to analog converters.  
**PREREQ:** PHYS208.

PHYS 446  **INSTRUMENTATION FOR SCIENTISTS**  3  
Electronic measurements and instrumentation with emphasis on applications in science. Amplification, noise, low-level signal recovery, lock-in amplifiers, digital signal averaging, frequency and time measurements, transducers, bridges, interfacing to laboratory computers and automation of experiments.  
**PREREQ:** PHYS208.

PHYS 449  **INTRODUCTION TO RESEARCH**  1-6  
Undergraduate research on an assigned problem carried out under the supervision of the staff.

PHYS 460  **COMPUTATIONAL METHODS OF PHYSICS**  3  
Introduction to basic computational techniques in science with application to a number of disciplines of current research interest, such as quantum physics, biophysics, statistical mechanics and chaos.  
**PREREQ:** MATH302 or MATH341, CISC105 or equivalent, PHYS208.

PHYS 465  **SENIOR SEMINAR**  1  
Senior seminar for physics majors.  
**RESTRICTIONS:** Requires senior status.

PHYS 466  **INDEPENDENT STUDY**  1-3  
Hands-on experience focusing on the techniques and analysis of astronomical observation, with emphasis on CCD imaging. Topics include celestial coordinates, telescope handling, CCDs, data reduction, and data analysis.  
**RESTRICTIONS:** Meets at Mt. Cuba Observatory in Greenville.

PHYS 501  **TOPICS IN MIDDLE SCHOOL PHYSICS EDUCATION: FORCE AND MOTION**  3  
Application of scientific principles to topics related to Newton’s first law, motion, force, electric circuits, magnetism, electromagnets, motors, and generators.  
**RESTRICTIONS:** Restricted to in-service middle school teachers.

PHYS 500  **TOPICS IN MIDDLE SCHOOL PHYSICS: PLANETARY SYSTEMS**  3  
Application of physics principles to topics related to the earth, moon, sun, planets, and seasons.  
**RESTRICTIONS:** Restricted to in-service middle school science teachers.

PHYS 503  **TOPICS IN MIDDLE SCHOOL SCIENCE EDUCATION: PROPERTIES OF MATTER**  3  
Application of scientific principles to topics related to the particle model and density, phase change, mixtures and solutions, and separation techniques.  
**RESTRICTIONS:** Restricted to in-service middle school science teachers.

PHYS 504  **TOPICS IN MIDDLE SCHOOL SCIENCE EDUCATION: TRANSFORMATION OF ENERGY**  3  
Application of scientific principles to topics related to energy changes, heat, light, and topics in other middle school science curricula such as ecosystems and weather systems.  
**RESTRICTIONS:** Restricted to in-service middle school science teachers.

PHYS 511  **TOPICS IN HIGH SCHOOL PHYSICS: FORCE, MOTION AND ENERGY**  3  
Application of physics principles to topics related to Newton’s Three Laws, work and mechanical energy.  
**RESTRICTIONS:** Restricted to in-service high school science teachers.

PHYS 560  **PHYSICS RESEARCH TALKS**  1 PF  
Lectures by Physics and Astronomy faculty describing their current research to aid graduate students in selection of an area of thesis research.

PHYS 601  **INTRODUCTION TO TEACHING PHYSICS AND ASTRONOMY**  1 PF  
Introduction to the methods and techniques of teaching and tutoring physics at a level appropriate for teaching assistants and tutors of undergraduate courses in Physics and Astronomy. Discussion and workshop formats are employed.

PHYS 603  **ELECTRICITY AND MAGNETISM I**  3  
First of a two-part sequence (with PHYS604) that provides an intermediate level treatment of electrostatics and magnetostatics, as well as an introduction to electrodynamics. Topics include a discussion of different techniques used for the calculation of electrostatic and magnetostatic fields in vacuum and in matter, and effects of time varying electric and magnetic fields.  
**PREREQ:** PHYS208, MATH302.  
**COREQ:** MATH303 suggested.

PHYS 604  **ELECTRICITY AND MAGNETISM II**  3  
Second in a two-part sequence (with PHYS603) that provides an intermediate level treatment of electrodynamics. Specific topics include a discussion of conservation laws, electromagnetic waves and radiation, and the theory of special relativity.  
**PREREQ:** PHYS603.

PHYS 607  **METHODS OF MATHEMATICAL PHYSICS**  3  
Mathematics commonly used in physics. Main topics are linear algebra, vector calculus, fourier series, integral transforms, and eigenfunction methods for differential equations.  
**PREREQ:** PHYS424.

PHYS 610  **QUANTUM MECHANICS**  3  
**PREREQ:** PHYS424.

PHYS 616  **KINETIC THEORY AND THERMODYNAMICS**  3  
Postulates of equilibrium thermodynamics; review of relevant mathematics; entropy maximum principle; energy minimum principle; Legendre transformations. Entropy representation, internal energy representation, Helmholtz representation and Gibbs representation. Maxwell relations; reduction of partial derivatives; phase transitions; statistical mechanics via Boltzmann’s elementary method; equipartition of energy; applications.  
May be cross-listed with ELEG616.  
**PREREQ:** MATH243 and PHYS309.

PHYS 620  **CLASSICAL MECHANICS II**  3  
Topics covered are Lagrangian and Hamiltonian dynamics, dynamics of systems of particles, rigid bodies and fluids, oscillations of systems of coupled particles, oscillations and waves in continuous systems. Provides a classical introduction to techniques used extensively in quantum and statistical physics.  
**PREREQ:** MATH302 and PHYS419.

PHYS 621  **FUNDAMENTALS OF MODERN PHYSICS**  3  
Application of quantum mechanics and the theory of relativity to selected topics in physics, with emphasis on elementary particle physics.  
**PREREQ:** MATH302 and PHYS424.

PHYS 624  **INTRODUCTION TO SOLID STATE PHYSICS**  3  
X-ray diffraction, structure and properties of metals, insulators and semiconductors, and band theory of solids; includes electrical, optical, magnetic and thermal properties.  
**PREREQ:** PHYS616 and PHYS621.

PHYS 631  **ACOUSTICS**  3  
Vibrations of particles, strings and membranes; acoustic waves; radiation of sound; room acoustics; and acoustic measurements.  
**PREREQ:** MATH302.

PHYS 632  **ASTROPHYSICS**  3  
Survey of diverse astronomical objects and the physical principles used in modeling them. Emphasis on the observational basis and foundations of astrophysics. Stellar magnitudes, colors and spectra; the HR diagram; solar and stellar activity; binary stars; the phenomena of galactic and extragalactic astronomy.  
**PREREQ:** MATH302 plus 14 credit hours of physics.
PHYS 633  INTRODUCTION TO STELLAR ASTROPHYSICS  3
Introduction to the physics of stellar interiors and atmospheres. The evolution of stars is explored by studying the changes in internal composition due to nuclear reactions. The physical processes underlying stellar spectra are investigated. Computer simulations of stars and their atmospheres may be used. PREREQ: PHYS632 and MATH302.

PHYS 634  PHYSICS OF THE SUN  3
Physics of processes which occur in the outer regions of the Sun. Topics include radiative transfer, convection, sound waves, magnetic fields, the chromosphere, the corona, the solar wind, and the cycle of solar activity. PREREQ: MATH302 or MATH341 plus 14 credit hours of physics.

PHYS 638  SELECTED TOPICS IN PHYSICS  3
Treatment of a specialized subject taken from the following list: particle astrophysics, magnetic materials, electron microscopy, elementary particles, cosmology, solar physics, and other advanced topics. RESTRICTIONS: May be repeated for credit when topics vary.

PHYS 644  ELEMENTARY PARTICLES AND BIG BANG COSMOLOGY  3
An introduction to the world of elementary particles, the fundamental building blocks of matter, and the essential role they play in the formulation of hot big bang and inflationary cosmologies. PREREQ: Some knowledge of quantum mechanics and special relativity is recommended. COREQ: PHYS424.

PHYS 645  ELECTRONICS FOR SCIENTISTS  3
Fundamentals of analog and digital electronics, with emphasis on applications in science. Circuit analysis, operational amplifiers, filters, gates, flip-flops, counters, analog to digital and digital to analog converters. PREREQ: PHYS208.

PHYS 646  INSTRUMENTATION FOR SCIENTISTS  3
Electronic measurements and instrumentation with emphasis on applications in science. Amplification, noise, low-level signal recovery, lock-in amplifiers, digital signal averaging, frequency and time measurements, transducers, bridges, interfacing to laboratory computers and automation of experiments. PREREQ: PHYS208.

PHYS 650  QUANTUM COMPUTATION  3

PHYS 660  COMPUTATIONAL METHODS OF PHYSICS  3
Introduction to basic computational techniques in science with application to a number of disciplines of current research interest, such as quantum physics, biophysics, statistical mechanics and chaos. PREREQ: MATH302 or MATH341, CISC105 or equivalent, PHYS208.

PHYS 669  OBSERVATIONAL ASTRONOMY  3
Hands-on focus on techniques and analysis of astronomical observation, with emphasis on CCD imaging. Topics include celestial coordinates, telescope handling, CCDs, data reduction, and data analysis. RESTRICTIONS: Meets at Mt. Cuba Observatory in Greenville.

PHYS 803  SOLID STATE PHYSICS  3
Crystal structure, mechanical, thermodynamic, electrical, optical and magnetic properties of solids; and imperfections in crystals. PREREQ: PHYS624.

PHYS 809  ELECTROMAGNETIC THEORY  3
Review of statics, Maxwell's equations, physical optics and wave guides. May be crosslisted with ELEG809. PREREQ: PHYS604.

PHYS 810  ELECTROMAGNETIC THEORY  3

PHYS 811  QUANTUM MECHANICS  3
Develops formal description of quantum systems as states in a complex vector space. Topics include time evolution, path integrals, symmetry groups and conservation laws, parity, angular momentum and tensor operators, operator treatment of the harmonic oscillator, identical particles, time independent and time dependent perturbation theory, and radiative transitions. Includes a summary of special functions and boundary problems appropriate to simple quantum systems. PREREQ: PHYS607 and PHYS610.

PHYS 812  QUANTUM MECHANICS  3
Continuation of PHYS811. Topics include: many-particle wave functions and many-body operators, helium atom, second quantization, advanced topics in perturbation theory, the Hartree-Fock method, a continuation of radiative transitions, scattering theory, and relativistic quantum, relativity. Measurement theory and the interpretation of quantum mechanics. Applications of quantum mechanics discussed throughout. PREREQ: PHYS811.

PHYS 813  STATISTICAL MECHANICS AND THERMODYNAMICS  3
Review of equilibrium thermodynamics and probability theory. Kinetic theory including the Boltzmann equation, Gibbsian ensemble theory in classical and quantum statistical mechanics. Classical ideal gases with internal degrees of freedom. Dissociation equilibrium. The ideal Bose and Fermi gases with elementary applications to fluids and solids. May be crosslisted with ELEG813. PREREQ: PHYS616.

PHYS 815  THEORY OF RELATIVITY  2-3
Critique of the special theory introductory to the general theory; physical basis of the general theory; Einstein's field equations; and problems of gravitational motion and radiation. PREREQ: PHYS809.

PHYS 817  ADVANCED CLASSICAL DYNAMICS  3
Theoretical treatment of classical dynamics. PREREQ: PHYS620.

PHYS 822  QUANTUM FIELD THEORY  3
An introduction to quantum field theory. Covers symmetry groups (including Lorentz and Poincare groups), classical field theory, relativistic wave mechanics, second quantization, scalar, vector and Fermion fields, quantum electrodynamics, Feynman rules, renormalization theory and the renormalization group. PREREQ: PHYS827.

PHYS 827  NUCLEAR PHYSICS I  3
First of a sequence of two course on nuclear physics. Topics covered include (1) the Fermi Gas Model, (2) Nuclear Matter, (3) the Independent Particle Model, (4) the Nuclear Shell Model, (5) Collective Models of Nuclei, and (6) Many-body methods. PREREQ: PHYS811 and PHYS812.

PHYS 828  NUCLEAR PHYSICS II  3
Second of a sequence of two course on nuclear physics. Topics covered include (1) Brueckner Theory, (2) Effective Interactions, (3) Electromagnetic Transitions, (4) the Weak Interaction, and (5) Nuclear Reactions. PREREQ: PHYS827.

PHYS 832  GALACTIC ASTRONOMY  3
A treatment of galaxies with an emphasis on the Galaxy. Topics include: stellar dynamics, galactic structure, star counts, stellar clusters, mass models, and dark matter. PREREQ: PHYS620.

PHYS 833  ASTROPHYSICS OF COMPACT OBJECTS  3
Formation and evolution of white dwarf stars, neutron stars and black holes. Topics include supernovae, cataclysmic variables, x-ray and gamma-ray sources. RESTRICTIONS: PHYS633 suggested.

PHYS 838  ADVANCED TREATMENT OF SELECTED TOPICS  3
Selected topics from quantum field theory, renormalization group and critical phenomena, nuclear theory, elementary particles and applications of group theory in physics. RESTRICTIONS: May be repeated for up to six credit hours when topics vary.

PHYS 862  SOLID STATE SEMINAR  1
Lectures and discussions by faculty and students on specialized topics in solid state physics.

PHYS 865  RESEARCH  1-9

PHYS 869  MASTER'S THESIS  1-6
**PHYSICAL THERAPY**

**PHYT 664 Independent Study 1-6**
Research and readings in preparation of dissertation topic and/or qualifying examinations for doctoral students before admission to candidacy but after completion of all required course work.

**Restrictions:** Not open to students who have been admitted to candidacy.

**PHYT 669 Doctoral Dissertation 1-12 PF**

**PHYT 864 Pre-Candidacy Study 3-12 PF**

**PHYT 660 Physical Therapy as a Profession 1**
Ethics, licensure laws and practice of physical therapy are explored. The Guide to Physical Therapy Practice is introduced and the importance to effective practice discussed.

**Restrictions:** Open to physical therapy graduate students only.

**PHYT 664 Functional Anatomy and Biomechanics 4**
Gives a description of normal and abnormal human movement. Emphasis on joint structure and function and gait using arthokinematic and osteokinematic analysis. Evaluation procedures such as EMG, cinematography and computer simulations utilized.

**Prerequisites:** PHYT622.

**Restrictions:** Open to physical therapy graduate students only or with permission of instructor.

**PHYT 666 Research 3**
An overview of methodological issues in the conduct of physical therapy research. Topics include scientific method, experimental design, statistical procedures and technical writing. Student expected to critically analyze current physical therapy literature.

**Restrictions:** Open to physical therapy graduate students only.

**PHYT 614 Sports Physical Therapy 3 PF**
Advanced orthopedics with emphasis in sports related injuries. Discuss evaluation and intervention of the athlete in the various major joints of the body, as well as other related topics in sports and orthopedics.

**Prerequisites:** PHYT608, PHYT622, PHYT604, PHYT7802, AND PHYT7808.

**Restrictions:** Open to physical therapy graduate students only.

**PHYT 615 Advanced Neurotherapeutics 3**
Discusses an integration of the various neurodevelopmental approaches to the treatment of the neurological patient.

**Restrictions:** Open to physical therapy graduate students only.

**PHYT 620 Educational Process in Community Health 1**
Focuses on the learning/teaching process as defined in the Guide to Physical Therapy Practice for application to the teaching roles of the health professional.

**Restrictions:** Open to physical therapy graduate students only.

**PHYT 622 Clinical Gross Anatomy 6**

**Prerequisites:** PHYT623.

**Restrictions:** Open to physical therapy graduate students only.

**PHYT 623 Clinical Neurosciences 4**
A study of the structure and function of the nervous system with major emphasis on the cause-effect relationships between lesions and their symptoms. Emphasis on the neural mechanisms controlling movement.

**Prerequisites:** PHYT622.

**Restrictions:** Open to physical therapy graduate students only or by permission of instructor.

**PHYT 624 Basic Evaluation Techniques 2**
Provides an understanding of the philosophy and practice of patient evaluation and physical therapy diagnosis. Muscle performance testing and measurement of joint motion of the extremities emphasized.

**Restrictions:** Open to physical therapy graduate students only.

**PHYT 626 Advanced Regional Anatomy 3 PF**
Structural and functional aspects of regions of the body under study are emphasized by means of a dissection of a specific region of the human body.

**Prerequisites:** PHYT622.

**PHYT 631 Physical Therapy in the Acute Care Environment 4**
Presents diagnoses commonly seen in the acute care environment. The pathological, anatomical, evaluation, documentation and treatment considerations in managing these diagnoses are discussed.

**Restrictions:** Open to physical therapy graduate students only.

**PHYT 632 Applied Physiology I 3**
In-depth analysis of the physiological mechanisms of the cardio-pulmonary system. Lectures in normal and abnormal function of this system. Emphasis on cardiopulmonary testing and rehabilitation techniques including stress tests and pulmonary function tests.

**Prerequisites:** PHYT622.

**Restrictions:** Open to physical therapy graduate students only.

**PHYT 633 Applied Physiology II 3**
Discusses the research on the effects of exercise on the various patient populations (not including cardiopulmonary). Emphasis placed on the musculoskeletal system and on exercise prescription and progression.

**Prerequisites:** PHYT632.

**Restrictions:** Open to physical therapy graduate students only.

**PHYT 634 Electrophysiology 4**
Provides an understanding of the physiological basis for the use of physical agents and electrotherapy. Emphasis placed on patient evaluation and clinical applications of modalities used in physical therapy clinics.

**Prerequisites:** All prior physical therapy graduate courses.

**Restrictions:** Open to physical therapy graduate students only.

**PHYT 641 Rounds I 1 PF**
Weekly clinical cases presented by faculty, clinical faculty, doctoral students and residents in Grand Rounds format for discussion by all students in the physical therapy graduate program.

**Restrictions:** Open to physical therapy graduate students only.

**PHYT 642 Rounds II 1 PF**
Weekly clinical cases presented by faculty, clinical faculty, doctoral students and residents in Grand Rounds format for discussion by all students in the physical therapy graduate program.

**Restrictions:** Open to physical therapy graduate students only.

**PHYT 643 Rounds III 1 PF**
Weekly clinical cases presented by faculty, clinical faculty, doctoral students and residents in Grand Rounds format for discussion by all students in the physical therapy graduate program.

**Restrictions:** Open to physical therapy graduate students only.

**PHYT 644 Rounds IV 1 PF**
Weekly clinical cases presented by faculty, clinical faculty, doctoral students and residents in Grand Rounds format for discussion by all students in the physical therapy graduate program.

**Restrictions:** Open to physical therapy graduate students only.

**PHYT 801 Medical Science I: General Medicine 3**
Lectures in pathology, clinical medicine, cardiology and pharmacology throughout the lifespan. Emphasis on the musculoskeletal system and on exercise prescription and progression.

**Restrictions:** Open to physical therapy graduate students only.

**PHYT 802 Medical Science II: Orthopedics 3**
Orthopedic pathology, medical and surgical management of musculoskeletal conditions across the lifespan with implications for physical therapy intervention. Includes radiology.

**Prerequisites:** All prior physical therapy graduate courses.

**Restrictions:** Open to physical therapy graduate students only.

**PHYT 803 Medical Science III: Neurology 3**
Lectures of basic principles of neurology throughout the lifespan. Emphasis placed on medical principles related to diseases most frequently encountered in physical therapy practice.

**Prerequisites:** PHYT623.

**Restrictions:** Open to physical therapy graduate students only.

**PHYT 804 Neurophysiologic Evaluation and Treatment 4**
Basic evaluation and treatment methods for managing patients with neurological dysfunctions. Analysis of these methods in light of current issues and theories of motor control, motor learning and neurobehavioral plasticity. Emphasis on learning strategies for treatment rather than through details of specific approaches.

**Prerequisites:** PHYT623.

**Restrictions:** Open to physical therapy graduate students only.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYT 805</td>
<td>Rehabilitation</td>
<td>4</td>
<td>Advanced instruction in the theory, research and clinical skills necessary for the comprehensive management of clients in a rehabilitation setting with an emphasis on building evidence-based program plans.</td>
</tr>
<tr>
<td>PHYT 806</td>
<td>Geriatrics</td>
<td>3</td>
<td>The personal-social, biological, socioeconomic and physiological factors accompanying the aging process, and the process of state required background intervention explored.</td>
</tr>
<tr>
<td>PHYT 807</td>
<td>Advanced Seminar</td>
<td>5</td>
<td>Lectures pursue various topics in greater depth and develop advanced clinical skills. Topics include wound care, hand therapy, women’s health issues, vestibular rehabilitation and aquatic therapy.</td>
</tr>
<tr>
<td>PHYT 808</td>
<td>Spine Management</td>
<td>4</td>
<td>Discusses the biomechanics, pathophysiology and disability associated with spine pain and dysfunction. Includes an understanding of the role of physical therapy evaluation in the determination and implementation of physical therapy interventions.</td>
</tr>
<tr>
<td>PHYT 809</td>
<td>Psychosocial Aspects of Health and Disease</td>
<td>3</td>
<td>Discusses the psychosocial characteristics of patient populations and therapists that impact on the rehabilitation process. Death and dying, social implications of illness diagnosis and other topics are discussed.</td>
</tr>
<tr>
<td>PHYT 810</td>
<td>Clinical Management</td>
<td>2</td>
<td>Discusses concepts of administration and issues in the management of hospital clinics, private practice and consultative ventures. Students introduced to current trends in billing and reimbursement strategies used by clinicians.</td>
</tr>
<tr>
<td>PHYT 811</td>
<td>Pediatrics</td>
<td>4</td>
<td>Instruction in the theory, research and clinical skills necessary for the comprehensive management of pediatric clients and their families. Emphasis on the incorporation of modern developmental science into evidenced-based program plans.</td>
</tr>
<tr>
<td>PHYT 812</td>
<td>Pediatric Integrated Clinical Experience</td>
<td>1 PF</td>
<td>Mentored clinical experience in pediatric healthcare facilities.</td>
</tr>
<tr>
<td>PHYT 821</td>
<td>Orthopedic Integrated Clinical Experience</td>
<td>3 PF</td>
<td>Mentored clinical experience in University of Delaware Physical Therapy Clinic. Emphasis is orthopedic with some exposure to outpatients with other diagnoses. All students participate in this experience for one semester.</td>
</tr>
<tr>
<td>PHYT 822</td>
<td>Neurologic and Older Adult Integrated Clinical Experience</td>
<td>3 PF</td>
<td>Mentored clinical experience in either the University of Delaware Neurologic and Older Adult Physical Therapy Clinic or a local clinical facility. Emphasis is on evaluating and treating a mixed caseload of older clients and/or those with neurologic diagnoses. All students participate in the experience for one semester.</td>
</tr>
<tr>
<td>PHYT 830</td>
<td>Introduction to Clinical Education</td>
<td>1</td>
<td>Prepares students for academic progression into their clinical affiliations. Provides the knowledge and skills necessary to prevent, recognize, and provide care for sudden cardiac or respiratory distress. Reviews current federal laws to protect an individual’s privacy in the medical setting. Other topics include how to handle infectious and hazardous materials, and the process of state required background checks to protect the public in positions of sensitivity.</td>
</tr>
<tr>
<td>PHYT 831</td>
<td>Clinical Internship I: Acute Care</td>
<td>3 PF</td>
<td>A six-week, full-time clinical experience in an acute care hospital setting. Students directly participate in all aspects of patient care under the supervision of a licensed physical therapist. Students involved in all aspects of patient care including, but not limited to, evaluation, treatment, patient and family education, charting, billing, and discharge planning.</td>
</tr>
<tr>
<td>PHYT 832</td>
<td>Clinical Internship II: Rehabilitation</td>
<td>3 PF</td>
<td>An eight-week, full-time clinical experience in a rehabilitation setting. Students participate in direct patient care under the supervision of a licensed physical therapist. Students involved in all aspects of patient care including, but not limited to, evaluation, treatment, patient and family education, charting, billing and discharge planning.</td>
</tr>
<tr>
<td>PHYT 833</td>
<td>Clinical Internship III: Elective</td>
<td>3 PF</td>
<td>An eight-week, full-time clinical experience under the supervision of a licensed physical therapist. Students may choose the type of experience they desire. Types available include acute care, orthopedics, rehabilitation or a specialty area.</td>
</tr>
<tr>
<td>PHYT 834</td>
<td>Clinical Internship IV</td>
<td>3 PF</td>
<td>A six-week, full-time clinical experience in an outpatient physical therapy setting. Direct participation in all aspects of patient care under the supervision of a licensed physical therapist. Students involved in all aspects of patient care including, but not limited to, evaluation, treatment, patient and family education, charting, billing and discharge planning.</td>
</tr>
<tr>
<td>PHYT 868</td>
<td>Research</td>
<td>1-9</td>
<td>Requires permission of instructor.</td>
</tr>
</tbody>
</table>

**PLANT AND SOIL SCIENCES**

<table>
<thead>
<tr>
<th>Course Code</th>
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</tr>
</thead>
<tbody>
<tr>
<td>PLSC 100</td>
<td>Plants and Human Culture</td>
<td>3</td>
<td>Current survey of interrelationships between plants and diverse human cultures. Different cultural lenses, such as socio-economic status, cultural heritage and residential environment are used to explore landscapes. Issues, including invasive species, water management and garden benefits provide opportunities for discussion and problem solving.</td>
</tr>
<tr>
<td>PLSC 101</td>
<td>Botany I</td>
<td>4</td>
<td>Introductory botany stressing fundamental concepts and processes in plants. Topics include cell structure and function, anatomy, genetics, reproduction, physiology, taxonomy, phylogeny and ecology.</td>
</tr>
<tr>
<td>PLSC 105</td>
<td>Introductory Forestry</td>
<td>3</td>
<td>Distribution, ecology, value, measurement and management of forest systems.</td>
</tr>
<tr>
<td>PLSC 133</td>
<td>Ornamental Horticulture</td>
<td>3</td>
<td>The use of ornamental plants. Emphasis on a basic knowledge of plant materials useful in maintaining an aesthetically and functionally pleasing environment in and around the home.</td>
</tr>
<tr>
<td>PLSC 140</td>
<td>People and Plants: Feast or Famine</td>
<td>3</td>
<td>Exploration of plant pathology as a biological science with its important ties to human welfare. Topics include food production systems, famine caused by plant diseases and their impact on human culture.</td>
</tr>
<tr>
<td>PLSC 151</td>
<td>Introduction to Crop Science</td>
<td>3</td>
<td>Plant structure and plant processes with practical application to the production and management of commercial crops.</td>
</tr>
<tr>
<td>PLSC 154</td>
<td>Topics in Production and Management of Ornamental Plants</td>
<td>1-6</td>
<td>Topics combine theory and practice in the areas of turf and ornamental horticulture.</td>
</tr>
<tr>
<td>PLSC 170</td>
<td>Soils and Environmental Quality</td>
<td>3</td>
<td>Role of soils in contemporary environmental problems, including the nature and causes of soil, air and water pollution; soil management practices to minimize environmental impacts of nutrients, pesticides, agricultural and industrial wastes, and contaminated soils; risk management strategies needed to develop environmental management programs.</td>
</tr>
</tbody>
</table>
PREREQ: PLSC204.

PLSC 201 Botany II 4
Sexual and vegetative characters of algae, bacteria, fungi, liverworts, mosses, ferns, horsetails, club mosses, quillworts, gymnosperms and angiosperms. Selected genera within these divisions considered in detail. PREREQ: PLSC101 or BISC207.

PLSC 204 Introduction to Soil Science 3
Fundamentals of soil including origin, classification and composition; physical, chemical and biological properties; significance of soil properties to use and management, and to soil-plant relationships. PREREQ: CHEM101.

PLSC 205 Introduction to Soil Science Laboratory 1
Laboratory exercises in soil science. COREQ: PLSC204.

PLSC 211 Herbaceous Landscape Plants 3
Survey of herbaceous plants including annuals, perennials and bulbs; plant identification, culture, selection and design in the landscape. PREREQ: PLSC133.

PLSC 212 Woody Landscape Plants 4
The study of woody plants for landscape use in the mid-Atlantic coastal region, including plant identification, selection and culture. PREREQ: PLSC133.

PLSC 270 Biotechnology: Science and Socioeconomic Issues 3
See ANSC270 for course description.

PLSC 275 Healing Plants: Medicine, Myth, Magic 3
Merges science, literature, folklore, world cultures, alternative medicine and analysis of current events. Hands-on learning activities include student-researched/developed medicine walks and propagating healing plants. A field trip to Delaware's Herbarium and to a plant-compounds analytical laboratory at Delaware State University is planned.

PLSC 300 Principles of Animal and Plant Genetics 3
See ANSC300 for course description.

PLSC 302 Vegetable Science 4
Basic factors affecting productivity and marketability of vegetable crops.

PLSC 303 Introductory Plant Pathology 4
Introduction to the nature, causes, development, effects and control of plant disease. Laboratory involves microscope use for examining plant disease specimens and fungal structures, and experience in isolation and culture of pathogenic fungi. PREREQ: PLSC201 or BISC207.

PLSC 305 Soil Fertility and Plant Nutrition 4
Practical application of the basic principles of soil chemistry, physics and microbiology to modern land-use programs. Covers basic principles of nutrient management (availability and cycling in soils, roles in plant nutrition), soil acidity and liming, soil testing, environmental fate of non-essential elements and organic chemicals, and role of risk assessment in soil management. PREREQ: CHEM102 and PLSC204.

PLSC 306 Introduction to Plant Molecular Biology 3
The molecular biology of higher plants, including organization of plant genes, genomes, gene expression, gene transfer and genetic engineering. PREREQ: BISC207, CHEM213.

PLSC 308 Fruit Science 3
Major temperate zone fruit crops, climatic requirements, growth and fruiting habits, and principles involved in production, harvesting and marketing.

PLSC 310 Animal and Plant Genetics Laboratory 1
See ANSC310 for course description.

PLSC 313 Turf Establishment and Maintenance 4
Factors affecting the establishment and maintenance of fine and utility turf; emphasis on the management of golf courses, athletic fields and sod farms. PREREQ: PLSC204.

PLSC 319 Environmental Soil Microbiology 4
Introduction to soil microbiology and biochemistry as related to environmental issues: microbial diversity and ecology in soil-plant systems, transformations of natural and synthetic organic compounds, biocycling of nutrients and metals, bioremediation. Introduction to laboratory methods for studying soil microorganisms and associated processes. PREREQ: PLSC204 and CHEM102.

PLSC 325 Nursery Production I 2
The planning, production, management and marketing of field-grown nursery stock. Student selects crops, propagates them and is responsible for all aspects of production, including cost accounting.

PLSC 326 Nursery Production II 2
The planning, production, management and marketing of container-grown nursery stock. Student selects crops, propagates them and is responsible for all aspects of production, including cost accounting.

PLSC 330 Landscape Construction Details 4
Introduction to principles involved in the design and installation of landscape elements: stone, brick, concrete, wood and metal.

PLSC 331 Landscape Construction Systems 4
Introduction to principles involved in contour grading, site drainage, lighting and irrigation design related to landscaping.

PLSC 332 Basic Landscape Design 4
Application of design principles to actual field problems, drafting and presenting techniques. PREREQ: PLSC212.

PLSC 340 Plants of Ecuador 3
Plants of major forest types in Ecuador, including native and introduced species as well as plants of medicinal, industrial and agricultural use. Field trips demonstrate techniques and provide field experience in plant identification. May be cross-listed with ENWC340.

PLSC 341 Tropical Forest Ecology 3

PLSC 344 Forest Ecology 2
See ENWC344 for course description. PREREQ: BISC208.

PLSC 364 Landscape Horticulture Internship 1-6
Supervised, faculty-monitored, career-related experience in one or more aspects of the ornamental horticulture industry. PREREQ: PLSC133.

PLSC 366 Independent Study 1-6

PLSC 399 Teaching Experience 1-2 PF
Practical teaching experience assisting in instruction of an undergraduate course. RESTRICTIONS: requires overall GPA of 2.75 and 3.0 in major. Must have taken the course in which assisting or have equivalent experience.

PLSC 401 Agronomic Crop Science 3
Production and management of the major grain and forage crops, with emphasis on diagnosis of production problems and decision making. PREREQ: PLSC151.

PLSC 403 Nursery and Garden Center Management 4
Production, maintenance and marketing of plants relative to the establishment and management of a nursery or garden center. PREREQ: PLSC101 or PLSC151.

PLSC 404 Plant Taxonomy 3
Identification, classification and nomenclature of vascular plants, including sight recognition as well as use of alternative-statement keys. Emphasis on economic plant families of eastern U.S. PREREQ: PLSC201.

PLSC 410 Introduction to Plant Physiology 3
The physiology of green plants: light and energy conversion, carbon fixation, nitrogen metabolism, amino acid synthesis, protein synthesis mechanics and regulation, water and solute utilization, nutrient translocation, photosynthesis and photoperiodism and growth hormones, considered at the fundamental level of operation. PREREQ: PLSC201 or BISC208, and CHEM213.
PLSC 411  Diagnostic Plant Pathology  3
Consideration of major pathogenic causes of economic losses of plants. Emphasis on principles of etiology, epiphytology, symptoms and control. PREREQ: PLSC303.

PLSC 413  Principles of Plant Disease Control  3
Principles of plant disease control by exclusion, eradication and resistance. Plant protection with emphasis on fungicides, bactericides, and nematicides and their use. PREREQ: PLSC303.

PLSC 415  Vascular Plant Anatomy  3
A developmental and comparative study of the cells, tissues and organs of vascular plants. Readings in the current anatomical literature.

PLSC 416  Plant Virology  4
Epidemiology, detection, identification and control of plant viruses and virus-like agents. PREREQ: PLSC303.

PLSC 417  Greenhouse Management  4
Greenhouse structures, environmental control, cultural techniques and general management practices in greenhouse operations. Laboratory exercises supplement lecture material. PREREQ: PLSC201 and PLSC204.

PLSC 419  Soil Microbiology  4
Characterization of microorganisms and microbial habitats in soil environments. Processes and interactions involving soil microorganisms with respect to agricultural productivity and environmental quality. Introduction to laboratory techniques for the observation, enumeration and isolation of soil microorganisms and measurement of associated activities.

PLSC 420  Plant Physiology Laboratory  2
The extraction from higher plants of enzymes and other macromolecules, and assay by chemical tests. Pigment extraction, organelle separation, ion uptake, protein manipulation using centrifuge, spectrophotometer, chromatography and electrophoresis. COREQ: PLSC410.

PLSC 422  Plant Propagation  3
Practical and physiological aspects of the propagation of economic plants including both sexual and asexual methods. PREREQ: PLSC201.

PLSC 429  Introduction to the Fungi  4
Introduction to the terminology, structures, and classification of the fungi, through the study of representative cultures and specimens. Fungi, mushrooms and molds as food, in industry, plant pathology, and in human health and wellness. Practical laboratory experience emphasized.

PLSC 435  Plant Developmental Biology  3
An anatomical and molecular analysis of plant growth and development with a focus on how genes regulate pattern formation and cellular differentiation. PREREQ: PLSC300.

PLSC 438  Fate/Transport Soil Contaminants  3
Fundamental concepts and mechanisms of contaminant fate and transport in porous media. Includes an overview of soil and groundwater as resources; types of soil and groundwater contaminants; transformation and attenuation of contaminants; solute transport in saturated and unsaturated systems. PREREQ: MATH221.

PLSC 440  Integrated Pest and Disease Management  3
See ENWC440 for course description.

PLSC 442  Plant Propagation  3
Improvement of crops through the application of genetic principles to breeding methods. PREREQ: ANSC300 or PLSC300 or introductory genetics course.

PLSC 455  Issues in Plant and Soil Sciences  3
An introduction to current and emerging issues facing the plant and soil sciences professions. Ethics, professionalism, environment, politics, technology and practices will be the foci of discussion groups, student oral and written presentations, case studies, guest lectures and field trips. RESTRICTIONS: Open to junior and senior majors only.

PLSC 461  Soils and Wetland Delineation  4
Soil taxonomy, use of a soil survey, properties of hydric soils and wetland delineation using soil characteristics, hydrology and plant ecological principles. PREREQ: PLSC101, PLSC204 and PLSC205.

PLSC 465  Seminar  1
Oral and written reports in one of the fields of plant science.

PLSC 466  Independent Study  1-6

PLSC 470  Weed Biology and Control  4
Introduction to weed science: weed biology and identification, survival strategies, competition, and impact of weeds. Weed management principles and practices including cultural, biological, and chemical control methods. PREREQ: PLSC101 or PLSC151 or PLSC204.

PLSC 601  Agronomic Crop Science  3
Production and management of the major grain and forage crops, with emphasis on diagnosis of production problems and decision making. PREREQ: PLSC151.

PLSC 602  Physiological Plant Productivity  3

PLSC 603  Soil Physics  3
Examines the importance of soil physics in relation to other disciplines of soil and environmental sciences. Topics include status of water in soil, fundamental principles of water flow, differences between saturated and unsaturated water flow, water balance in the field, infiltration, evapotranspiration, heat, gas and solute (contaminant) transport in soil. May be cross-listed with BREG603. PREREQ: PLSC204.

PLSC 604  Plant Taxonomy  3
Identification, classification and nomenclature of vascular plants, including sight recognition as well as use of alternative-statement keys. Emphasis on economic plant families of eastern U.S. PREREQ: PLSC201.

PLSC 605  Plant Breeding  3
Improvement of crops through the application of genetic principles to breeding methods. PREREQ: ANSC300 or PLSC300 or introductory genetics course. RESTRICTIONS: Includes at least two mandatory Saturday field trips.

PLSC 606  Soil Genesis and Classification  4
Soil forming factors and processes; chemical, physical and mineralogical parameters useful in characterizing soil; geologic and geomorphic settings in Delaware and their influence on soil formation and classification; soil taxonomy and soil limitations and interpretations. PREREQ: PLSC204.

PLSC 607  Plant and Soil Water Relations  3
Environmental aspects, measurement and control of water flux and storage in the soil-plant-atmosphere continuum; and development and significance of plant water deficits. PREREQ: PLSC305 and PLSC410.

PLSC 608  Environmental Soil Chemistry  3
Principles of soil chemical reactions and their application to the environment including: inorganic and organic soil components; soil solution-solid phase equilibria, sorption phenomena, ion exchange reactions, kinetics of soil chemical processes, redox chemistry, soil acidity and salinity. May be crosslisted with CHEM6608. PREREQ: CHEM102 or CHEM104 and PLSC204.

PLSC 609  Plant Microtechnique  4
Introduction to techniques useful in microscopically examining diseased and nondiseased plant structures. Emphasis on fixation, embedding, sectioning, staining and interpretation of prepared materials.
PLSC 611  Diagnostic Plant Pathology  3
Consideration of major pathogenic causes of economic losses of plants. Emphasis
on principles of etiology, epiphytology, symptoms and control.
PREREQ: PLSC303.

PLSC 613  Principles of Plant Disease Control  3
Exclusion, eradication, resistance and protection with emphasis on fungicides,
bactericides and nematocides and their use.
PREREQ: PLSC303.

PLSC 615  Vascular Plant Anatomy  3
A developmental and comparative study of the cells, tissues and organs of
vascular plants. Readings in the current anatomical literature.

PLSC 616  Plant Virology  4
The epidemiology, detection, identification and control of plant viruses and virus-
like agents.
PREREQ: PLSC303.

PLSC 619  Soil Microbiology  4
Characterization of microorganisms and microbial habitats in soil environments.
Processes and interactions involving soil microorganisms with respect to
agricultural productivity and environmental quality. Introduction to laboratory
techniques for the observation, enumeration and isolation of soil microorganisms,
and measurement of associated activities.

PLSC 620  Plant Physiology Laboratory  2
The extraction from higher plants of enzymes and other macromolecules, and
assay by chemical tests. Pigment extraction, organelle separation, ion uptake,
protein manipulation using centrifuge, spectrophotometer, chromatography and
electrophoresis.
COREQ: PLSC410.

PLSC 629  Introduction to the Fungi  4
Introduction to the terminology, structures, and classification of the fungi, through
the study of representative cultures and specimens. Fungi, mushrooms and molds
as food, in industry, plant pathology, and in human health and wellness. Practical
laboratory experience emphasized.

PLSC 630  Collections Management and Curation  3
Organization and maintenance of curatorial records including; plant records and
labeling, organization of seed plants (phylogeny), nomenclature, policy statements
and management concerns.
COREQ: PLSC402.

PLSC 635  Plant Developmental Biology  3
An anatomical and molecular analysis of plant growth and development with a
focus on how genes regulate pattern formation and cellular differentiation.
PREREQ: PLSC300.

PLSC 640  Integrated Pest and Disease Management  3
See ENWC640 for course description.

PLSC 644  Physiology of Plant Stress  3
Angiosperms’ response to biotic and abiotic environmental stresses; mineral
nutrients, salt, drought, cold, heat, light, pathogens and herbivores at the
physiological and molecular levels.
PREREQ: PLSC410.

PLSC 646  Plant Cell Biology  3
See BISC646 for course description.
PREREQ: Introductory organic chemistry.

PLSC 655  Pollution Microbiology  3
Integration of basic chemical, physical and biological processes that affect
biotransformation of organic and inorganic pollutants in soils and subsurface
sediments. Organization is based on a progression from molecular to field scale
processes.
PREREQ: PLSC204, CHEM213, PLSC101 or BISC207.

PLSC 660  Pesticides in the Environment  3
Role of pesticides in agriculture and public health. Classification and environmental
fate in soil, water and atmosphere. Management practices, non-target effect,
detoxification of pesticide waste, risk assessment, regulation, impact of pesticide
alternatives.
PREREQ: CHEM102.

PLSC 670  Weed Biology and Control  4
Introduction to weed science: weed biology and identification, survival strategies,
competition, and impact of weeds. Weed management principles and practices
including cultural, biological, and chemical control methods.
PREREQ: PLSC101 or PLSC151 or PLSC204.

PLSC 675  Current Topics: Plant Biology  1 PF
A journal club for students interested in discussing hot issues of plant biology.

PLSC 800  Current Topics in Plant Science  1-3
Discussion of selected topics and recent literature in plant science.

PLSC 801  Plant Science Techniques  3
Theories, principles and applications of laboratory techniques used in planning
and conducting plant science research. RESTRICTIONS: Requires permission of instructor.

PLSC 802  Professional Development  1
Professional development including grantsmanship, manuscript writing and
reviewing, resume preparation, job interviewing and presentation of research at
professional meetings.

PLSC 803  Advanced Soil Fertility and Plant Nutrition  3
Analysis of chemical and biochemical factors involved in nutrient availability and
transport in the soil. Evaluation of current theories of ion uptake, translocation and
accumulation.
PREREQ: PLSC305 and PLSC410.

PLSC 804  Plant Molecular Biology  3
Fundamental and applied aspects of plant molecular biology, including
organization of plant genes, genomes, gene expression, gene transfer and genetic
engineering.
PREREQ: ANSC670 or BISC653.

PLSC 805  Insect-Plant Chemical Ecology  2
See ENWC805 for course description.

PLSC 810  Kinetics and Surface Chemistry of Soils  3
Kinetics and mechanisms of soil chemical reactions, including application of
chemical kinetics to natural systems, rates of sorption/desorption, redox,
precipitation/dissolution, and ion exchange processes and application of surface
spectroscopic and microscopic techniques to elucidate reactions at the soil
mineral/water interface.
May be cross-listed with CHEM810.
PREREQ: PLSC608, and either CHEM418 or CHEM443.

PLSC 819  Ecological Soil Microbiology  3
Ecological principles of microbial activities and processes in soil/plant systems:
 dynamics of soil and rhizosphere populations, symbiotic interactions with plants,
and selected topics in environmental quality.
PREREQ: PLSC619.

PLSC 823  Seminar: Principles of Plant Infection  2
The basic factors governing the development of plant infection by phytopathogenic
organisms: invasion, parasitism, colonization, dissemination, epidemiology and
host-parasite relationships.
RESTRICTIONS: Requires permission of instructor.

PLSC 831  Taxonomy of Ornamental Plants  3
Identification, considering the plant families that include the majority of the
ornamental plants grown in botanic gardens, arboreta and horticultural institutions.

PLSC 832  Botanic Garden Management  1-10
Lecture and laboratory format conducted at Longwood Gardens to familiarize
Longwood Fellows with the operations and purposes of all areas of Longwood
Gardens and other botanic gardens.
RESTRICTIONS: May be repeated for up to ten credits.

PLSC 833  Seminar: Soil Science  1
Current topics in soil science discussed from the literature.

PLSC 834  Current Topics in Agronomy  1
Seminars to review current agronomic literature.

PLSC 835  Environmental Soil Physics  4
Fundamentals of water, heat and solute transport in soil. Reactions and movement
of organic/inorganic compounds in the soil environment. Application of
management models to solute transport.
PREREQ: PLSC204 and MATH221.

PLSC 864  Seminar Planning and Development  1 PF
Planning, developing and hosting a major seminar series: topic and speaker
selection, format and schedule development, marketing, local arrangements and
hosting.

PLSC 865  Seminar  1

PLSC 868  Research  1-9

PLSC 869  Master's Thesis  1-6
POLITICAL SCIENCE

PLSC 874  TOPICS IN MOLECULAR BIOLOGY  1
Provides a forum for the discussion of current topics in molecular biology, with critical reading of relevant primary literature.
REstrictions: Requires permission of instructor.

PLSC 964  PRE-CANDIDACY STUDY  3-12 PF
Research and readings in preparation of dissertation topic and/or qualifying examinations for doctoral students before admission to candidacy but after completion of all required course work.
REstrictions: Not open to students who have been admitted to candidacy.

PLSC 969  DOCTORAL DISSERTATION  1-12 PF

PORTUGUESE

PORT 105  BRAZILIAN PORTUGUESE I - ELEMENTARY  4
Introduction to Brazilian Portuguese language and development of speaking, listening, reading and writing skills through the use of basic texts.

PORT 106  BRAZILIAN PORTUGUESE II - ELEMENTARY/INTERMEDIATE  4
Completion of basic Brazilian Portuguese. Increasing mastery of the basic skills of speaking, listening, reading and writing.
PREREQ: PORT105.
REstrictions: Two or three years of high school Brazilian Portuguese acceptable in lieu of prerequisite.

PORT 207  BRAZIL: PAST AND PRESENT  3
Introduction to Brazil, its people, and the issues confronting them, with emphasis on understanding historical developments that have shaped contemporary Brazilian society.

PORT 315  INTENSIVE PORTUGUESE FOR SPANISH SPEAKERS  3
Basic structures and vocabulary of Portuguese in a concentrated covering of material in PORT105 and PORT106.
PREREQ: Any 300 level Spanish course, or graduate status in Spanish, or being a Heritage speaker of Spanish.

Political Science

POSC 100  INTRODUCTION TO POLITICAL SCIENCE  3
Introduction to the study of central concepts of the discipline, such as political power, authority, decision making, conflict management, representation and institutions of government.

POSC 102  CIVICS AND ECONOMICS FOR TEACHERS  3
See HEP102 for course description.
REstrictions: Elementary teacher education majors only.

POSC 150  AMERICAN POLITICAL SYSTEM  3
Constitutional principles, structure and functions of the political process in the United States.

POSC 151  EXPLORING AMERICAN POLITICS  1
Analysis of an array of problems in American government and politics. Individual and group participation expected.
COREQ: POSC150.
REstrictions: Open only to freshmen and sophomore political science and political science education majors.

POSC 202  INTRODUCTION TO SCIENTIFIC INQUIRY  3
Introduces students to the foundations of scientific social research, with emphasis on political phenomena. Prepares students in the skills needed to conduct scientific research.
REstrictions: Students cannot take both POSC202 and POSC300 for credit.

POSC 211  INTRODUCTION TO POLITICS IN DEVELOPING COUNTRIES  3
Forces affecting politics in emerging nations. Impact of colonialism, economic development, military rule, instability and environment. Discussion of how developing nations affect the world political system.
REstrictions: Only one of either POSC211 or POSC311 can count for degree credit.

POSC 220  INTRODUCTION TO PUBLIC POLICY  3
Emphasis on what government does, with a focus on substantive policy areas as well as the mechanisms of policy making. Case studies of policy areas (e.g., health policy, environmental policy, social welfare policy, etc.) used to illustrate processes of agenda setting, decision making and policy implementation.

POSC 240  INTRODUCTION TO INTERNATIONAL RELATIONS  3
The development of international systems, their structure and political economic dynamics. Fundamental analytical concepts and approaches.

POSC 241  EXPLORING INTERNATIONAL RELATIONS  1
Analysis of an array of problems facing the global community. Individual and group participation expected.
COREQ: POSC240.
REstrictions: Open only to freshmen and sophomore international relations majors.

POSC 266  SPECIAL PROBLEM  1-3

POSC 270  COMPARATIVE POLITICS  3
Introduction to comparison of politics "within nations." Covers Europe, Africa, Asia and Latin America.

POSC 285  CURRENTS IN POLITICAL THEORY  3
Basic introduction to political philosophy, organized not around particular historical periods or specific philosophers, but around some of the most important, enduring questions of political theory: What is the nature of the state? What are the obligations and responsibilities of citizens?

POSC 300  DATA ANALYSIS FOR POLITICAL SCIENCE  3
Applied statistical analysis, including regression, analysis of variance, descriptive statistics and exploratory data analysis, statistical inference, and measurement.

POSC 301  STATE AND LOCAL GOVERNMENT  3
American federalism with emphasis on government and politics, with special attention to Delaware.

POSC 303  PUBLIC ADMINISTRATION  3
Introduction to management in the public sector; personnel, budgeting, leadership, ethics, and the role of civil service in government.

POSC 306  ECONOMIC THEORY OF POLITICS  3
See ECON306 for course description.

POSC 309  POLITICAL CULTURE BY COUNTRY  3
Introduction to the political and civic cultures underpinning and supporting different political systems. Topics may vary depending on host country. May be cross-listed with FLLT309.
REstrictions: Offered only in conjunction with travel abroad programs. May be repeated for credit when topics vary.

POSC 310  EUROPEAN GOVERNMENTS  3
Structure and process of British, French, West German and Russian governments.

POSC 311  POLITICS OF DEVELOPING NATIONS  3
Forces determining public policy among the emerging nations. Cross-national comparative analysis.
REstrictions: Only one of either POSC211 or POSC311 can count for degree credit.

POSC 312  POLITICS OF EAST ASIAN DEVELOPMENT  3
Examines contemporary issues and questions of political legitimacy and economic development in East and Southeast Asia. Traditional patterns of authority, impact of Western colonialism, emergence of new Southeast Asian states and the political and economic development of selected countries are covered.

POSC 313  AMERICAN FOREIGN POLICY  3
The theory, policies and administration of U.S. foreign policy.

POSC 315  THIRD WORLD WOMEN IN POLITICS  3
Introduction to the role of women in politics and society in Africa, Asia, Latin America and the Middle East.
May be cross-listed with WOMS315.

POSC 316  INTERNATIONAL POLITICAL ECONOMY  3
Interaction of international political and economic phenomena. Considers history and development of political economy, and the political underpinnings of effects of global monetary, trade, financial and investment systems. Both relations among advanced countries, and between the advanced and poor countries are considered.

POSC 319  TOPICS IN POLITICS AND BROADCAST JOURNALISM  3
See COMM319 for course description.

POSC 320  PARTIES AND INTEREST GROUPS  3
Organization and behavior of political parties and interest groups, including structure, leadership, recruitment and decision making.
POSC 321 CLASS, ETHNICITY AND POLITICS
Examines the history, strategic positions and political tactics of cultural and ethnic minorities in the U.S. Where appropriate, the politics of cultural and ethnic minorities are compared to that of racial minorities. Attention also given to social class as a factor influencing politics in the U.S.

POSC 322 RACE AND POLITICS
Provides an insight and understanding of race as an intricate part of the political process in the U.S. The role of race in U.S. politics is explored primarily through the political experiences of black Americans and how the political system has responded. May be cross-listed with BAMS322.

POSC 323 INTRODUCTION TO WOMEN AND POLITICS
Political-legal status of American women since the Revolution, and their participation in the political process. Women's present political-legal status, as illustrated through current issues such as reproductive rights, pay equity and the feminization of poverty. May be cross-listed with WCOM323.

POSC 324 VOTING AND ELECTIONS
Examines various aspects of political behavior including political socialization, the formation of political attitudes and opinion, electoral behavior and political participation. Attention also given to the relationship of political behavior and public policy.

POSC 329 INTERNATIONAL MIGRATION
Interdisciplinary introduction to alternative/complementary disciplinary approaches to the study of human movement between states. Offered on a rotational basis by faculty involved in the University of Delaware migration group. May be cross-listed with GEOG329, HIST329 and/or SSCI329.

POSC 330 POLITICAL TERRORISM
Selectively examines cases, trends and organizations which have made violence termed terrorism so salient. Also examines whether governments, including the U.S., are responding appropriately to the challenge. RESTRICTIONS: Not open to freshmen except with consent of instructor.

POSC 333 CONTEMPORARY POLITICAL IDEOLOGIES
Considers the theoretical development of liberal democracy and significant ideological challenges to its dominance including Marxist, Islamist, postcolonial and postmodernist political theories. Students read the original sources of these positions while considering their historical development and application to contemporary politics.

POSC 334 LIBERALISM AND CONSERVATISM
Introduces capitalism, socialism, liberalism, conservatism and democratic forms of Marxism. Accents problems of economic growth, equality, freedom and self-realization, bureaucracy, representation, justice, brotherhood, the profit motive, social cohesion, nationalism and the international order.

POSC 339 BRITAIN AND EUROPE
Examines Britain's role in an integrated Europe, with focus on contemporary problems and prospects of closer British ties to the European Union and related bodies.

POSC 340 POLITICS AND THE MEDIA
Political roles of the media in socialization, political competence, agenda setting, the electoral process and political crises. Emphasis on media-political system interaction and its import in a democratic society. May be cross-listed with COMM340.

POSC 341 ENVIRONMENT OF MULTINATIONAL CORPORATIONS
See BUAD341 for course description.

POSC 343 SOCIETY, POLITICS AND HEALTHCARE
Interdisciplinary study of the political, social, economic and humanistic issues of healthcare and health policy. Students will develop the capacity to understand the political process and its relationship to the healthcare delivery system. May be cross-listed with CSCI343 and/or SSCI343.

POSC 350 POLITICS AND THE ENVIRONMENT
The political context of environmental issues; air and water pollution, population control, and conservation.

POSC 355 URBAN POLITICS AND COMMUNITY DEVELOPMENT
Examines the decision making processes and the exercise of political power in urban communities. Special focus placed on urban politics and government and the impact of social and economic problems on the development of urban society. Explores the concepts and practices of community development in urban communities.

POSC 362 DIPLOMACY
Diplomacy is the art of formal representation and policy implementation. Diplomats need to understand complex material and represent positions in an effective manner. These skills are applicable in a variety of contexts. Readings, discussions, cases and simulations are used to introduce diplomatic skills.

POSC 363 INTERNATIONAL LAW AND ORGANIZATION
Introduction to the development of international law and international organization.

POSC 366 INDEPENDENT STUDY
May be cross-listed with JWST366.

POSC 372 EAST CENTRAL EUROPEAN POLITICS
Survey of East Central European political systems (Poland, Hungary, Czechia and Slovakia, Germany, Romania, former Yugoslavia, Bulgaria and Albania) after World War II. The so-called new federal states in Germany (ex-DDR) are emphasized.

POSC 377 ARAB-ISRAELI POLITICS
Development of the Arab-Israeli conflict analyzed from the Dreyfus Affair and the Balfour Declaration to current events. May be cross-listed with JWST377.

POSC 380 INTRODUCTION TO LAW
Broad overview of the nature, functions and limits of law. Emphasis on law as the political instrument used to regulate, control and promote behavior and deal with social problems. May be cross-listed with LEST380.

POSC 387 AMERICAN POLITICAL THOUGHT
Overview of American political thought. Focuses on critical formative periods in American politics, such as the Founding, Civil War and Industrial Revolution, with readings selected from the writings and speeches of key American statesmen.

POSC 389 HONORS COLLOQUIUM
See ARSC390 for description.

POSC 400 PRACTICUM IN TEACHING POLITICAL SCIENCE
Available to outstanding senior political science majors interested in obtaining teaching experience at the college level. Provides opportunity to lead discussion sections of students in lower division courses. RESTRICTIONS: Requires permission of instructor.

POSC 401 TOPICS IN CONSTITUTIONAL LAW
Critical topics of constitutional law. Topics vary by instructor. May be cross-listed with WOMS401.

POSC 402 CIVIL LIBERTIES: INDIVIDUAL FREEDOMS
Constitutional issues of freedom of speech, press, religion, and separation of church and state.

POSC 403 CIVIL LIBERTIES: EQUAL PROTECTION CLAUSE
Focuses on fundamental rights and the constitutional guarantee of equal protection of the laws.

POSC 404 THE JUDICIAL PROCESS
Structure, process and personnel of American courts; factors influencing decisions and judicial policy making.

POSC 405 CONSTITUTIONAL LAW OF THE UNITED STATES
Constitutional principles regulating organization and function of federal government. United States Supreme Court decisions placed in a socio-political context.

POSC 407 AMERICAN PRESIDENCY
Modern American presidency with emphasis on presidential recruitment, organization and staffing. The nature and exercise of presidential power in the decision making process.

POSC 408 INTERNATIONAL ORGANIZATION
Analysis of the organization of the international system, its structure, operating principles, formal and informal components.

POSC 409 CONTEMPORARY PROBLEMS OF WORLD POLITICS
Critical areas of international politics. Topics vary by instructor. May be cross-listed with JWST409.

POSC 410 ISLAM IN GLOBAL AFFAIRS
Explores three main elements of political Islam - epistemological, reformative and militant, and examines how the struggle to construct Islam is reconstructing the international system.
POSC 411 Politics and Poverty
Relationship of poverty and social conditions in the United States with regard to policy making and social conditions in the United States with regard to capacity of government to cope with problems arising from overpopulation and socio-economic differences.

POSC 412 Foreign Policy of the Post-Soviet Union
Principles, foreign policies and administration of the former Soviet Union and its most important successor states.

POSC 413 Problems in American Government
Contemporary problems in American government and politics. May be crosslisted with WOMS413.

POSC 414 Problems in American Foreign Policy
Contemporary problems in American foreign policy and policy making.

POSC 415 Force and World Politics
Interrelationship of military and foreign policy; military strategies, arms control and disarmament; the American experience.

POSC 418 Constitutional Issues in American Public Schools
Case studies are used to explore how controversial issues have arisen in public education over the years; what laws and legal precedents presently govern them; how policies have evolved over time and what questions remain unsolved.

POSC 420 Introduction to Political Economy
Recent political and economic history, contemporary economic policy disputes and an analysis of how the Democratic-Republican balance of power affects, and is affected by, changing economic conditions and the results of policies put into effect.

POSC 422 Political Leadership
Study of the theories and practices of effective political leadership in both contemporary and historical contexts. Includes case materials and may include non-U.S. cases for study.

POSC 423 Congress and Public Policy
Democratic functions of a modern legislature; legislative structures and processes; coalitions and cleavages; parties, ideological factions and interest groups; the Federal budget, national priorities and Congressional intervention in the economy; central policy issues before Congress; Congressional oversight of the bureaucracy; Congress and the Presidency; and election of the Congress.

POSC 424 Energy Policy and Administration
World and U.S. energy policies with emphasis on nuclear power, solar energy and fossil fuels. Analyzes progress and design of U.S. science and technology policy in energy domain.

POSC 425 Advanced Topics in Politics and Broadcast Journalism
See COMM425 for course description.

POSC 426 Latin American Political Systems
Impact of social and economic change on the political processes.

POSC 427 Politics in China
General introduction to politics of the People's Republic of China, including examination of politics and modernization efforts under Mao Zedong and Deng Xiaoping and legacies left by both. Significance of Tiananmen, dilemmas of economic and political liberalization, regionalization, and future of Communist Party also discussed.

POSC 428 Politics in Japan
An in-depth study of who governs Japan and how these relations have evolved since the end of World War II.

POSC 429 Southeast Asia and the World
Examines patterns of international relations within Southeast Asia and between the region and greater powers, Southeast Asia's insecurity and patterns of relations at the domestic, regional and global levels. Discussion of contemporary issues including the emergence of economic blocs, the rise of China and the future of the Association of Southeast Asian Nations.

POSC 431 Latin American Politics: Countries
Contemporary political events in three Latin American nations. Comparisons of the actions and influence of the military, church, bureaucracies, political parties and guerrilla groups in three different Latin American settings: modern, transitional and traditional.

POSC 432 Political System of the Post-Soviet Union
Structure and process of the political system of the USSR and its most important successor states (Russia, Ukraine, Byelorussia, Kazakhstan and others).

POSC 433 African Politics
Overview of politics and society in sub-Saharan Africa including: colonialism, the rise of nationalism, decolonization, single-party and military rule, the role of social movements and religious, class, gender and ethnic identities and the move toward economic and political liberalization.

POSC 434 Political Thought I
From Plato to Machiavelli.

POSC 435 Political Thought II
From Machiavelli to present.

POSC 436 Politics and Literature
Class, civil rights, feminism, revolution and other political issues examined through novels, film and other literary works.

POSC 437 Who Governs? Perspectives on Political Power
Raises the question "Who Governs?" and attempts to answer it by critically examining various schools of thought about who actually has and who should have political power in capitalist countries.

POSC 438 Problems in African Politics
Examination of selected topics in contemporary African politics. Focuses in-depth on aspects of politics and society in a specific region of Africa or investigates in greater detail issues confronting Africa today such as economic structural adjustment, democratization and state-society relations.

POSC 439 Problems in Latin American Politics
Examination of current political trends in Western European politics, including changes in party systems and problems of European integration.

POSC 440 Problems of Western European Politics by Country
Examination of current political trends in Western European politics. Focuses in-depth on aspects of politics and society in a specific region of Europe or investigates in greater detail issues confronting Europe today such as economic structural adjustment, democratization and state-society relations.

POSC 441 Problems of Western European Politics by Country
Intensive examination of European politics from the perspective of a specific country, e.g., Spain, England and France.

POSC 442 Problems of Western European Politics
Examination of current political trends in Western European politics, including changes in party systems and problems of European integration.

POSC 443 China and the World
An historical and theoretical examination of Chinese foreign policy since 1949, including discussion of China's relations with larger and developing powers, China's historical conception of itself in the world, significance of China's interdependence with the world and China's participation in international and regional organizations.

POSC 444 Global Agenda
Seminar survey of current geopolitical problems facing the US government and global news media. Guest lecturers and practitioners in diplomacy and the international media explore the problems. U.S. foreign policy and media influence upon both. May be crosslisted with COMM444.

POSC 445 Human Rights and World Politics
Alternative theories of human rights examined in cross-cultural and international contexts. International documents, contemporary cases (e.g. South Africa) and U.S. foreign policies also examined and evaluated.

POSC 446 International Human Rights on Film
A study of the history, evolution and current status of universal human rights using film as a primary medium. Content covers origins of the international human rights movement during and after WWII. A series of feature films and documentaries also highlight recent and current human rights violations in foreign nations.

POSC 448 Theories of International Relations
Surveys the theoretical debates regarding how we can conceive of and understand world politics, as well as how we can evaluate contending perspectives. Considers such schools of thought as ancient, idealist, realist, behavioralist, interdependence, radical, neo-realist and poststructuralist perspectives.

POSC 450 Problems of Latin American Politics
Current political issues in selected Latin American countries.

POSC 451 Problems in Policy and Administration
Examination of select topics related to contemporary public administration or the study of public policy and issues and controversies in a select policy area.

POSC 452 Urban Politics and Policy
Examines the exercise of political power, the policy making process, and contemporary policy issues in urban areas. Special emphasis on the study of contemporary political relationships and the social, political, and economic problems and dilemmas within urban communities.
POSC 453  PUBLIC SECTOR HUMAN RESOURCE MANAGEMENT  3
Recruitment, selection, training, performance assessment and pay issues in public personnel administration.

POSC 454  ORGANIZATIONAL BEHAVIOR AND THEORY IN THE Public Sector  3
Examines major administrative and organizational theories ranging from Weberian bureaucratic to organizational humanism as applied to public organizations. Explores various aspects of behavior in the public organizational settings through analysis of individuals, groups and the organizations as a whole.

POSC 455  PUBLIC BUDGETING AND FINANCIAL MANAGEMENT  3
Revenue and expenditure systems, alternative budget formats, basic principles of accounting and capital financing in the public sector.

POSC 456  DISASTER AND POLITICS  3
U.S. emergency management and disaster policy examined through books, articles and video tapes dealing with governmental preparedness for, and response to, natural and human-caused disasters and emergency incidents.

POSC 458  COMMUNITY SERVICE FIELDWORK  3
Fieldwork experiences in public or private community service agencies. Students share and analyze experiences in a seminar setting with academic requirements. RESTRICTIONS: May be repeated for credit once when topics vary.

POSC 463  THE UNITED NATIONS AND WORLD AFFAIRS  3
Examines the development, institutional structure, and prospects of the United Nations and UN system.

POSC 464  INTERNSHIP IN POLITICAL SCIENCE  1-6
Internship in a political science or international relations-related field. Includes preparation of a journal of activities and a final project. RESTRICTIONS: Requires permission of instructor.

POSC 465  MODEL ORGANIZATION OF AMERICAN STATES  3
Theoretical and practical preparation for participation in the Model Organization of American States conference held in Washington, D.C. each year. Participation as delegates to the week-long simulation. RESTRICTIONS: May be repeated once for credit when topics vary. May only count toward political science or international relations major one time.

POSC 466  INDEPENDENT STUDY  1-6
Research conducted under the direction of or in conjunction with a faculty member. May result in a major research paper or be incorporated into a faculty project.

POSC 470  SENIOR HONORS SEMINAR  3

POSC 475  MODEL UNITED NATIONS  3
Intensive preparation for effective participation in the National Model United Nations held in New York City each spring. Participation as delegates to the week-long simulation. RESTRICTIONS: May be repeated once for credit when topics vary. May only count toward political science or international relations major one time.

POSC 604  INTERNATIONAL LAW  3
See MAST673 for course description.

POSC 605  TOPICS IN LAW AND COURTS  3
Content varies from year to year. Possible topics may be comparative public law, jurisprudence, constitutionalism. A major research paper is required.

POSC 610  ISLAM IN GLOBAL AFFAIRS  3
Examines three main elements of political Islam - epistemological, reformative and militant, and examines how the struggle to construct Islam is reconstructing the international system.

POSC 612  FOREIGN POLICY OF THE POST-SOVIET UNION  3
Principles, foreign policies and administration of the former Soviet government and its most important successor states.

POSC 614  JUDICIAL PROCESS  3
Examines the structure, personnel, and process of the American judiciary, including factors that influence judicial decisions and the scope and nature of judicial policy making.

POSC 615  FORCE AND WORLD POLITICS  3
Interrelationship of military and foreign policy; military strategies, arms control and disarmament; and the American experience.

POSC 624  ENERGY POLICY AND ADMINISTRATION  3
World and U.S. energy policies with emphasis on nuclear power, solar energy and fossil fuels. Analyzes progress and design of U.S. science and technology policy in energy domain. May be cross-listed with MAST620 and/or UAPP625.

POSC 626  CONSERVATION AND RENEWABLE ENERGY POLICY  3
See UAPP626 for course description.

POSC 627  LATIN AMERICAN POLITICAL SYSTEMS  3
Impact of social and economic change on the political processes.

POSC 628  COMPARATIVE ENVIRONMENTAL POLITICS  3
See UAPP627 for course description.

POSC 629  SOUTHEAST ASIA AND THE WORLD  3
Examines patterns of international relations within Southeast Asia and between the region and greater powers, Southeast Asia's insecurity and patterns of relations at the domestic, regional and global levels. Discussion of contemporary issues including the emergence of economic blocs, the rise of China and the future of the Association of Southeast Asian Nations.

POSC 632  POLITICAL SYSTEM OF THE POST-SOVIET UNION  3
Structure and process of the political system of the USSR and its most important successor states (Russia, Ukraine, Byelarus, Kazakhstan and others).

POSC 633  AFRICAN POLITICS  3
Overview of politics and society in sub-saharan Africa including colonialism, the rise of nationalism, decolonization, single-party and military rule, the role of social movements and religious, class, gender and ethnic identities and the move toward economic and political liberalization.

POSC 634  POLITICAL THOUGHT I  3
An in-depth study of major political philosophers of the Western tradition from Plato to Machiavelli.

POSC 635  POLITICAL THOUGHT II  3
An in-depth study of major political philosophers of the Western tradition from Machiavelli to the present.

POSC 639  PROBLEMS IN AFRICAN POLITICS  3
Examination of selected topics in contemporary African politics. Focus in-depth on aspects of politics and society in a specific region of Africa or investigate in greater detail issues confronting Africa today such as economic structural adjustment, democratization and state-society relations.

POSC 640  INTERNATIONAL DEVELOPMENT POLICY AND ADMINISTRATION  3
Poverty and inequality in developing countries and the economic development policies employed to alleviate them. Emphasis on policy reform, trade strategies, sustainable development, and the role of the state. The approaches used by the World Bank, the IMF and USAID. May be cross-listed with UAPP640.

POSC 642  PROBLEMS OF WESTERN EUROPEAN POLITICS  3
Examination of current political trends in Western European politics, including changes in party systems and problems of European integration.

POSC 650  PROBLEMS OF LATIN AMERICAN POLITICS  3
Current political issues in selected Latin American countries.

POSC 651  PROBLEMS IN POLICY AND ADMINISTRATION  3
Examination of select topics related to contemporary public administration or the study of public policy and issues and controversies in a select policy area.

POSC 652  TOPICS IN POLITICAL THEORY  3
Focuses on selected topics in political theory, including Marxism, Liberalism and Contemporary Political Theory.

POSC 653  POLITICS AND HEALTHCARE  3
Prepares students to understand and assess the American healthcare delivery system. Examines the political dynamics involved in developing healthcare policies in both the public and private sectors. May be cross-listed with UAPP653.

POSC 656  POLITICS AND DISASTER  3
The politics and public administration of governmental preparedness for, and response to, natural and human-caused disasters and emergency incidents. May be cross-listed with UAPP656.

POSC 659  TOPICS IN PUBLIC ADMINISTRATION  1-3
See MAST659 for course description.

POSC 663  DECISION TOOLS FOR POLICY ANALYSIS  3
See MAST663 for course description.

POSC 678  ADMIRALTY AND MARITIME LAW  3
See MAST678 for course description.

POSC 679  SHIPPING AND PORT MANAGEMENT  3
See MAST679 for course description.
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<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tr>
<td>POSC 681</td>
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<tr>
<td>POSC 683</td>
<td>Regional Policy Analysis</td>
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<td>POSC 685</td>
<td>Personnel and Human Resource Issues: Current Topics</td>
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<td>POSC 687</td>
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<td>POSC 688</td>
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<td>POSC 800</td>
<td>Seminar: Theories of Political Inquiry</td>
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<td>POSC 804</td>
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<td>POSC 806</td>
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<td>POSC 811</td>
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<td>POSC 813</td>
<td>Seminar: American Foreign Policy</td>
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<td>POSC 814</td>
<td>Political Economy of the Environment</td>
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<td>POSC 815</td>
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<td>POSC 816</td>
<td>Advanced Social Research for Political Science</td>
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<td>POSC 817</td>
<td>Financing Alternatives in the Public Sector</td>
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<td>POSC 818</td>
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<td>Management Decision Making in Public and Nonprofit Sectors</td>
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<td>POSC 830</td>
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<td>POSC 833</td>
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<td>POSC 835</td>
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<td>POSC 837</td>
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<td>POSC 839</td>
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<td>POSC 840</td>
<td>International Political Economy</td>
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PSOC 842 INTERNATIONAL ORGANIZATION 3
Introduction to theories of international organization. Focuses on the organization and governance of the international system. Areas of inquiry include the role of norms in structuring interactions in world politics, international regimes, formal international organization and international law.

PSOC 843 GLOBAL GOVERNANCE: THEORY AND CASES 3
Exploration of international organization, regime and global governance theory. Analysis of global governance arrangements in various issue areas such as the environment, ocean issues, human rights, development, world health, telecommunications, trade and finance. May be cross-listed with MASTB843 and/or UAPP843.

PSOC 844 INTERNATIONAL SECURITY 3
Introduction to the theoretical, empirical and policy-relevant literatures connected with international security affairs, defined as issues connected with the use or threat of force in international affairs. Topics include nuclear deterrence and proliferation, grand strategy, ethnic violence, peacekeeping, and terrorism and counterterrorism.

PSOC 845 HUMAN RIGHTS AND GLOBAL GOVERNANCE 3
A seminar that surveys international human rights issues with a special focus on those dimensions of rights most relevant to global governance. Topics include (but are not limited to) cosmopolitan ethics, just war theory, cultural relativism, and human rights regimes.

PSOC 850 COLLOQUIUM ON GLOBAL GOVERNANCE AND SOCIETY 1-3
Departmental speaker series. RESTRICTIONS: First and second year students enroll for one credit and attend the speaker series. Third year Ph.D. students enroll for three credits and the speaker series accompanies a research colloquium.

PSOC 868 RESEARCH 3
To be taken by M.A. students seeking to satisfy the program's research requirement through the research paper option.

PSOC 869 MASTER'S THESIS 1-6

PSOC 899 RESEARCH PAPER FOR MASTER OF ARTS 0 PF
Independent study, where the M.A. student works with a supervising faculty member to complete the master of arts research paper.

PSOC 964 PRE-CANDIDACY STUDY 3-12 PF
Research and readings in preparation of dissertation topic and/or qualifying examinations for doctoral students before admission to candidacy but after completion of all required course work. RESTRICTIONS: Not open to students who have been admitted to candidacy.

PSOC 969 DOCTORAL DISSERTATION 1-12 PF

PSYCHOLOGY

PSYC 100 GENERAL PSYCHOLOGY 3
Provides foundation in the application of the scientific method to problems of human behavior and experience.

PSYC 207 RESEARCH METHODS 3
Reviews the major issues involved in the design of psychological experiments. Includes measurement issues, internal and external validity of experiments, research with single subjects, and research ethics. Discusses both laboratory and field research. PREREQ: PSYC100. RESTRICTIONS: Majors and minors only.

PSYC 209 MEASUREMENT AND STATISTICS 3
Theory and the application of statistical techniques to psychological data. PREREQ: PSYC100 and one course in basic college mathematics. RESTRICTIONS: Majors and minors only.

PSYC 270 FAMILIES AND DEVELOPMENTAL DISABILITIES 3
See IFST270 for course description.

PSYC 301 PERSONALITY 3
A survey of data and theories of human personality and affect. PREREQ: PSYC100.

PSYC 303 INTRODUCTION TO SOCIAL PSYCHOLOGY 3
Analysis of interpersonal behavior with special emphasis on problems of conformity and influence, the organization and dynamics of social groups, and the development of opinions and attitudes. PREREQ: PSYC100.

PSYC 310 SENSATION AND PERCEPTION 3
Theories and experimental study of sensation and perception. PREREQ: PSYC207 and PSYC209.

PSYC 312 LEARNING AND MOTIVATION 3
Experimental study of contemporary theories of learning and motivation. PREREQ: PSYC207 and PSYC209.

PSYC 314 BRAIN AND BEHAVIOR 3
Study of the brain mechanisms underlying hunger, sex, aggression, learning, memory, perception, sleep and waking. May be cross-listed with CGSC314. PREREQ: PSYC207 and PSYC209.

PSYC 316 BIOLOGICAL BASES OF BEHAVIOR 3
An evolutionary approach towards three modern theories of motivation: ethologists' instinct theory, psychoanalytic theory, and drive theory. Topics include circadian rhythms, obesity and anorexia, sleep, fever, phobias, helplessness, voodoo death, fear, love, and aggression. PREREQ: PSYC207 and PSYC209.

PSYC 320 INTRODUCTION TO NEUROSCIENCE 3
Survey of the basic sciences of the brain (neuroanatomy, neurophysiology, neuropharmacology), building on these principles to examine the neurobiological bases of a variety of phenomena, including perception and cognition, memory and amnesia, fear and aggression, and the pharmacokinetics of several mental disorders. PREREQ: PSYC207 and PSYC209.

PSYC 325 CHILD PSYCHOLOGY 3
Survey of the interactions of physiological, psychological, and environmental factors determining psychological development. Consideration of major theories of child development. PREREQ: PSYC100.

PSYC 333 PSYCHOLOGY OF WOMEN 3
Psychological analysis of the meaning and implications of being a woman and cause and consequences of the female experience. Biological sex vs. psychological sex role identity, stereotyping, discrimination, self-concept and the feminist perspective. May be cross-listed with WOMS333. PREREQ: PSYC100.

PSYC 334 ABNORMAL PSYCHOLOGY 3
Disorders of behavior and consciousness including the various psychoses, psychoneuroses, mental deficiency, and other conditions. PREREQ: PSYC100.

PSYC 336 PSYCHOLOGY OF HUMAN SEXUALITY 3
Examination of human sexuality using the theoretical perspectives and empirical methods of psychology. Topics include sexuality development, sexual behavior and communication, and sexual disorders and dysfunctions. Emphasis is placed on the influence that social factors have on individual sexual expression. PREREQ: PSYC100.

PSYC 340 COGNITION 3
Survey of major themes in human thought processes, concept formation, problem solving, creativity, language use and cognitive development. May be cross-listed with CGSC340. PREREQ: PSYC207 and PSYC209.

PSYC 344 PSYCHOLOGY OF LANGUAGE 3
Describes the nature of human language, how it is used to speak and comprehend, and how it is learned. Subtopics include language and thought, animal communication, and language in special populations, such as children born deaf or blind. PREREQ: PSYC207 and PSYC209.

PSYC 346 PSYCHOLOGY AND THE LAW 3
See CRJU346 for course description.

PSYC 350 DEVELOPMENTAL PSYCHOLOGY 3
An analysis of theory and research in developmental psychology including the topics of developmental processes, developmental risk, systems theory and contemporary social issues. PREREQ: PSYC207 and PSYC209. RESTRICTIONS: If both PSYC325 and PSYC330 are taken, only PSYC325 will count for major credit. Open to psychology majors and minors only.

PSYC 365 PSYCHOLOGY FIELD PLACEMENT 3
Student contracts with any psychology instructor. Requirements include a minimum of four hours per week working in an agency, institution or business, reading assignments and writing a term paper. Placement will be made with assistance from Career Planning and Placement. Inquiries should be made several months in advance. PREREQ: PSYC207 and PSYC209.
PSYC 366 | INDEPENDENT STUDY | 1-6

An analysis of contemporary issues and research in personality including the assessment of personality traits, the personality situation interaction and the social and biological bases of individual differences. PREREQ: PSYC207 and PSYC209. RESTRICTIONS: If both PSYC301 and PSYC370 are taken, only PSYC301 will count for major credit. Open to psychology majors and minors only.

PSYC 370 | RESEARCH IN PERSONALITY | 3

Exploration of research on diagnosis, etiology and treatment of major pathological disorders. Emphasis on original research articles, class discussion and assessment instruments, in addition to analysis of video-taped interviews with patients used to illustrate the disorders. PREREQ: PSYC207 and PSYC209. RESTRICTIONS: If both PSYC301 and PSYC370 are taken, only PSYC301 will count for major credit. Open to psychology majors and minors only.

PSYC 380 | PSYCHOPATHOLOGY | 3

Psychological theory and research on human cultural variation and focuses on different national populations (especially North Americans and East Asians), with some attention to the psychological experience of multicultural populations within the United States. PREREQ: PSYC207 and PSYC209.

PSYC 390 | SOCIAL PSYCHOLOGY | 3

An introduction to the study of how culture shapes psychological experience, including social behavior, cognition, motivation, and the experience of the self. Covers psychological theory and research in social psychology. PREREQ: PSYC207 and PSYC209. RESTRICTIONS: Open to junior and senior psychology majors and minors only.

PSYC 400 | PSYCHOLOGY OF NONVERBAL BEHAVIOR | 3

A seminar on the social psychological implications of the research literature on nonverbal behavior in social interaction. Focuses on interpersonal attraction, leadership, impression formation, causal attribution, deception, social attitudes and cross-cultural factors, with practical applications. PREREQ: PSYC207 and PSYC209. RESTRICTIONS: Open to junior and senior psychology majors and minors only.

PSYC 406 | REDUCTION OF INTERGROUP CONFLICT | 3

The reduction of intergroup conflict in business, educational and experimental laboratory settings, with special attention given to organizational mergers. Investigation of strategies for reducing intergroup conflict. PREREQ: PSYC207 and PSYC209. RESTRICTIONS: Open to junior and senior psychology majors and minors only.

PSYC 407 | EMOTIONS AND PREVENTIVE INTERVENTION | 3

The emotions: their neural, expressive, and experiential components and their relation to adaptive and maladaptive behavior. Translating emotion theory and research into therapeutic and preventive interventions. Requirements include doing emotion tutoring with child. PREREQ: PSYC207 and PSYC209. RESTRICTIONS: Requires permission of instructor. Open to junior and senior psychology majors and minors only.

PSYC 410 | BIOLOGICAL BASIS OF MOTIVATION AND EMOTION | 3

An evolutionary approach towards three major modern theories of motivation: ethologists' instinct theory, Freud's psychoanalytic theory and psychologists' drive theory. Covers current work on circadian rhythms, obesity and anorexia, sleep, fever, phobias, learned helplessness, voodoo death, fear, love and aggression. PREREQ: PSYC207 and PSYC209. RESTRICTIONS: Open to junior and senior psychology majors and minors only.

PSYC 411 | IDEAS IN BIOPSYCHOLOGY | 3

Focuses on important ideas in biopsychology as communicated in seminal books. Examines at least six influential books in psychology, biology, or philosophy. Students lead the discussions, which will be "problem-based" and focused on the personal and social context, theoretical importance, and social impact of the book. PREREQ: PSYC207 and PSYC209. RESTRICTIONS: Open to junior and senior psychology majors and minors only.

PSYC 412 | HORMONES AND BEHAVIOR | 3

Focuses on description of the physiology of human hormones and the relations of hormones to behavior. PREREQ: PSYC207 and PSYC209. RESTRICTIONS: Open to majors and minors only and students in the neuroscience program.

PSYC 414 | DRUGS AND THE BRAIN | 3

Topics include drug treatment of mental illness, and drug abuse/addiction. PREREQ: PSYC207 and PSYC209. RESTRICTIONS: Open to junior and senior psychology majors and minors only.

PSYC 415 | HISTORY AND SYSTEMS OF PSYCHOLOGY | 3

Psychology from the early Greeks through the more important "schools" of the 20th century. PREREQ: PSYC207 and PSYC209. RESTRICTIONS: Open to junior and senior psychology majors and minors only.

PSYC 416 | PSYCHOLOGICAL PERSPECTIVES ON THE BLACK AMERICAN | 3

The experience of Black Americans as viewed from a psychological perspective. Psychological theory and research pertaining to Black Americans; reactions to oppression, collective behavior, personality development, and life styles. May be cross-listed with BAMS432. PREREQ: PSYC207 and PSYC209. RESTRICTIONS: Open to junior and senior psychology majors and minors only.

PSYC 420 | MENTAL ILLNESS: HISTORICAL AND CRITICAL PERSPECTIVES | 3

Explores historical and current issues in understanding mental illness from biomedical and social constructionist perspectives. Focuses on recent advances and problems in conceptions of cause, diagnosis, and intervention. PREREQ: PSYC207 and PSYC209. RESTRICTIONS: Open to junior and senior psychology majors and minors only.

PSYC 421 | BIOLOGY AND BEHAVIOR: GENDER, INTELLIGENCE AND PSYCHOPATHOLOGY | 3

Critically examines psychological claims about the relations between biology and behavior. Organized around the topics of gender, intelligence, and psychopathology and addresses issues raised by evolutionary psychology, behavioral genetics, and biological and brain reductionism. PREREQ: PSYC207 and PSYC209. RESTRICTIONS: Restricted to junior and senior majors and minors.

PSYC 424 | APPLIED SOCIAL PSYCHOLOGY | 3

The application of basic principles of interpersonal behavior to everyday life. Topics include persuasion, reciprocation, employee motivation, organizational development, liking and authority. PREREQ: PSYC207 and PSYC209. RESTRICTIONS: Open to junior and senior psychology majors and minors only.

PSYC 425 | FAMILY CONFLICT AND THE CHILD | 3

Analysis of specific topic areas in child psychology, such as infancy and cognitive and social development. Topics may vary from year to year. PREREQ: PSYC207 and PSYC209. RESTRICTIONS: Open to junior and senior psychology majors and minors only.

PSYC 433 | COGNITIVE NEUROSCIENCE | 3

Examines the brain mechanisms responsible for cognitive functions such as perception, memory, and language. Surveys the neural mechanisms underlying cognition and the current methods for relating mind and brain, including studies of brain-damaged patients and brain imaging techniques. PREREQ: PSYC207 and PSYC209. RESTRICTIONS: Open to junior and senior psychology majors and minors only.

PSYC 440 | TOPICS IN PSYCHOLOGICAL METHODS | 3

An overview of psychological methods and research designs used in psychology. Topics may include the study of human behavior in laboratory, field and natural settings. PREREQ: PSYC207 and PSYC209. RESTRICTIONS: Open to junior and senior psychology majors and minors only.

PSYC 442 | PERCEPTION, MEMORY AND IMAGINATION | 3

Addresses controversial issues about what it means to perceive, remember, and imagine our world. Examines research from cognitive psychology, cognitive science, and neuropsychology and includes in-class demonstrations of perceptual illusions, memory distortions, and imagery. PREREQ: PSYC207 and PSYC209.

PSYC 443 | TOPICS IN ORGANIZATIONAL COMMUNICATION | 3

See COMM442 for course description.

PSYC 445 | TOPICS IN ADOLESCENT PSYCHOLOGY | 3

Analysis of the physiological, psychological and social factors influencing psychological development from late childhood to adolescence. PREREQ: PSYC207 and PSYC209. RESTRICTIONS: Open to junior and senior psychology majors and minors only.

PSYC 460 | ASSESSMENT OF YOUNG CHILDREN | 3

See IFST452 for course description.

PSYC 462 | LANGUAGE ACQUISITION | 3

See EDUC462 for course description.
RUSS 104 RUSSIAN I - ELEMENTARY 4
Introduction to the Russian language and development of speaking, listening, reading and writing skills through the use of basic texts.
PREREQ: RUSS103.

RUSS 105 RUSSIAN II - ELEMENTARY/INTERMEDIATE 4
Completion of basic Russian. Increasing mastery of the basic skills of speaking, listening, reading and writing. May be repeated for credit when topics vary.
PREREQ: RUSS105.

RUSS 106 RUSSIAN III - INTERMEDIATE 4
Review of grammar, continued practice in speaking and writing, and testing of average difficulty. May be repeated for credit when topics vary.
PREREQ: RUSS106.

RUSS 200 RUSSIAN GRAMMAR REVIEW 3
Systematic review of elementary and intermediate Russian grammar, study of complex sentence structure and idioms. Some conversational practice. May be repeated for credit when topics vary.
PREREQ: RUSS107.

RUSS 205 RUSSIAN CONVERSATION 3
Practical use of the language. Emphasis on topics drawn from contemporary Russian life and literature. May be repeated for credit when topics vary.
PREREQ: RUSS107.

RUSS 211 RUSSIAN READING AND COMPOSITION: SHORT FICTION 3
Reading and discussion of 20th century Russian short stories and novellas. Several short compositions. Grammar review where appropriate. May be repeated for credit when topics vary.
PREREQ: RUSS107.

RUSS 305 RUSSIAN CONVERSATION AND COMPOSITION 3
Discussion of current cultural, social and political topics in Russia and the former republics. Vocabulary building, grammar exercises and frequent compositions. May be repeated for credit when topics vary.
PREREQ: Any 200-level course conducted in Russian.

RUSS 310 INTRODUCTION TO RUSSIAN LITERATURE I 3
Masterpieces of poetry, narrative prose and drama from the 19th century. May be repeated for credit when topics vary.
PREREQ: RUSS211 or RUSS305.

RUSS 312 INTRODUCTION TO RUSSIAN LITERATURE II 3
Masterpieces of poetry, narrative prose and drama from the 20th century. May be repeated for credit when topics vary.
PREREQ: RUSS211 or RUSS305.

RUSS 325 RUSSIAN CIVILIZATION AND CULTURE 3
Survey of the major cultural, social and political developments in Russia from its inception to the present.
PREREQ: RUSS211 or RUSS305.

RUSS 366 INDEPENDENT STUDY 1-3
Selected topics in advanced Russian grammar, with special attention to participial constructions, verbs of motion, aspect and problems of syntax and word order. Exercises in writing correct and idiomatic Russian. May be repeated for credit when topics vary.
PREREQ: Any 200-level Russian course.

RUSS 401 ADVANCED RUSSIAN GRAMMAR AND COMPOSITION 3
Further applications to behavior measurement of probability, regression and analysis of variance and covariance; psychometrics and scaling techniques; and design of experiments.
PREREQ: RUSS211 or RUSS305.

RUSS 455 SELECTED AUTHORS, WORKS AND THEMES 3
Exercises in writing correct and idiomatic Russian. May be repeated for credit when topics vary.
PREREQ: RUSS211 or RUSS305.

RUSS 465 SEMINAR 3
Various authors and themes. May be repeated for credit when topics vary.
PREREQ: RUSS211 or RUSS305.

RUSS 665 SEMINAR 3
Various authors and themes. May be repeated for credit when topics vary.
PREREQ: RUSS211 or RUSS305.

RUSS 837 SUPERVISED PRACTICE IN CLINICAL PSYCHOLOGY IV 1-3 PF
Continuation of PSYC834, PSYC835 and PSYC836.
PREREQ: PSYC836.

RUSS 845 CHILDHOOD PSYCHOPATHOLOGY 3
See EDUC813 for course description.

RUSS 860 PSYCHOLOGICAL STATISTICS 3
Applications to behavior measurement of probability, regression and analysis of variance and covariance; psychometrics and scaling techniques; and design of experiments. May be repeated for credit when topics vary.
PREREQ: RUSS211.

RUSS 861 PSYCHOLOGICAL STATISTICS 3
Further applications to behavior measurement of probability, regression and analysis of variance and covariance; psychometrics and scaling techniques; and design of experiments. May be repeated for credit when topics vary.
PREREQ: RUSS211.

RUSS 864 TEACHING PRACTICUM IN PSYCHOLOGY 3
Prepares graduate students in psychology to teach undergraduate courses. Topics include course design, active learning techniques, effective lecturing, teaching writing, student assessment, campus resources, and teaching philosophies and portfolios. May be repeated for credit when topics vary.
PREREQ: RUSS860.

RUSS 865 SEMINAR 3
Various authors and themes. May be repeated for credit when topics vary.
PREREQ: RUSS860.

RUSS 866 INDEPENDENT STUDY 1-3
Various authors and themes. May be repeated for credit when topics vary.
PREREQ: RUSS860.

RUSS 964 PRE-CANDIDACY STUDY 3-12 PF
Research and readings in preparation of dissertation and/or qualifying examinations for doctoral students before admission to candidacy but after completion of all required course work. May be repeated for credit when topics vary.
PREREQ: RUSS963.

RUSS 969 DOCTORAL DISSERTATION 1-12 PF
May be repeated for credit when topics vary.
PREREQ: RUSS968.
SCIENCE

SCEN 492  STUDENT TEACHING SEMINAR: SECONDARY SCIENCE  3 PF
Methods, techniques and problems in student teaching in secondary schools and their solutions. Assertiveness, authority, management, strategies and teaching for understanding.
COREQ: EDUC400.

SCEN 540  ENERGY ACROSS SYSTEMS FOR SECONDARY EDUCATORS  3
Standards-based format challenges and extends the content knowledge of practicing science teachers, grades 6-10, and examines critical topics in significant depth in a problem-based setting. Themes include solar energy, heat, light, electrical power generation, energy transformation, photosynthesis, and energy conservation.
RESTRICTIONS: Intended for practicing teachers.

SCEN 541  THE NATURE OF MATTER FOR SECONDARY EDUCATORS  3
Standards-based format challenges and extends the content knowledge of practicing science teachers, grades 6-10, and examines critical topics in significant depth in a problem-based setting. Themes include the particle model, atomic structure, chemical reactions, and energy transformations including photosynthesis.
RESTRICTIONS: Limited to practicing teachers.

SCEN 545  QUANTITATIVE LITERACY/SCIENTIFIC INQUIRY FOR SECONDARY EDUCATORS  3
Standards-based format challenges and extends the content knowledge of practicing science teachers, grades 6-10, and examines critical topics in significant depth in a problem-based setting. Themes include the relationship between evidence and inference, measurement errors, data representations, from the viewpoint of mathematics and science.
RESTRICTIONS: Limited to practicing teachers.

SCEN 549  DELAWARE’S ECOSYSTEMS  3
Presents the basics of ecosystem structure and function while comparing Delaware’s major ecosystems. Integration with ecosystem and wetland kits, science standards and performance indicators; use of field technology; associated environmental issues. Lecture and discussion supplement outdoor studies in meadow, forest, stream, and estuary ecosystems.

SEXUALITIES AND GENDER STUDIES

SGST 200  CULTURAL INTRODUCTION TO SEXUALITIES AND GENDER STUDIES  3
An exploration of the variations in the social construction of lesbian, gay, bisexual, heterosexual, transsexual, transgender and queer identities and communities in contemporary American society by study of gay literature, history, theory, religious and legal issues and the arts including film, music, television and visual arts.
May be cross-listed with WOMS200.

SGST 208  CURRENT ISSUES IN SEXUALITY AND GENDER LECTURE SERIES  1-3
Lecture series in which faculty and guest speakers discuss their research on contemporary and historical perspectives on sexuality and gender. Research presented from several disciplines including sociology, history, literature, art, music, anthropology and psychology, among others.
May be cross-listed with WOMS208.
RESTRICTIONS: May be repeated for credit when topics vary.

SGST 301  GAY AND LESBIAN FILM  3
Explores gay and lesbian issues represented in film and an academic analysis of these issues. Through film, students study the social constructs of sexuality and gender, analyze the role of homosexuality, examine the development of gay and lesbian characterization, and explore the differences between sex and sexuality.
May be cross-listed with WOMS301.

SOCI 201  INTRODUCTION TO SOCIOLOGY  3
An overview of the sociological perspective of the study of society, social organization and social institutions with special emphasis on the social causes and consequences of human behavior.

SOCI 203  INDIVIDUAL AND SOCIETY  3
Analysis of the social formation of the individual. Particular emphasis on socialization and personality development. The contribution of individual patterns of behavior to the functioning of social systems.

SOCI 204  URBAN COMMUNITIES  3
Urbanization, rural-urban social differences and the organization of urban communities by race, class, ethnicity and stage in the life cycle.
May be cross-listed with BAMS204.

SOCI 206  WOMEN AND WORK  3
See WOMS206 for course description.

SOCI 209  SOCIAL PROBLEMS  3
Topics may include poverty, intergroup conflicts, war, mental illness, aging, adolescence and environmental pollution.

SOCI 211  MEN, CONFLICT AND SOCIAL CHANGE  3
See WOS211 for course description.

SOCI 213  MEN AND WOMEN IN AMERICAN SOCIETY  3
Provides a sociological framework for analyzing sex and gender relations in contemporary American society. Topics include the social construction of gender, patterns of sex-role socialization, gender stratification in the paid work force, gender relations in the family and other social institutions.
May be cross-listed with WOS213.

SOCI 215  RACE IN SOCIETY  3
Social definitions of race, how race is incorporated into social institutions and how race structures relationships among diverse groups in society. Includes analysis of rights and privileges denied or extended to groups and how disadvantaged groups work towards racial equality.
May be cross-listed with BAMS215.

SOCI 266  SPECIAL PROBLEM  1-3
SOCI 270  FAMILIES AND DEVELOPMENTAL DISABILITIES  3
May require.

SOCI 301  INTRODUCTION TO SOCIOLOGICAL RESEARCH  4
Survey of research methods and data analysis employed in sociology. PREREQ: SOC1201 and completion of the College of Arts and Sciences math requirement.
RESTRICTIONS: Strongly recommended - junior status and 12 social science credits.

SOCI 302  SOCIAL DEViance  3
Defining deviance, research on deviance and explaining deviance. May be cross-listed with CRJU302.

SOCI 303  JUVENILE DELINQUENCY  3
Historical definition of delinquency, abuse and neglect, research in delinquency, causes and treatment of delinquents.
May be cross-listed with CRJU303.
PREREQ: SOC1201 or SOC1209.

SOCI 304  CRIMINOLOGY  3
The nature, kinds and causes of crime. Criminal liability, criminal careers and organized racketeering.
May be cross-listed with CRJU304.
PREREQ: SOC1201 or SOC1209.

SOCI 305  SOCIAL CLASS AND INEQUALITY  3
Internal differentiation as a basis for inequality and differential life chances of human societies.

SOCI 306  PERSONALITY AND SOCIETY  3
Interaction of personality and society, including such segments as complex organizations and small groups. Particular emphasis on the social formation of personality, and its role in the production of various modes of social behavior and the dynamics of social change.
PREREQ: SOC1201, SOC1203 or PSY100.

SOCI 308  THE FAMILY  3
The comparative study of the family in various societies provides a background for the analysis of family organization in modern America.
PREREQ: SOC1201 or SOC1203 or SOC1209.

SOCI 311  SOCIOLOGY OF HEALTHCARE  3
Professionalization of health occupations, hospitals as social systems, medical education and practice organizations, healthcare organizations and their interrelationships (politics of health), and health service patterns.

SOCI 312  THEORIES OF SOCIETY  3
Covers writings of Karl Marx, Emile Durkheim, Max Weber and related current approaches. Focuses on theoretical perspectives concerned with social development, social conflict, solidarity, social class and gender.
PREREQ: SOC1201.

492
SOCI 320 PERSONALITY AND POLITICS
The role of personality in political behavior. Considerations include the social and psychological motivations for political activity and the differential relationship of personality to variations in political systems, roles, ideologies and dynamics, such as political consensus and cleavage. Attention given to particular methods of research in this specific area of social behavior. PREREQ: SOCI201 or SOCI203 or PSYC100 or SOCI150.

SOCI 322 CROWDS, CULTS AND REVOLUTIONS
Analysis of forms of behavior in relatively unstructured situations such as crowds, panics, riots and demonstrations; and processes of interaction: susceptibility, contagion, polarization and communication. May be cross-listed with CRJU322. PREREQ: SOCI201.

SOCI 323 SOCIOLOGY OF RISK
Focuses on how individuals, organizations, and government agencies assess various types of risk and act with respect to those assessments. Topics include risk perception, risk assessment, risk management under conditions of scientific uncertainty, and public debates about safety. PREREQ: SOCI201.

SOCI 324 ISSUES IN EMERGENCY MANAGEMENT
Overview of the development of emergency management as a profession in the United States. Issues associated with emergency management are also discussed with reference to the disaster research literature. PREREQ: SOCI325.

SOCI 325 DISASTERS AND SOCIETY
Sociological introduction to the field of disaster studies, including the ways in which societies attempt to prepare for, respond to, and recover from their impacts. PREREQ: SOCI201.

SOCI 326 EMERGENCY AND ENVIRONMENTAL MANAGEMENT PRACTICUM AND SEMINAR
Internship in an organization or agency responsible for emergency or environmental management. With approval of the area coordinator, student is assigned to an organization to become familiar with issues, policies and practices pertaining to disasters. Student under direct supervision of agency personnel while in the placement position. In addition to the internship, students are expected to meet weekly in a seminar with the area coordinator and other students to discuss issues and experiences. PREREQ: SOCI212 or SOCI237, and SOCI470. RESTRICTIONS: Approval of the area coordinator

SOCI 327 SOCIOLOGY OF ORGANIZATIONS
Business enterprises, the military, governmental bureaus and other large-scale organizations. Bureaucratic structure, internal systems of status and authority, division of labor, social control, and the individual in the organization. PREREQ: SOCI201.

SOCI 328 WORK IN A GLOBAL ECONOMY
The role of work in contemporary society. Social, institutional and cultural influences on work. Special emphasis on problem areas such as job satisfaction, professionalism, career patterns, leisure and occupational choice.

SOCI 330 POPULATION, LAW AND SOCIETY
Interrelationships among population, law and social structure with an emphasis on analyzing strategies of adaptation to change. Introduction to demographic techniques; contemporary issues such as family planning, population policies, migration, marriage and divorce.

SOCI 331 WORLD POPULATION: PROFILES AND TRENDS
Study of the size, composition and distribution of world populations. An examination of the structure and dynamics of selected countries and the specific problems-causes, consequences and possible solutions. Population problems are examined in relationship to social organization, environment and technology.

SOCI 336 THE DETECTIVE IN FILM AND FICTION
See CRJU336 for course description.

SOCI 341 WELFARE AND SOCIETY
Institutional apparatus created to deal with the welfare problems of an industrial society. Development of welfare institutions, their structure and functioning. PREREQ: 18 credit hours in sociology, psychology, political science or economics.

SOCI 343 SOCIETY, POLITICS AND HEALTHCARE
See POSC343 for course description.

SOCI 345 SOCIOLOGY OF LAW
Analysis of law as a social process in both historical and comparative perspective. Focuses on various theories of law and society and relevant empirical research. May be cross-listed with CRJU345.

SOCI 346 GENDER AND AGING
Empirical and theoretical investigation of the aging process. PREREQ: SOCI201 or SOCI203 or PSYC100.

SOCI 348 THEORIES OF SOCIAL WORK PRACTICE
Methods of social work practice; casework, group work, community organization; sociological and psychological foundations underlying social services. PREREQ: SOCI201.

SOCI 350 SOCIAL INEQUALITY AND FILM
Using a sociological framework for understanding equality, major films are used to explore the depictions and representations of race, gender, sexuality and social class issues. Examines the ideologies presented in films, the contexts that create them and how they contrast with social realities. PREREQ: SOCI201.

SOCI 356 RACE, CLASS AND CRIME
See CRJU355 for course description.

SOCI 360 SOCIOLOGY OF RELIGION
Sociological analysis of major religions and the societies with which they have been associated, social settings of particular systems of belief, the relation of status; religious affiliation and personal behavior in modern societies. May be cross-listed with JWST360.

SOCI 361 RACIAL INEQUALITY
A detailed examination of racial inequality, including the social construction of race, the nature of oppression and advantage, government policies and resistance strategies. There will be attention to the status of men and women and social class diversity within racial-ethnic communities. May be cross-listed with BAMS361. PREREQ: SOCI201.

SOCI 366 INDEPENDENT STUDY
1-3
Independent research under the supervision of a faculty member. Requires preparation and presentation of a research paper and a final report. PREREQ: Approval of the area coordinator. RESTRICTIONS: Requires permission of instructor.

SOCI 369 ALCOHOL, DRUGS AND CRIME
See CRJU369 for course description. PREREQ: CRJU110 or SOCI201.

SOCI 375 CRIMINAL JUVENILES
See CRJU375 for course description.

SOCI 377 CRIMINAL PROCEDURE
See CRJU377 for course description.

SOCI 381 THEORIES OF CRIMINAL LAW
See CRJU381 for course description.

SOCI 382 CRIMINAL JUSTICE: ORGANIZATION AND ADMINISTRATION
See CRJU382 for course description.

SOCI 383 THE CRIMINAL JUSTICE SYSTEM
See CRJU383 for course description.

SOCI 384 CRIMINAL LAW AND THE FAMILY
See CRJU384 for course description.

SOCI 399 PRACTICUM: TEACHING SOCIOLOGY
3 PF
Field experience and related seminar. Placement in urban planning and service agencies where students work for approximately 160 hours under professionally trained supervisors. Students meet in a weekly seminar with coordinator. PREREQ: SOCI204.

SOCI 401 ADVANCED SOCIOLOGICAL METHODS
3 PF
Field experience in undergraduate education is gained by serving as a discussion leader in a course taught by a regular member of the faculty. RESTRICTIONS: Requires permission of instructor. Not for major credit.

SOCI 402 URBAN STUDIES PRACTICUM AND SEMINAR
4 PF
Field experience and related seminar. Placement in urban planning and service agencies where students work for approximately 160 hours under professionally trained supervisors. Students meet in a weekly seminar with coordinator. PREREQ: SOCI204.

SOCI 407 SOCIOLOGY OF SEX AND GENDER
Seminar on sex and gender relations from a sociological perspective. Surveys current research on gender stratification in the work force, the feminization of poverty, gender relations in the family, sexual violence, and feminism as a social movement. Special attention given to current theoretical debates on the origins and persistence of sexual inequality and the intersection of gender with race and class in patterns of social stratification. May be cross-listed with WOMS407. PREREQ: SOCI201, and either SOCI213 or WOMS201. RESTRICTIONS: Restricted to junior and senior sociology and women's studies majors.

SOCI 410 HEALTH SERVICES PRACTICUM AND SEMINAR
4 PF
Field experience and related seminar. Placement in health service settings where student works for about 160 hours under supervision of health service administrators. Students meet in a weekly seminar with coordinator. RESTRICTIONS: Requires permission of instructor.
SOCI 411  **TECHNIQUES OF DEMOGRAPHIC ANALYSIS**  3
Study of demographic equation (fertility, mortality and migration), population processes (composition and distribution) and the use of computers to analyze demographic data.
PREREQ: SOCI310.

SOCI 412  **RESEARCH PRACTICUM**  4 PF
Field experience and related seminar. Placement in research, planning and service agencies where students work for approximately 160 hours under professionally trained supervisors. Students meet in a weekly seminar with coordinator.
PREREQ: SOCI310.
RESTRICTIONS: Requires permission of instructor.

SOCI 415  **RACE, CLASS AND GENDER**  3
Analysis of current American social issues that show interrelationship of race, class and gender. Readings from sociology, Afro-American studies, feminist studies, history and literature. May be cross-listed with BAMS415 and/or WOMS415.

SOCI 416  **SOCIAL THOUGHT AND CONTEMPORARY SOCIETY**  3
Seminar focuses on ways in which social thought defines and analyzes contemporary society. Explores how alternative theories and methods serve to create knowledge about contemporary concerns with everyday life, democracy, equality, social structure and power.
PREREQ: SOCI312.

SOCI 418  **RACE, GENDER AND POVERTY**  3
An examination of contemporary American poverty with attention to race and gender as fundamental dimensions of inequality. Social policy, employment and family composition are key topics. May be cross-listed with BAMS418 and/or WOMS418.
PREREQ: SOCI210.

SOCI 422  **FADS AND FASHIONS**  3
Examination of the dynamics of short-term enthusiasms. Emphasis will be on fads and fashions in education, science, medicine, and other institutions, rather than on fads in clothing.

SOCI 428  **CORPORATE CRIME**  3
Nature and causes of the deviant behaviors and crimes of large organizations. How organizations act, are accused of deviance and defend themselves in cases such as price-fixing, sale of unsafe drugs and illegal spying. May be cross-listed with CRJU428.

SOCI 430  **COMPARATIVE SOCIOLOGY**  3
Examines sociological similarities and differences between the United States and a selected country on a number of critical sociological topics. Topics include ethnic and religious diversity, culture, demographic structure, social institutions, social stratification and urbanization.
May be cross-listed with JWST430.
RESTRICTIONS: Requires permission of instructor. Only three credits may apply toward departmental requirement of six 400-level credits. Offered only in the study abroad program and subject to acceptance by the Office of International Programs.

SOCI 435  **SOCIOLGY OF AMERICAN JEWRY**  3
Examines the demographic, socioeconomic, cultural and institutional dimensions of the US Jewish population in the context of models of social integration and in comparison to other immigrant groups in the population. These dimensions are used to discuss current issues facing this population subgroup.
May be cross-listed with JWST435.
PREREQ: SOCI210.

SOCI 441  **SOCIAL WELFARE PRACTICUM AND SEMINAR**  4 PF
Field experience and related seminar. Placement in social service agencies where students work for approximately 160 hours under professionally trained supervisors; students meet in a weekly seminar with coordinator.
PREREQ: SOCI341.
RESTRICTIONS: Requires permission of instructor.

SOCI 442  **LAW AND SOCIETY PRACTICUM AND SEMINAR**  4 PF
Field experience and related seminar. Placement in court, law firm or other law-related institution where students work for approximately 160 hours under professionally trained supervisors; weekly seminar with program coordinator.
PREREQ: SOCI345.
RESTRICTIONS: Requires permission of instructor.

SOCI 448  **COMMUNITY-BASED TREATMENT**  3
Explores issues related to the appropriateness and design of community-based programs for the mentally disabled, substance abusers, the homeless, dependent children, etc. Emphasis on analyzing client needs and community resources, and on understanding the perspectives of clients, staff and neighbors about these programs. 
May be cross-listed with CRJU448.

SOCI 450  **POLITICAL SOCIOLOGY**  3
Analysis of political organization and action, including evaluation of major approaches. Case studies of political structures and behavior.
PREREQ: SOCI210.

SOCI 452  **DRUGS AND THE CRIMINAL JUSTICE SYSTEM**  3
See CRJU452 for course description.
RESTRICTIONS: Requires permission of the instructor.

SOCI 456  **LAWYERS AND SOCIETY**  3
Seminar focusing upon the social organization and dynamics of the legal profession. Topics include professional association, law school socialization, professional ethics and law practice. May be cross-listed with CRJU456.
PREREQ: SOCI210 and three additional sociology courses.

SOCI 460  **WOMEN IN INTERNATIONAL DEVELOPMENT**  3
Understanding of international development process in third world countries by examination of the roles of men and women. Analyzes processes of development with emphasis on women's participation and/or exclusion. Examines development at the project proposal or program implementation level. Hands-on experience in practical project development and proposal presentation skills. May be cross-listed with GEOG460, IFST460 and/or WOMS460.

SOCI 464  **INTERNSHIP**  1-4 PF
Provides an opportunity to apply sociological theory and research while working in an agency or other organizational setting under supervision of department faculty. Must complete an internship agreement and secure approval from faculty member to sponsor internship.

SOCI 466  **INDEPENDENT STUDY**  1-3
PREREQ: SOCI201.

SOCI 470  **ENVIRONMENTAL SOCIOLOGY**  3
A substantive and theoretical introduction to the major issues in environmental sociology: the emergence and development of the environmental movement; the development of environmental issues; and how environmental issues are related to structural, contextual and perceptual factors.
PREREQ: SOCI210 and SOCI312.
RESTRICTIONS: Requires upper division status.

SOCI 495  **FIELD EXPERIENCE IN CRIMINAL JUSTICE**  4 PF
See CRJU495 for course description.

SOCI 496  **PRACTICUM IN TEACHING**  1-3 PF
PREREQ: SOCI201.

SOCI 605  **DATA COLLECTION AND ANALYSIS**  3
A survey of methods and techniques for defining research problems and for gathering and analyzing data in sociological research. 
RESTRICTIONS: Requires permission of instructor.

SOCI 606  **QUALITATIVE METHODOLOGY**  3
Focuses on research design, the logic of inquiry and an elaboration of selected issues introduced in SOCI605. Special emphasis on epistemological issues, methodological concerns central to the social sciences and non-positivistic research strategies and techniques.

SOCI 607  **SOCIOLOGY OF GENDER**  3
Reviews current research and theory in the sociology of gender with particular attention to issues arising from the gender division of labor, feminism and social change, gender and the structure of social institutions, and the interaction of gender, race, class and sexuality. Introduces sociological theory and methodology as used and revised by scholars working on gender issues.

SOCI 608  **GENDER, WORK AND FAMILIES**  3
Brings together studies of the workplace and studies of the family with special focus on areas of overlap. Analysis of gender roles and the work/family overlap as well as focused discussion on issues of family policy.
RESTRICTIONS: Requires permission of instructor.

SOCI 611  **TECHNIQUES OF DEMOGRAPHIC ANALYSIS**  3
Study of demographic equation (fertility, mortality and migration), population processes (composition and distribution) and the use of computers to analyze demographic data.
SOCI 612  DEVELOPMENT OF SOCIOLOGICAL THEORY 3
Historical survey of the development of sociology and sociological theory beginning with the period of the Social Contract theorists through the classic European theorists of the 19th century.

SOCI 614  ADVANCED DATA ANALYSIS 3
Methods of analyzing data in sociological research focusing on multivariate approaches.
PREREQ: SOCI605.

SOCI 621  THEORIES AND APPROACHES IN SOCIAL DEVIANCE 3
General and specific theoretical orientations in the analysis of social deviance.

SOCI 622  COLLECTIVE BEHAVIOR 3
Process and mechanisms operating in panics, riots, demonstrations and other disruptions of social order.

SOCI 628  CORPORATE AND GOVERNMENTAL DEVIANCE 3
Analyses and cases of internal organizational behavior when external efforts are made to have these behaviors treated as deviant. Also defenses used by the accused organizations, and preconditions for, and consequences of, successfully labeling and sanctioning an organization as deviant.

SOCI 637  LAW AND SOCIETY IN HISTORICAL PERSPECTIVE 3
Examination of the social history of law, crime and legal institutions in the United States from colonial times to present. Focus is on the role that law has historically played in allocating resources, structuring social relationships, and distributing political power. May be cross-listed with HIST 637.

SOCI 655  LAW AND SOCIETY 3
Historical and structural development of legal systems. Emphasis on comparing legal systems in various cultures from Roman and Oriental law to Anglo-American legal systems.

SOCI 658  SOCIAL SCIENCE, LAW AND THE LEGAL PROCESS 3
Examines the relationship between social science and law. Reviews the use of social science research to understand the operation and impact of law and the legal system. Critically examines the growing use of social science testimony by the courts.

SOCI 661  RACIAL STRATIFICATION 3
Reviews the concept of race as a social historical category and examines the relationship of racial stratification to other systems of inequality. Also evaluates sociological theories of racial discrimination and institutionalized racism.

SOCI 666  SPECIAL PROBLEM 1-12
Deals with current controversies in social theory such as the public/private distinction, the development of symbolic interactionism and Neo-Marxism.
RESTRICTIONS: Must have completed one graduate-level course.

SOCI 813  CURRENT ISSUES IN SOCIAL THEORY 3
Deals with current controversies in social theory such as the public/private distinction, the development of symbolic interactionism and Neo-Marxism.
RESTRICTIONS: Must have completed one graduate-level course.

SOCI 815  MICROTHEORIES IN SOCIOLOGY 3
Advanced graduate seminar focusing on microtheoretical approaches in Sociology—symbolic interactionism, social constructionism, and sociological social psychology.
PREREQ: SOCI612 and SOCI813.
RESTRICTIONS: Graduate students only. Strongly advised for students taking the doctoral exam in Social Theory.

SOCI 835  THEORETICAL CRIMINOLOGY I 3
Examines classical and contemporary theories of crime and crime control by focusing on various explanations for why select types of conduct are categorized and treated as criminal, as well as why people engage in criminal behavior. Specific deviant and criminal activities are described and explained using established theoretical frameworks. Provides a comprehensive background in the disciplinary development of criminology.

SOCI 836  APPLICATION OF CRIMINOLOGICAL THEORY AND EMPirical TESTS 3
Examines issues and strategies involved in the collection and analysis of criminological data. Analyzes major theoretical, empirical, and policy-oriented research related to the design, implementation, and analysis of criminological data. Prepares students for continued study and application of contemporary research in criminology.

SOCI 837  CRIMINOLOGY AND SYSTEMS OF CRIMINAL JUSTICE 3
Focuses on basic policy issues in the administration of the criminal justice system, whose key elements are law enforcement, courts, and corrections. Prepares students for continued study of these organizations.

SOCI 868  RESEARCH 1-6
Research and readings in preparation of dissertation topic and/or qualifying examinations for doctoral students before admission to candidacy but after completion of all required course work.
RESTRICTIONS: Not open to students who have been admitted to candidacy.

SOCI 869  MASTER'S THESIS 1-6

SOCI 964  PRE-CANDIDACY STUDY 3-12 PF

SOCI 969  DOCTORAL DISSERTATION 1-12 PF
SPAN 207  CONTEMPORARY LATIN AMERICA I  3
Introduction to contemporary Latin America, its culture, its people, their way of life and the issues confronting them.
RESTRICTIONS: Taught abroad, in both English and Spanish. Not for major credit. Does not satisfy College of Arts and Sciences language requirement. May be repeated for credit when taken on different study abroad programs.

SPAN 208  CONTEMPORARY SPAIN I  3
Introduction to contemporary Spain, its culture, its people, their way of life and the issues confronting them.
RESTRICTIONS: Taught abroad, in both English and Spanish. Not for major credit. Does not satisfy College of Arts and Sciences language requirement.

SPAN 254  LATIN AMERICA IN THE NEWS  3
Explores topics in contemporary Latin American society, culture and politics as expressed in the news media. Emphasis on current events and issues of Latin America. Focus of study is the Latin American press: newspapers and magazines printed in the Latin American language.
PREREQ: SPAN107 or SPAN112. SPAN200 highly recommended.

SPAN 255  SPAIN IN THE NEWS  3
Explores topics in contemporary Spanish society, culture and politics as expressed in the news media. Emphasis on current events and issues of Spain. Focus of study is the Spanish press: newspapers and magazines printed in the Spanish language.
PREREQ: SPAN107 or SPAN112. SPAN200 highly recommended.

SPAN 300  ADVANCED SPANISH COMPOSITION AND GRAMMAR I  3
Second part of a thorough review and intensive practice, targeting structure, essential vocabulary, speaking, listening and extensive writing.
PREREQ: SPAN200.

SPAN 301  SURVEY OF SPANISH LITERATURE  3
Development of Spanish literature from its origins through the 17th century. Study of representative works, discussions and collateral readings.
PREREQ: SPAN201.

SPAN 302  SURVEY OF SPANISH LITERATURE  3
Spanish literature from the 18th century to the present. Selection of representative works, discussions and collateral readings.
PREREQ: SPAN201.

SPAN 303  SURVEY OF SPANISH-AMERICAN LITERATURE  3
Representative works in all genres of Latin American literature from pre-Columbian to Modernism.
PREREQ: SPAN201.

SPAN 304  SURVEY OF SPANISH-AMERICAN LITERATURE  3
Representative works in all genres of Latin American literature in the 20th century.
PREREQ: SPAN201.

SPAN 305  ORAL COMMUNICATION  3
For individuals with a comprehensive knowledge of Spanish grammar and vocabulary. Emphasis on refinement of expression of abstract ideas as well as mastery of practical communication.
PREREQ: SPAN200.
RESTRICTIONS: Not intended for native speakers.

SPAN 306  PRACTICAL ORAL/WRITTEN EXPRESSION  3
Strengthens skills in grammar and vocabulary in preparation for advanced courses. Includes oral exposures, discussion of articles and videos, textual analysis and compositions.
PREREQ: SPAN200.
RESTRICTIONS: Taught abroad only.

SPAN 308  CONTEMPORARY SPAIN II  3
Discussion and study of issues related to contemporary cultural, political and social developments in Spain, including its place in today's European community.
PREREQ: Any two 200-level Spanish courses taught in the Spanish language.
RESTRICTIONS: Taught abroad and in Spanish.

SPAN 314  SPANISH PHONOETICS AND PHONOLOGY  3
PREREQ: SPAN200.
RESTRICTIONS: Recommended for prospective teachers.

SPAN 325  SPANISH CIVILIZATION AND CULTURE  3
Survey of geography, history, art and society of Spain.
PREREQ: SPAN200.

SPAN 326  LATIN AMERICAN CIVILIZATION AND CULTURE  3
Survey of geography, history, art and society of Latin American lands.
PREREQ: SPAN200.

SPAN 352  INTRODUCTION TO BUSINESS SPANISH  3
Introduction of essential business/commercial terminology in common business context, reinforcing strategies for understanding, interpreting, and responding to new information, and providing opportunities for interactive practice. Familiarizes student with basic policies and practices of the Hispanic business community. Includes writing, conversation, grammar and culture.
PREREQ: SPAN200 and SPAN201.

SPAN 355  SPECIAL TOPICS  3
Explores an area of special interest in Spanish literature or culture studies. Subject matter varies and will be announced in the registration booklet.
PREREQ: SPAN201.
RESTRICTIONS: May be repeated for credit when topics vary.

SPAN 366  INDEPENDENT STUDY  1-3

SPAN 370  STUDIES IN SPANISH LITERATURE TAUGHT IN SPAIN  3
Presents an historical overview of an area of special interest in Spanish literature or culture studies with emphasis on its cultural and/or cross-cultural context. Topics may include a general survey of Spanish literature from its medieval roots in Latin, Arabic, and Hebrew texts to the multiple influences impacting Spanish literature of the 20th century.
PREREQ: SPAN201.
RESTRICTIONS: May be repeated for credit when topics vary.

SPAN 401  ADVANCED SPANISH GRAMMAR II  3
Study and practice of selected problems of written and oral Spanish syntax and vocabulary as well as textual analysis.
PREREQ: SPAN300.

SPAN 403  HISTORY OF THE SPANISH LANGUAGE  3
History of the language from Latin to the present. Historical phonology and morphology.
PREREQ: Any 300-level Spanish course.

SPAN 406  ADVANCED SPANISH LANGUAGE  3
Advanced grammatical structure and stylistics with special attention given to technical vocabulary and discourse (e.g., business, law, science, agriculture).
PREREQ: Any 300-level Spanish course.
RESTRICTIONS: Taught abroad only.

SPAN 411  LATIN AMERICAN LITERATURE AND ITS POLITICAL CONTEXT  3
Analysis of selected works by contemporary Latin American authors, focusing on the techniques used by these writers to reveal the political upheaval that has affected Latin America in recent years.
PREREQ: One 300-level survey of literature.

SPAN 416  CERVANTES: DON QUIJOTE  3
The reading of Don Quijote in Spanish; major themes of the book. The life and times of Cervantes. Antecedents to Don Quijote in Spanish literature. The purpose of Don Quijote. Introduction to the language of Cervantes.
PREREQ: One 300-level survey of literature.

SPAN 417  HISPANIC NOBEL PRIZE AUTHORS  3
Covers the works of Spanish and Latin American Nobel Prize authors - Echegaray, Benavente, Mistral, Jimenez, Austurias, Aleixandre, Neruda, Garcia Marquez, Paz and Cela - in relation to their cultural milieu on the regional, national and international levels and in relation to their authors' biographies.
PREREQ: One 300-level survey of literature.

SPAN 418  GOD, MAN AND WOMAN  3
Analysis of the presentation of God, man and woman in a selection of narrative poems, dramas and novels from the 15th to the 17th centuries. Authors studied include Santillana, Diego de San Pedro, Luis de Leon, Zayas and others.
PREREQ: One 300-level survey of literature.

SPAN 420  TOPICS: MEDIEVAL LITERATURE  3
Works of one or more authors or of a special theme or genre within Spanish medieval literature. Example: Love and Passion in the Middle Ages on the Iberian Peninsula.
PREREQ: One 300-level survey of literature.

SPAN 421  SPANISH MEDIEVAL LITERATURE  3
Survey of the major authors and genres of Spanish medieval literature from the early lyric poetry through narrative poetry, short story, drama, novel to the 15th century.
PREREQ: One 300-level survey of literature course.

SPAN 430  LATIN AMERICAN NOVEL AND CINEMA  3
Study of a selection of novels of the 20th century which brought international recognition to Latin American writers. These novelists depict the social, economic, political and cultural traits of their respective countries. Film versions of some of the novels illustrate artistic interpretations of the subject matter.
PREREQ: One 300-level survey of literature.
SPAN 436 TOPICS: LITERATURE OF THE SPANISH GOLDEN AGE
Works of one or more authors or of a special theme or genre within Spanish literature of the Golden Age (16th and 17th centuries).
PREREQ: One SPAN 300-level survey of literature course.

SPAN 439 POSTWAR SPANISH NARRATIVE
The Spanish novel from 1962 to the present. Focuses on novels by leading authors such as Luis Martín-Santos, Juan Gaytisolo, Juan Benet, Carmen Martín Gaite, Ana María Moix and Estela Truequet. Analysis of these works grounded in international literary theory and criticism.
PREREQ: One SPAN300-level survey of literature.

SPAN 440 TOPICS: EIGHTEENTH AND NINETEENTH CENTURY HISPANIC LITERATURE
Works of one or more authors or of a special theme or genre within Hispanic literature of the 18th and 19th centuries.
PREREQ: One SPAN 300-level survey of literature course.

SPAN 447 CONTEMPORARY HISPANIC FICTION BY WOMEN
Explores current fiction by women in Spain and Spanish America. Analyzes selected works as individual literary creations, and also situates them in their cultural, historical and aesthetic contexts, using appropriate critical methodologies.
PREREQ: One 300-level survey of Spanish literature course.

SPAN 450 TOPICS: MODERN HISPANIC LITERATURE 1898-1936
Works of one or more authors or of a special theme, genre, or topic within Hispanic literature from 1898 to 1936.
PREREQ: One SPAN 300-level survey of literature course.

SPAN 451 CONTEMPORARY SPANISH POETRY
Analysis of Spanish poetry from Becquer to the present day.
PREREQ: One SPAN300-level survey of literature course.

SPAN 452 ADVANCED BUSINESS SPANISH
Refines basic knowledge of Spanish business/commercial terminology by helping students realize the importance of cultural awareness in doing business in Hispanic countries or with Hispanics in the United States.
PREREQ: SPAN200 and SPAN201. SPAN300 and SPAN332 highly recommended.

SPAN 454 INTRODUCTION TO SPANISH CINEMA
Study of modern Spanish cultural history through the films of such masters as Bardem, Saura, Bunuel, Almodovar, Berlanga, Miro, Amenabar, Medem, Paris, Fejerman, etc. Relation of these films to Spanish culture, politics, history, and to European film theory and analysis.
PREREQ: Any 300-level survey of Spanish literature. SPAN325 is strongly recommended.

SPAN 455 SELECTED AUTHORS, WORKS AND THEMES
Works of one or more outstanding authors or on a special theme.
PREREQ: One 300-level Spanish literature course.
RESTRICTIONS: May be repeated for credit when topics vary.

SPAN 460 TOPICS: CONTEMPORARY HISPANIC LITERATURE 1936-PRESENT
Works of one or more authors or of a special theme, genre, or topic within Hispanic literature from 1936 to the present.
PREREQ: One SPAN 300-level survey of literature course.

SPAN 462 TOPICS: HISPANIC SHORT FICTION
Explores short stories and novellas by major writers of the Hispanic world. Each narrative is analyzed as an individual work of literature and is situated in its literary, historical and critical contexts.
PREREQ: One SPAN 300-level survey of literature course.

SPAN 464 CONTEMPORARY SPANISH AMERICAN LITERATURE BY WOMEN
Explores twentieth-century fiction by women authors from diverse regions of Spanish America. Analyzes selected works as individual literary creations and situates each author in her specific socio-cultural, historical and literary contexts.
PREREQ: One SPAN 300-level survey of literature course.

SPAN 466 INDEPENDENT STUDY
1-3

SPAN 475 TOPICS: HISPANIC CULTURE AND CIVILIZATION
Study of topics in Hispanic culture and civilization, ranging through the geography, history, art and society of Spain and Latin American countries.
PREREQ: Either SPAN325 or SPAN326.

SPAN 484 CONTEMPORARY SPANISH THEATRE
Twentieth century Spanish theater as a reflection of and commentary on society. Principal authors: Garcia Lorca, Buero Vallejo and Sastre.
PREREQ: One SPAN300-level survey of literature.

SPAN 601 ADVANCED SPANISH GRAMMAR
Study and practice of selected problems of written and oral Spanish syntax and vocabulary as well as textual analysis.

SPAN 603 HISTORY OF THE SPANISH LANGUAGE
History of the language from Latin to the present. Historical phonology and morphology.

SPAN 615 LATIN AMERICAN LITERATURE AND ITS POLITICAL CONTEXT
In-depth analysis of selected works by contemporary Latin American authors, focusing on techniques used by these writers to reveal the political upheaval that has affected Latin America in recent years.

SPAN 616 CERVANTES: DON QUIJOTE
The reading of Don Quijote in Spanish; major themes of the book. The life and times of Cervantes. Antecedents to Don Quijote in Spanish literature. The purpose of Don Quijote. Introduction to the language of Cervantes.

SPAN 617 HISPANIC NOBEL PRIZE AUTHORS
Studies the works of Spanish and Latin American Nobel Prize authors - Chegevaray, Benavente, Mistral, Jimenez, Asturias, Salmier, Garcia Marquez, Paz and Cela - in relation to their cultural milieu on the regional, national and international levels and in relation to their authors' biographies.

SPAN 618 GOD, MAN AND WOMAN
Analysis of the presentation of God, man and woman in a selection of narrative poems, dramas and novels from the 15th to the 17th centuries. Authors studied include Villadiego, Diego de San Pedro, Luis de Leon, Zayas and others.

SPAN 620 TOPICS: MEDIEVAL LITERATURE
Works of one or more authors or of a special theme or genre within Spanish medieval literature. Example: Love and Passion in the Middle Ages on the Iberian Peninsula.

SPAN 621 SPANISH MEDIEVAL LITERATURE
Survey of the major authors and genres of Spanish medieval literature from the early lyric poetry through narrative poetry, short story, drama, novel to the 15th century.

SPAN 630 LATIN AMERICAN NOVEL AND CINEMA
Study of a selection of novels of the 20th century which brought international recognition to Latin American writers. These novelists depict the social, economic, political and cultural traits of their respective countries. Film versions of some of the novels illustrate artistic interpretations of the subject matter.

SPAN 636 TOPICS: LITERATURE OF THE SPANISH GOLDEN AGE
Works of one or more authors or of a special theme or genre within Spanish literature of the Golden Age (16th and 17th centuries).

SPAN 639 POSTWAR SPANISH NARRATIVE
Covers the Spanish novel from 1962 to the present. Focuses on novels by leading authors such as Luis Martin-Santos, Juan Gaytisolo, Carmen Martín Gaite, and Esther Tusquets. Analysis of these works is grounded in international literary theory and criticism.

SPAN 640 TOPICS: EIGHTEENTH AND NINETEENTH CENTURY HISPANIC LITERATURE
Works of one or more authors or of a special theme or genre within Hispanic literature of the 18th and 19th centuries.

SPAN 647 CONTEMPORARY HISPANIC FICTION BY WOMEN
Explores current fiction by women in Spain and Spanish America. Analyzes selected works as individual literary creations, and also situates them in their cultural, historical and aesthetic contexts, using appropriate critical methodologies.

SPAN 650 TOPICS: MODERN HISPANIC LITERATURE 1898-1936
Works of one or more authors or of a special theme, genre, or topic within Hispanic literature from 1898 to 1936.

SPAN 651 CONTEMPORARY SPANISH POETRY
Analysis of Spanish poetry from Becquer to the present day. Special emphasis on stylistics.

SPAN 655 SELECTED AUTHORS, WORKS AND THEMES
Works of one or more outstanding authors or on a special theme.
RESTRICTIONS: May be repeated for credit when topics vary.

SPAN 660 TOPICS: CONTEMPORARY HISPANIC LITERATURE 1936-PRESENT
Works of one or more authors or of a special theme, genre, or topic within Spanish literature from 1936 to the present.

SPAN 662 TOPICS: HISPANIC SHORT FICTION
Explores short stories and novellas by major writers of the Hispanic world. Each narrative is analyzed as an individual work of literature and is situated in its literary, historical and critical contexts.
PREREQ: STAT370.

Distributions of common statistics, sampling techniques, estimation, confidence
of random variables; order statistics; expected value and central limit theorem.

Basic probability; continuous, discrete and joint distributions; distribution of functions
following courses: MATH300, STAT370, STAT371 or MATH450.

RESTRICTIONS: If STAT475 is taken, degree credit cannot be given for any of the
statistical techniques with a variety of environmental data sets.

Introduction to statistical methods for analyzing environmental data. Relevant
probability and sampling theory is introduced, as well as procedures for
summarizing, modeling and estimating and making inferences from environmental
data. Examples taken from maximum likelihood estimation, robust and ridge regression,
resource allocation, transportation problems.

STATISTICS

STAT 200 Basic Statistical Practice 3
Uses real data from a variety of disciplines to explore topics in data analysis, estimation
and inference such as graphical displays, estimation of and hypothesis tests on means and proportions, sampling distributions, confidence intervals, analysis of variance, simple linear regression, chi-square tests for independence. PREREQ: College algebra.

STAT 266 Special Problem 1-3

STAT 366 Independent Study 1-6

STAT 370 Introduction to Statistical Analysis I 3
Basic probability; continuous and discrete joint distributions; distribution of functions
of random variables; order statistics; expected value and central limit theorem. PREREQ: MATH222 or MATH243.

STAT 371 Introduction to Statistical Analysis II 3
Distributions of common statistics, sampling techniques, estimation, confidence intervals, hypotheses testing and selected topics. PREREQ: STAT370.

STAT 408 Statistical Research Methods I 3
See FREC408 for course description.

STAT 409 Regression and Experimental Design 3
Introduction and overview of inferential methods used in analyzing regression models and linear models for experimental designs. PREREQ: STAT200 or FREC408 or equivalent.

STAT 417 Data Analysis and Nonparametric Statistics 3
Techniques of exploratory and graphical data analysis for univariate and multivariate data sets, and numerical and categorical variables. Emphasis on selection of proper procedure. Non-parametric techniques of estimation testing and curve smoothing. PREREQ: STAT371.

STAT 465 Independent Study 1-6

STAT 475 Statistics for Environmental Science 3
Introduction to statistical methods for analyzing environmental data. Relevant
probability and sampling theory is introduced, as well as procedures for
summarizing, modeling and estimating and making inferences from environmental
data. A computer-based statistical package is used to explore behavior of different statistical techniques with a variety of environmental data sets. A computer-based statistical package is used to explore behavior of different statistical techniques with a variety of environmental data sets. May be cross-listed with ENSC475. PREREQ: MATH243 and GEOC290. RESTRICTIONS: If STAT475 is taken, degree credit cannot be given for any of the following courses: MATH300, STAT370, STAT371 or MATH450.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>STAT 635</td>
<td>Statistical Quality Control</td>
<td>3</td>
<td>Process variation, sequence plotting, control charts, cumulative sum process control procedures; process capability studies, acceptance sampling, quality management and organization, and trouble shooting using graphical techniques. PREREQ: STAT371.</td>
</tr>
<tr>
<td>STAT 640</td>
<td>Statistical Consulting</td>
<td>3</td>
<td>Topics include the client/consultant relationship; effective communication; identifying the question, developing a plan and presenting the results; following up; actual consulting experience.</td>
</tr>
<tr>
<td>STAT 641</td>
<td>Statistical Laboratory</td>
<td>1</td>
<td>Requires attendance at the weekly statistical laboratory meetings.</td>
</tr>
<tr>
<td>STAT 656</td>
<td>Biostatistics</td>
<td>3</td>
<td>An introduction to statistics focused toward applications in biological, medical and other life sciences. Topics include graphical and numerical techniques, random variables and their distribution, estimation and inference. PREREQ: MATH201.</td>
</tr>
<tr>
<td>STAT 657</td>
<td>Statistics for Earth Sciences</td>
<td>3</td>
<td>Spatial distributions; directional data; statistical graphics, regression and time series analysis; model validation; sampling; principal components; cluster analysis; and statistical software routines. May be cross-listed with GEO657. PREREQ: MATH201.</td>
</tr>
<tr>
<td>STAT 664</td>
<td>Statistics Internship</td>
<td>1-6 PF</td>
<td>Supervised on the job experience, performing statistical analysis of problems for clients. RESTRICTIONS: Requires permission of instructor.</td>
</tr>
<tr>
<td>STAT 674</td>
<td>Applied Data Base Management</td>
<td>3</td>
<td>See FREC674 for course description.</td>
</tr>
<tr>
<td>STAT 675</td>
<td>Logistic Regression</td>
<td>3</td>
<td>Practical and computational introduction to logistic regression and related topics. Applications include financial, marketing and biomedical research. The use of SAS and other statistical packages will be emphasized. RESTRICTIONS: Requires permission of instructor.</td>
</tr>
<tr>
<td>STAT 800</td>
<td>Estimation and Statistical Inference I</td>
<td>3</td>
<td>Selected topics in estimation and inference such as uniformly most powerful tests, uniformly most powerful unbiased tests, similarity and completeness, sufficiency, likelihood ratio tests, invariant tests, permutation test. PREREQ: STAT602, MATH602.</td>
</tr>
<tr>
<td>STAT 801</td>
<td>Estimation and Statistical Inference II</td>
<td>3</td>
<td>Further topics in estimation and inference will be covered. PREREQ: STAT800.</td>
</tr>
<tr>
<td>STAT 815</td>
<td>Linear Statistical Inference I</td>
<td>3</td>
<td>Vector random variables, matrix operations, multivariate normal distributions, distribution of functions of vector random variables, topics from multivariate analysis and specific linear models. PREREQ: STAT602, STAT615.</td>
</tr>
<tr>
<td>STAT 816</td>
<td>Linear Statistical Inference II</td>
<td>3</td>
<td>Topics from general linear hypotheses of full rank and not full rank. PREREQ: STAT815.</td>
</tr>
<tr>
<td>STAT 824</td>
<td>Advanced Topics in Statistics I</td>
<td>3</td>
<td>A presentation of a current area of statistical application or research. Examples of topics which may be covered include: biometry, bootstrapping, data analysis, response surfaces, survival analysis and time series. PREREQ: STAT816.</td>
</tr>
<tr>
<td>STAT 831</td>
<td>Time Series Analysis</td>
<td>3</td>
<td>Introduction to fundamental topics in time series analysis featuring analysis in both time and frequency domains. The Box and Jenkins technique of fitting data to autoregressive moving average models will be used in time domain. Emphasis on model building, evaluation and forecasting. Analysis in frequency domain includes such topics as digital filtering and methods of estimating and interpreting the spectrum. PREREQ: STAT602.</td>
</tr>
<tr>
<td>STAT 832</td>
<td>Topics in Data Analysis</td>
<td>3</td>
<td>Topics: graphical analysis; model evaluation, robust procedures; influence functions; multidimensional data plots; residual analysis; Bayesian concepts in data analysis.</td>
</tr>
<tr>
<td>STAT 836</td>
<td>Response Surface Methodology</td>
<td>3</td>
<td>Derivation of nonlinear relationships between variables. Techniques for characterization and interpreting multidimensional studies through canonical and ridge analysis. Correlation analysis through eigenvalues and eigenvectors for linear systems. PREREQ: STAT602 and either STAT611 or STAT617.</td>
</tr>
<tr>
<td>STAT 852</td>
<td>Advanced Topics in Mathematical Statistics</td>
<td>3</td>
<td>Selected topics: Sequential methods, reliability theory, multivariate contingency tables, large sample theory, density estimation, robust and nonparametric estimation. RESTRICTIONS: Requires permission of Department.</td>
</tr>
<tr>
<td>STAT 869</td>
<td>Doctoral Dissertation</td>
<td>1-12 PF</td>
<td></td>
</tr>
</tbody>
</table>
THEA 236 FUNDAMENTALS OF JAZZ DANCE 3
Jazz dance as an art form and vehicle for individual and group expression. Emphasis on rhythm and style. RESTRICTIONS: Previous dance experience recommended.

THEA 300 FUNDAMENTALS OF STAGECRAFT 3
Concentrates on traditional techniques used in the construction and rigging of scenery and properties for the stage. Demonstrates basic techniques and processes through a combination of classroom lecture and laboratory experience. PREREQ: THEA200 or THEA202.

THEA 301 FUNDAMENTALS OF PROPERTIES CONSTRUCTION 3
Introduces basics of organization and management of properties for a theatrical production in addition to basic techniques of property construction. Demonstrates basic techniques and processes through a combination of classroom lecture and laboratory experience. PREREQ: THEA200 or THEA202.

THEA 302 FUNDAMENTALS OF STAGE LIGHTING 3
Introduces basic techniques and processes used in the lighting of theatrical productions. Emphasizes the use and manipulation of lighting equipment. Demonstrates equipment and basic techniques and processes through a combination of classroom lecture and laboratory experience. PREREQ: THEA200 or THEA202.

THEA 303 FUNDAMENTALS OF SCENE PAINTING 3
Introduction to the tools, materials, and techniques of painting scenery for the stage. Demonstrates basic techniques and processes through a combination of classroom lecture and laboratory experience. PREREQ: THEA200 or THEA202.

THEA 304 FUNDAMENTALS OF AUDIO FOR THE THEATRE 3
Introduces the physical phenomenon of sound and the techniques of controlling and manipulating it for theatrical productions. Demonstrates basic techniques and processes through a combination of classroom lecture and laboratory experience. PREREQ: THEA200 or THEA202.

THEA 305 FUNDAMENTALS OF COSTUME CONSTRUCTION FOR THE STAGE 3
Introduces basic costume construction techniques through lectures, demonstrations, and laboratory experience. Culminates in the construction of a finished costume. PREREQ: THEA203.

THEA 306 FUNDAMENTALS OF PATTERNMAKING FOR THE STAGE 3
Teaches basic patternmaking techniques required in costuming through lectures, demonstrations, and laboratory experience. Includes how to recreate historical details used for period theatrical garments. PREREQ: THEA203.

THEA 307 FUNDAMENTALS OF DRAPING FOR THE STAGE 3
Teaches basic draping skills and applies them to period costumes. Examines several historical periods commonly used in theatrical productions. Students create muslins or finished garments from at least four historical periods. PREREQ: THEA203.

THEA 308 FUNDAMENTALS OF COSTUME CRAFTS 3
Provides basic experience in several crafts-related areas commonly utilized in costuming, including maskmaking, surface design, hatmaking, leather work and thermoplastics. PREREQ: THEA203.

THEA 309 FUNDAMENTALS OF STAGE MANAGEMENT 3
Study of the techniques and procedures used in managing theatrical productions from conception through performance. PREREQ: THEA200 or THEA202.

THEA 310 FUNDAMENTALS OF MASKMAKING 3
Includes casting, sculpting human and animal features, and explores various methods and materials for constructing theatrical masks. Students construct three to four masks. PREREQ: THEA203.

THEA 311 FUNDAMENTALS OF SCENE DESIGN 3
Introduction to the exploration of conceptual principles underlying the practice of scene design. Explore elements of visual thinking through the manipulation of drafting and drawing with emphasis on line, form, color, and spatial relationships as they relate to the play. Some artistic ability is helpful. PREREQ: THEA200, or THEA202, or permission of instructor.

THEA 341 THEATRE/DRAMA: CLASSIC/medieval 3
Survey of major historical and theoretical developments in theatre practice and dramaturgy during the period. Readings in primary and secondary historical sources, major critical and theoretical texts, and representative plays of the period. May be cross-listed with CMIL341.
THEA 604  Voice Development IIA  1
Continuation of THEA603, with an emphasis on range extension and the
development of greater variety in expressiveness.
PREREQ: THEA603.

THEA 605  Voice Development IIB  1
Continuation of THEA604.
PREREQ: THEA604.

THEA 606  Voice Development IIIA  1
Individual instruction to identify habitual vocal patterns and to strengthen individual
weaknesses in voice.
PREREQ: THEA605.

THEA 607  Voice Development IIIB  1
Continuation of THEA606.
PREREQ: THEA606.

THEA 608  Stage Movement IA  1
Exercises and assignments to develop alignment, strength, flexibility, control,
awareness, endurance, rhythmic sensitivity, balance and expressiveness.
RESTRICTIONS: Requires enrollment in the Professional Theatre Training
Program/Acting or Directing.

THEA 609  Stage Movement IIB  1
Continuation of THEA608.
PREREQ: THEA608.

THEA 610  Stage Movement IIA  1
Continuation of THEA609, with an emphasis on stage combat, tumbling, circus
and other advanced movement techniques.
PREREQ: THEA609.

THEA 611  Stage Movement IIIB  1
Continuation of THEA610.
PREREQ: THEA610.

THEA 612  Stage Movement IIIA  1
Individual instruction to identify habitual movement patterns and to strengthen individual
weaknesses in stage movement.
PREREQ: THEA611.

THEA 613  Stage Movement IIIB  1
Continuation of THEA612.
PREREQ: THEA612.

THEA 614  Stage Speech IA  2
Ear training and phonetics. Corrective work on regional speech habits.
RESTRICTIONS: Requires enrollment in the Professional Theatre Training
Program/Acting or Directing.

THEA 615  Stage Speech IIB  2
Continuation of THEA614. Beginning work on verse scansion.
PREREQ: THEA614.

THEA 616  Stage Speech IIA  1
Continuation of THEA615 with an emphasis on phrasing and verse scansion.
PREREQ: THEA615.

THEA 617  Stage Speech IIB  1
Continuation of THEA616.
PREREQ: THEA616.

THEA 618  Stage Speech IIIA  1
Stage dialects and advanced work in phrasing and verse scansion. Individual
 tutoring in problem areas.
PREREQ: THEA617.

THEA 619  Stage Speech IIB  1
Continuation of THEA618.
PREREQ: THEA618.

THEA 620  Rehearsal and Performance/Acting  1-6
Practical instruction and assignments in the preparation, rehearsal and
performance of theatrical productions.
RESTRICTIONS: Requires enrollment in the Professional Theatre Training
Program/Acting. May be repeated up to 24 credit hours.

THEA 633  Stage Management Organizational and
Managerial Techniques IA  1-2
Development of organizational structuring and communication techniques for the
administration of stage managerial projects.
RESTRICTIONS: Requires enrollment in the Professional Theatre Training
Program/Stage Management.

THEA 634  Stage Management Organizational and
Managerial Techniques IB  1-2
Further development of organizational structuring and communication techniques
for the administration of stage managerial projects.
PREREQ: THEA633.

THEA 635  Stage Management Organizational and
Managerial Techniques IIA  1-2
Development of organizational structuring and communication techniques for the
administration of stage managerial projects.
PREREQ: THEA634.

THEA 636  Stage Management Organizational and
Managerial Techniques IIIB  1-2
Further development of organizational structuring and communication techniques
for the administration of stage managerial projects.
PREREQ: THEA635.

THEA 638  Stage Management Organizational and
Managerial Techniques IIIB  1-2
Further development of organizational structuring and communication techniques
for the administration of stage managerial projects.
PREREQ: THEA637.

THEA 639  Stage Management Production Skills IA  1-2
Development of stage managerial skills for organizing, preparing and fulfilling
theatrical productions from inception through rehearsals and performance.
RESTRICTIONS: Requires enrollment in the Professional Theatre Training
Program/Stage Management.

THEA 640  Stage Management Production Skills IB  1-2
Further development of stage managerial skills for organizing, preparing and
fulfilling theatrical productions from inception through rehearsals and performance.
PREREQ: THEA639.

THEA 641  Stage Management Production Skills IIA  1-2
Development of stage managerial skills for organizing, preparing and fulfilling
theatrical productions from inception through rehearsals and performance.
PREREQ: THEA640.

THEA 642  Stage Management Production Skills IIB  1-2
Further development of stage managerial skills for organizing, preparing and
fulfilling theatrical productions from inception through rehearsals and performance.
PREREQ: THEA641.

THEA 644  Stage Management Production Skills IIIB  1-2
Further development of stage managerial skills for organizing, preparing and
fulfilling theatrical productions from inception through rehearsals and performance.
PREREQ: THEA643.

THEA 645  Rehearsal and Performance/Stage Management  1-5
Practical instruction and assignments in the preparation, rehearsal and
performance of theatrical productions.
RESTRICTIONS: Requires enrollment in the Professional Theatre Training
Program/Stage Management. May be repeated up to 24 credit hours.

THEA 648  Costume Construction  1
Introductory exploration of the mechanics and technology of the art of costuming.
Surveys all aspects of the costumer's craft including practical work in the costume
shop.
RESTRICTIONS: Requires enrollment in the Professional Theatre Training
Program/Costume Construction.

THEA 664  Internship in Professional Theatre  1-9
Engagement with professional theatre in individual discipline area.
RESTRICTIONS: Requires enrollment in the Professional Theatre Training Program.
May be repeated up to 18 credit hours.

THEA 665  Theatre Literacy  2
Discussion, research, and practicum in theatre terminology, literature and history.
RESTRICTIONS: Requires enrollment in the Professional Theatre Training Program.
May be repeated up to 12 credit hours.

THEA 668  Research  1-6

THEA 674  Scenery Production  1
Materials, tools, hardware and construction methods used for scenery construction.
Emphasis on traditional scenic construction with wood as the primary material.
RESTRICTIONS: Requires enrollment in the Professional Theatre Training
Program/Technical Production.
THEA 675 PROPERTIES PRODUCTION 1
Concentrates on property production techniques with emphasis on properties management, acquisition, and health and safety. 
REQUIREMENTS: Requires enrollment in the Professional Theatre Training Program/Technical Production.

THEA 676 SCENERY: METALWORKING 1
Materials, tools and methods of working with metal for scenery construction. 
PREREQ: THEA674.

THEA 677 PROPERTIES PRODUCTION II 1
Tools, materials and methods for upholstering and drapery, casting, mold-making, and other properties techniques. 
PREREQ: THEA675.

THEA 679 SCENERY: STAGE RIGGING 1
Tools, hardware and methods of rigging scenery. Emphasis on standard theatre rigging systems. 
PREREQ: THEA674.

THEA 680 LIGHTING PRODUCTION 1
Electrical theory and practice as applied to theatre production. Emphasis on current lighting production practice, systems and equipment. 
REQUIREMENTS: Requires enrollment in the Professional Theatre Training Program/Technical Production.

THEA 681 AUDIO PRODUCTION 1
Sound theory and practice as applied to contemporary theatre production. Emphasis placed on utilizing current systems, equipment and technology for audio production. 
REQUIREMENTS: Requires enrollment in Professional Theatre Training Program/Technical Production.

THEA 682 LIGHTING DESIGN 1
Essential skills and procedures for creating, documenting and realizing a lighting design for a theatrical production. 
PREREQ: THEA680.

THEA 683 PRODUCTION PROJECT MANAGEMENT 1
Examines how project management techniques are applied to technical production. Techniques for project analysis, priority setting, scheduling, resource allocation and project tracking will be examined. 
REQUIREMENTS: Requires enrollment in the Professional Theatre Training Program/Technical Production.

THEA 684 TECHNICAL PRODUCTION SEMINAR 1
Investigation and discussion of technical problems and issues encountered in productions. 
REQUIREMENTS: Requires enrollment in the Professional Theatre Training Program/Technical Production. May be repeated up to six credit hours.

THEA 686 INFORMATION TECHNOLOGIES FOR THEATRE 1
Application of computer software to theatrical production practice. Emphasis is placed on CAD (drafting) techniques for theatre production. 
REQUIREMENTS: Requires enrollment in the Professional Theatre Training Program/Technical Production.

THEA 687 SCENERY PAINTING 1
Painting tools, materials, color theory and scenery painting techniques for theatrical production. 
REQUIREMENTS: Requires enrollment in Professional Theatre Training Program/Technical Production.

THEA 688 COMPUTER AIDED DRAFTING AND SCENERY CONSTRUCTION 1
Continued work on CAD (drafting) with emphasis on construction work drawings for scenery construction. Further study of standard and specialized scenery construction methods. 
PREREQ: THEA686.

THEA 692 PRODUCTION AND PERFORMANCE/TECHNICAL 1-6
Practical instruction and assignments in the technical preparation and production of Professional Theatre Training Program public performances. Assignments include (but are not limited to): Master Carpenter, Master Electrician, Property Master, Audio Engineer, Scenic Artist and Technical Director. 
REQUIREMENTS: Requires enrollment in the Professional Theatre Training Program/Technical Production. May be repeated up to 20 credit hours.

THEA 693 PRODUCTION SEMINAR 1
Development of management and communication techniques for effective interaction among stage management, costume production and technical production areas of theatre. 
REQUIREMENTS: Requires enrollment in the Professional Theatre Training Program. May be repeated up to six credit hours.

THEA 694 SPECIAL TOPICS IN THEATRE PRODUCTION 1-3
Multiple units on advanced topics in theatre production and management. Students select topics from a list offered by FTPP production faculty. 
REQUIREMENTS: Requires enrollment in the Professional Theater Training Program. May be repeated up to nine credit hours.

UAPP 601 MEASURING AND DEFINING PLANNING PROBLEMS 1
Methods for identifying and measuring planning-related problems, including analyses of land use patterns, population dynamics, economic trends, social indicators, and ecological characteristics as predictors and determinants of future development.

UAPP 602 INTRODUCTION TO COMPREHENSIVE PLANNING 1
Overview of the comprehensive planning process. Description of goals, objectives and components behind the development of a comprehensive plan and methods for preparing and understanding the value of a comprehensive plan to the community.

UAPP 603 INTRODUCTION TO ZONING AND LAND USE CONTROLS 1
Survey of the theories underlying land use patterns and description of the legal structure and methods surrounding public sector control and management of land use including police power, eminent domain, zoning, subdivision control, and master plans.

UAPP 604 LEADERSHIP IN ORGANIZATIONS 3
Understanding the process of change and positively affecting change in organizations through the exercise of leadership skills and knowledge.

UAPP 605 TOPICS IN URBAN AFFAIRS 3
Focuses on selected topics in urban affairs such as urban politics and government, urban education and neighborhood analysis. 
REQUIREMENTS: May be repeated up to nine credits when topics vary.

UAPP 606 LOCAL ECONOMIC DEVELOPMENT: POLICY AND PRACTICE 3
Examines theory and contemporary practice for promoting the economic development of local communities. Reviews alternative ways of understanding the dynamics of local economic development and devising strategies that will benefit community residents.

UAPP 607 SEMINAR IN COMMUNITY DEVELOPMENT AND NONPROFIT LEADERSHIP 1
Examines the complex ways in which the concepts of community analysis and development are used and understood. May be cross-listed with IFST607.

UAPP 608 POVERTY, NEIGHBORHOODS AND COMMUNITY DEVELOPMENT 3
Examines social science literature through which multidisciplinary analysts have described and explained poverty, analyzed neighborhoods, and categorized community development efforts. Focusing on the United States, particular attention is paid to analyses from 1960 to the present. May be cross-listed with IFST608.

UAPP 609 FINANCIAL STATEMENT ANALYSIS FOR NONPROFITS 1
Geared toward graduate students with little or no background in accounting or reading financial statements. Gives basic understanding of financial statement analysis. Covers basic accounting concepts with an emphasis on understanding the financial statements of nonprofit organizations.

UAPP 610 URBAN LAND USE PLANNING AND ADMINISTRATION 3
Interaction of political, economic and social forces in the planning and land use control process. Emphasis on planning agency administration and current policies impacting the planning process, including recently enacted environmental and community development legislation. Concern for the role of the planner, the planning agency and the planning function as it relates to economic and community development.

UAPP 611 REGIONAL WATERSHED MANAGEMENT 3
Reviews the practical applications of watershed planning as a tool to manage land, water and ecosystem resources. Explores public policies and practices of watershed planning by examining case studies. Uses a multidisciplinary approach involving the fields of geography, environmental science, geology, public policy, land planning, geographic information systems (GIS) and engineering. May be cross-listed with FREC611.

UAPP 612 URBAN HOUSING POLICY AND ADMINISTRATION 3
Examines problems associated with providing adequate and affordable housing in the United States. Covers the structure and dynamics of the housing market; supply and demand factors; market failure; financing methods; federal, state and local public policy affecting housing, including taxation, regulation, subsidy programs, and land use controls.
UAPP 613 Planning Theory and Urban Policy 3
Provides an overview of the development and current conceptual normative and methodological issues in planning theory as applied to urban regions.

UAPP 614 The American Suburb 3
An examination of the historical and geographical origins of the American suburb and its role in metropolitan development and larger society. Includes the evolution of the streetcar and automobile suburbs with special emphasis on the post World War II suburban boom and contemporary post-suburban trends. May be cross-listed with GEOG614 and/or HIST614.

UAPP 615 Urban, Regional and Environmental Planning 3
Provides an introduction to urban planning, focuses mainly on U.S., but some comparisons made with Britain and Canada. Issues covered include zoning, urban growth management, land policies, regional policies and urban policy. May be cross-listed with GEOG615.

UAPP 616 Volunteer Management 1
Provides an introduction and overview of the field of volunteer administration, explores the components of the effective management of volunteers and builds students’ problem solving skills. Comparisons to the management of paid staff and the role of volunteerism in the larger organizational structure.

UAPP 617 Contemporary Issues in Environmental and Energy Policy 1
Links students with leading energy and environmental policy scholars on a bi-weekly basis to debate key issues such as global warming, ozone layer deterioration, environmental justice, sustainable development and ecological democracy. International, national and community dimensions of these and other policy issues are explored through seminar discussion.

UAPP 618 Human Service Systems: Policy, Practices, Administration 3
Centers on operational practices and administration of human service systems. Includes an analysis of human service systems concepts and policies, delivery practices and administration. Human service systems dimensions reviewed in relation to the rising influence of organized human service professional (practitioner) groups and organized human service consumer groups.

UAPP 619 Contemporary Issues in Urban Affairs and Public Policy 2
Overview of the origins of urban affairs and public policy and its current academic role and status as a profession. Students meet with and engage in discussions with leading scholars and policy makers invited to the campus to talk about their current research and interests.

UAPP 620 Criminal Justice Administration 3
Focuses on issues of concern to students planning careers as administrators in the criminal justice system. Covers administrative policy, organizational dynamics, budgetary matters, and the role of the computer in criminal justice. Explores the complexities, conflicts and ambiguities of criminal justice management.

UAPP 621 Conflict Resolution 1
Introduction to conflict resolution skills. Provides communication and problem solving skills designed to de-escalate conflicts and create win-win solutions. Students learn new ways of approaching conflict while gaining an understanding of their own conflict management style. Examines how these skills transfer to the workplace.

Restrictions: Requires permission of instructor.

UAPP 622 Resources, Development and the Environment 3
See GEOG622 for course description.

UAPP 623 Independent Study in Geographical Information Systems 1
Students complete self-paced individualized tutorials and apply knowledge in a project of their choice. Material addressed includes creation and display of digital maps and data bases, preparation of data sets, sources of data and GIS standards.

UAPP 624 Seminar in Criminal Justice 3
Discussion and evaluation of institutional components of criminal justice systems. Topics include police, judicial and correctional systems.

UAPP 625 Energy Policy and Administration 3
See POSC624 for course description.

UAPP 626 Conservation and Renewable Energy Policy 3
Covers current policy issues for energy conservation, energy efficiency, and renewable energy sources. Some prior background in energy policy is assumed. Topics include environmental impacts, utility programs, and international comparisons. May be cross-listed with MAST622 and/or POSC626. Prereq: POSC624.

UAPP 627 Comparative Environmental Politics 3
Examines the effect of institutional and systemic factors in the formulation and implementation of environmental policy in several developed and developing countries. Considers the impact of modes of political participation, level of development, and type of political economy on policy. May be cross-listed with POSC628.

UAPP 628 Issues in Land Use and Environmental Planning 3
See GEOG628 for course description.

UAPP 629 Theory and Practice of Historical Preservation Planning 3
Examines the historic preservation planning process, the theory supporting this process and contemporary practices. Case studies used to demonstrate the integration of theory and practice. May be cross-listed with ARTH628, HIST625 and/or MSST629.

UAPP 630 Methods in Historic Preservation 4
Upper-level field research seminar concentrating on developing graphic, photographic and narrative skills for architectural documentation and professional skills related to historic preservation. Involves classroom and field sessions.

UAPP 631 Documentation of Historic Structures 1
Focuses on learning to create scaled, annotated field notes of historic resources in preparation for making measured drawings of the buildings. Students spend all of their time in the field, working as part of a team to record a variety of buildings through plans, sections, elevations and details. May be cross-listed with HIST638.

UAPP 632 Making the American City 3
Advanced research and reading seminar on the material organization of early American cities. Examination of historical and cultural issues related to housing, consumerism, gender, ethnicity, craft, poverty and wealth as a means to interpreting the city as artifact and symbolic setting. Includes field trips to cities in the region. Students will work with primary sources including archaeological materials, architecture and documentary evidence. May be cross-listed with ARTH632 and/or HIST632.

UAPP 633 Analysis and Interpretation of Historical Landscapes 3
Explores the interpretation of historic vernacular and designed landscapes, with emphasis on application to historic preservation planning. Focuses on the examination of a series of historic American landscapes from eighteenth to twentieth century suburban and industrial environments. Involves a field orientation and individual projects interpreting an historical landscape.

UAPP 634 Housing Finance and Development 3
Fundamentals of real estate and housing finance and the methods available to finance the development of real estate. Financial instruments and institutions involved in each phase. Relevant tax laws and likely tax consequences. Development of public policy as it affects the availability of housing credit. The functions, operation and regulation of financial and related institutions, including FHA, FNM, GNMA, FHFB and FHLMC.

UAPP 635 The Evolution of the American Urban Landscape 3
Reading and research seminar on the evolution of the American urban landscape from approximately 1850 to the present. Examination of historical, cultural and geographical issues and processes related to industrialism and capitalism, technology, gender and ethnicity, housing, poverty and wealth as a means of understanding the formation of the historic American urban landscape. Includes field trips to cities in the region. May be cross-listed with GEOG635 and/or HIST635.

UAPP 636 Research Topics in Historic Preservation 3
Seminar that addresses a specific research issue within historic preservation including hypothesis construction, design of research methodology and evaluation of results. Emphasis on the use of primary sources and application of database techniques. May be cross-listed with ARTH628, GEOG636 and/or HIST636.

UAPP 637 Organizing for Social Justice 1
An analysis and comparison of four contemporary types of organizing styles used in the United States; examining their ideologies, methods of application, theories of change and expected outcomes relative to initiatives to change, propose, and/or oppose social, economic and political policies and practices.

UAPP 638 World Cities in Comparative Perspective 3
See GEOG638 for course description.

UAPP 639 Community Development Theory, Concepts and Practice 3
Explores the evolution of core principles and concepts associated with community development, examines various models of practice, and identifies and assesses current challenges and issues confronting the field in the United States.
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<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tr>
<td>UAPP 640</td>
<td>International and Development Administration</td>
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<tr>
<td>UAPP 641</td>
<td>Topics in Nonprofit Management and Leadership</td>
<td>3</td>
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<tr>
<td>UAPP 642</td>
<td>Strategic Planning for Public and Nonprofit</td>
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<tr>
<td>UAPP 643</td>
<td>Historic Roadside Architecture</td>
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<td>UAPP 644</td>
<td>Grantsmanship and Proposal Writing</td>
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<td>UAPP 645</td>
<td>Civic Engagement</td>
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<td>UAPP 646</td>
<td>Administrative Law</td>
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<td>UAPP 648</td>
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<td>UAPP 649</td>
<td>Civil Rights Law and Policy</td>
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<td>UAPP 650</td>
<td>Values and Ethics of Leadership</td>
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<td>UAPP 651</td>
<td>Managing Risk and Security</td>
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<td>UAPP 652</td>
<td>Geographic Information Systems in Public Policy</td>
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<td>UAPP 653</td>
<td>Politics and Healthcare</td>
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<td>UAPP 654</td>
<td>Vernacular Architecture</td>
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<td>UAPP 655</td>
<td>Geographic Information Systems in the Public and</td>
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<td>UAPP 656</td>
<td>Politics and Disaster</td>
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<td>UAPP 657</td>
<td>Health Policy</td>
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<td>Contemporary Issues in Public Administration</td>
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<td>UAPP 660</td>
<td>Seminar in Urban Management</td>
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<td>UAPP 662</td>
<td>Municipal Management</td>
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<td>UAPP 663</td>
<td>Decision Tools for Policy Analysis</td>
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<td>UAPP 664</td>
<td>Case Studies in State and Local Management</td>
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<td>UAPP 665</td>
<td>Fund Development: Fundraising from Individuals</td>
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<td>UAPP 666</td>
<td>Fund Development: Fundraising from Institutions</td>
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<tr>
<td>UAPP 667</td>
<td>Land Use and Transportation Linkages</td>
<td>1</td>
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<td>UAPP 668</td>
<td>Survey Research</td>
<td>1</td>
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</table>
UAPP 677 PLANNING INFORMATION TECHNOLOGY - ENHANCED PROJECTS 1
Introduces the issues surrounding planning for projects requiring the acquisition and application of technology in the public and nonprofit sectors. Focuses on three themes that impact the adoption, implementation, and evaluation of information technology (IT) efforts: technology, policy, and administration.

UAPP 678 ADMIRALTY AND MARITIME LAW 3
See MAST678 for course description.

UAPP 679 VIRTUAL GOVERNMENT 1
Explores the evolving field of e-government and evaluates opportunities to enhance the delivery of government services. Reviews developments throughout the world and strategies for implementation in Delaware.

UAPP 680 MYERS-BRIGGS AND PERSONAL DEVELOPMENT 1
Emphasis is on an intensive understanding of the elements of the Myers-Briggs Type Indicator (MBTI) indexes as they apply to individuals. Includes the application to and opportunity for individual development, conflict, communication, change and leadership. Although not as rigorous as the full qualifying program, it offers a thorough understanding and direct application to many other areas that impact individuals personally.

UAPP 681 METROPOLITAN INFRASTRUCTURE AND TRANSPORTATION 3
Movement is essential for metropolitan area performance. Roads and water systems are infrastructure components that impact on where houses, stores, and jobs are located; which in turn links into movement, pollution and congestion. Treats infrastructure decision making using approaches from public economics. May be cross-listed with POSC681. PREREQ: UAPP834 or microeconomics.

UAPP 682 MYERS-BRIGGS AND EFFECTIVE ORGANIZATIONS 1
Explores the "Type" of organizations, how to build effective teams and how to work with people who are not just like we are. PREREQ: A basic understanding of Myers-Briggs personality preferences and how they apply to oneself.

UAPP 683 REGIONAL POLICY ANALYSIS 3
Why do some regions grow and change? Presents theories of regional development, methods of inter-regional analysis, as well as internal-regional topics such as land use, migration, city-suburban shifts, and neighborhoods. Various kinds of regional policies are analyzed. May be cross-listed with UAPP816. PREREQ: UAPP834 or microeconomics.

UAPP 684 PERFORMANCE MANAGEMENT 3
Increases the knowledge of techniques and definitions used in the managing-for-results movement; introduces the indicators used by government and their use for accountability and improved effectiveness; furthers competence in the areas of strategic planning, benchmark indicators, performance-based budgeting, and performance measurement; and explores linkages and alignments of systems for improved efficiency and effectiveness.

UAPP 685 PERSONNEL AND HUMAN RESOURCE ISSUES: CURRENT TOPICS 3
Analysis of selected policies, practices, and issues currently important in the field of public personnel/human resources. Topics vary depending on instructor (illustrations: EEO developments, "Glass Ceiling" issues, ADA, benefits/cost containment, labor negotiation trends, the changing workforce and workplace). Seminar with individually-tailored projects. May be cross-listed with POSC685. PREREQ: UAPP837. RESTRICTIONS: Based on prior coursework and professional experience, prerequisite may be waived with instructor approval.

UAPP 686 STATE AND LOCAL GOVERNMENT: CONCEPTS AND ISSUES 3
Explores the state and local government context in which public managers work. Examines the organizational, administrative, and economic forces shaping state and local public action, as well as the political decision making apparatus used by subnational governments. Assesses their contemporary role in the federal system. May be cross-listed with POSC686.

UAPP 687 STATE GOVERNMENT POLICY AND MANAGEMENT 3
Focuses on roles and functions of United States state government. Topics include legislative policy making and operations, executive branch organization and functions, structure and role of state courts, and the role of the governor and the states in intergovernmental policy making. State government in the mid-Atlantic region will receive special attention. May be cross-listed with POSC687.

UAPP 688 TOPICS IN STATE AND LOCAL MANAGEMENT 3
Focuses on selected topics in state and local management and policymaking. May include in-depth exploration of management processes/instruments (e.g., budgeting) and/or contemporary policy issues (e.g., educational reform, environmental crises) within state and local government with which public managers must contend. May be cross-listed with POSC688.

UAPP 692 ENVIRONMENTAL VALUES, MOVEMENTS AND POLICY 3
See MAST692 for course description.

UAPP 699 ADVANCED SOCIAL STATISTICS 3
Provides advanced training in applied social research. Topics include analysis of variance, regression analysis, analysis of covariance, multivariate cross-classifications and future analysis. Lectures supplemented laboratory work involving computer statistical packages and simulations.

UAPP 714 PUBLIC MANAGEMENT STATISTICS 3
Emphasis on the practical knowledge of statistical techniques and their use in the management of data (or data systems) in the public sector. Discussion and appraisal of various statistical tools from a theoretical standpoint, and application of statistical methods and procedures in a laboratory situation for the collection, organization and analysis of statistical information in public management research.

UAPP 800 RESEARCH METHODS AND DATA ANALYSIS 4
Focuses on concepts, issues and techniques related to research design, data acquisition and data analysis in the fields of urban affairs and public policy.

UAPP 801 PROCESSES OF SOCIAL INQUIRY 3
Explores the philosophical underpinnings of social inquiry and epistemological and methodological issues surrounding the development and use of social research. Encourages students to consider the role of critical analysis in social change. Students prepare research designs on topics of their choosing and are assisted by the instructors in developing them into thesis and dissertation proposals.

UAPP 802 ELECTRICITY POLICY AND PLANNING 3
Analyzes the technological and regulatory policy evolution of the electricity industry. Considers how technology innovations and policy/regulatory actions have guided the planning of the industry from its early days.

UAPP 803 SEMINAR: PUBLIC ADMINISTRATION 3
Reading and discussion of theories and problems of public administration, including organization, coordination, field administration, contracts, personnel, policy making, participation, adjudication, budgeting and administrative behavior. May be cross-listed with POSC803.

UAPP 804 PROGRAM EVALUATION FOR HEALTH AND SOCIAL SERVICES 3
Introduces quantitative and qualitative methods for evaluating health and social service programs. Emphasizes program design evaluation, process evaluation, experimental and quasi-experimental design, and clinical trials.

UAPP 806 SURVEY RESEARCH 3
Methods and procedures for the design, administration and analysis of sample surveys.

UAPP 808 QUALITATIVE METHODS FOR PROGRAM EVALUATION 3
Provides skills and examines issues in the use of qualitative methods in the context of program evaluation. Qualitative design, sampling approaches, data collection, and analysis are included. PREREQ: UAPP800, IFST615 or comparable research methods course. RESTRICTIONS: Enrollment limited to 15.

UAPP 810 POLITICAL ECONOMY OF THE ENVIRONMENT 3
Reviews major theories developed over the last half century to explain nature-society relations. Policy case studies on environmental justice, trade and environment, global climate change, and sustainable development are used to evaluate the current range of political-economic explanations of nature-society relations. International, national and local responses to these problems are analyzed. May be cross-listed with MAST814 and/or POSC814.

UAPP 813 PUBLIC MANAGEMENT STATISTICS 3
Emphasis on the practical knowledge of statistical techniques and their use in the management of data (or data systems) in the public sector. Discussion and appraisal of various statistical tools from a theoretical standpoint, and application of statistical methods and procedures in a laboratory situation for the collection, organization and analysis of statistical information in public management research.

UAPP 816 ADVANCED SOCIAL STATISTICS 3
Provides advanced training in applied social research. Topics include analysis of variance, regression analysis, analysis of covariance, multidimensional cross-classifications and future analysis. Lectures supplemented by laboratory work involving computer statistical packages and simulations.

UAPP 817 PUBLIC INVESTMENT POLICY 3
Focuses on the means by which government activities can be financed. Topics are tax vs. debt financing; use of appropriate instruments and policies, e.g., types of bonds; and forces that influence implementation, e.g., the design of instruments, fiscal capacity, rating system and market behavior. May be cross-listed with POSC817.

UAPP 818 ENVIRONMENTAL POLICY AND ADMINISTRATION 3
See POSC818 for course description.
UAPP 819  Management Decision Making in Public and Nonprofit Sectors 3
Focuses on analytical decision making within public and nonprofit organizations. Examines processes by which decisions can be made and evaluated. Emphasis on conceptual factors that provide a guide to decisions and evaluations of decision methodologies, e.g., systems analysis, cost/benefit analysis, PERT/critical path method, decision trees, performance measurement and time series. May be cross-listed with POSC819.
PREREQ: Excel.

UAPP 820  International Perspectives on Energy and Environment 3
See POSC820 for course description.

UAPP 821  Proseminar: Technology, Environment and Society 3
Over the last two centuries, forces of industrialization and urbanization have transformed economic, social and political life and the natural environment. Examines theories that explain and assess these transformations, with the goal of fostering critical analysis of social and environmental transformation in international, national and local contexts. May be cross-listed with POSC821.

UAPP 822  Proseminar in Governance, Planning and Management 3
Deals with policy and research issues concerning the making, administering and outcomes of public policies affecting urban populations and with how urban governance, planning and management processes are influenced by the interaction of the public, private and third sectors at the local, national and international scales.

UAPP 823  Proseminar: Social and Urban Policy 3
Social policy attempts to promote the well-being of individuals, families and communities through public action. Explores efforts to address social and economic problems in urban society. Considers differential policy impacts by social class, race/ethnicity, gender and age. Topics: welfare, housing, social security, health, education, criminal justice and employment. May be cross-listed with EDUC825 and/or IFST823.

UAPP 824  Sustainable Energy Policy and Planning 3
Analyzes sustainable energy strategies in terms of their technology, economics, impacts on the environment and governance attributes. Also analyzes policy options to facilitate a sustainable energy future.
RESTRICTIONS: Graduate students with a background in policy, economics and/or technology. Senior-level undergraduate students only with permission of the instructor.

UAPP 825  Comparative Public Administration 3
See POSC825 for course description.

UAPP 826  Multivariate Statistical Analysis 3
Provides an in-depth understanding of advanced statistical methods with an applied focus on estimation, inferences, and prediction of models. Major topics are: multiple regression, functional forms, types of data, regression diagnostics (collinearity, serial correlation, heteroscedasticity, and simultaneity), different estimators, comparison of models, dummy dependent variables, dynamic models and lags, and multi-equation models.
PREREQ: UAPP815.
RESTRICTIONS: A statistics course that introduces regression analysis.

UAPP 827  Program and Project Analysis 3
Explores the ways in which decision-makers in the public sector evaluate the feasibility of government programs and projects through the application of Cost-Benefit Analysis (CBA), Cost Utility Analysis (CUA), and Cost Effectiveness Analysis (CEA). Focuses on the determination of social costs and social benefits of public policies.
PREREQ: UAPP834 or comparable course in public economics and permission of instructor.

UAPP 828  Urban Society and Urban Policy 3
Traces the evolution of the major social, economic and physical dimensions of U.S. cities in order to understand the nature of current challenges facing American society. Compares the “American” model of urban society with societal forms found in other parts of the world. Examines the role of public policy as a major determinant of the nature of urban communities.

UAPP 829  Taxation and Fiscal Policies 3
Advanced course in theory and application of financing, spending and regulatory policy instruments of state and local governments. Topics include efficiency, equity and impacts of different types of taxation, user charges, expenditure approaches (transfers/subsidies) and regulation alternatives.
May be cross-listed with POSC829.

UAPP 833  Financial Management in Public and Nonprofit Sectors 3
Principles of public finance and public sector economics are used to examine issues of demand for and delivery of public goods by state and local governments and nonprofit organizations. Topics include revenues, expenditures, intergovernmental and cross-sectoral relationships, budgeting, debt management and asset allocation.
May be cross-listed with POSC839.
PREREQ: UAPP834.

UAPP 834  Economics in Public and Nonprofit Sectors 3
Develops microeconomic concepts and applies them to public issues, policies, and programs. Applications deal with a wide range of topics, including health care, education, transportation, housing, community development, energy, and the environment. Emphasizes how microeconomic analysis can enhance decision making.

UAPP 835  Organization and Management in Public and Nonprofit Sectors 3
Explores (1) theories and concepts of organizational phenomena, (2) current challenges and implications for the public and nonprofit sectors, and (3) issues for individuals who work in these organizations. Behavioral competencies are developed.
May be cross-listed with POSC835.

UAPP 836  Real World Ethics 1
Examines real world situations requiring ethical considerations. Variety of topics to be covered including public policy issues, managerial responsibility and demonstrating ethical integrity in leadership.

UAPP 837  Human Resources Management in Public and Nonprofit Sectors 3
Examines the human resource management function from three perspectives: (1) basic technical competencies [recruitment, selection, compensation, benefits], (2) legal and constitutional issues in HR, and (3) leadership and organizational change.
May be cross-listed with POSC837.

UAPP 838  Public Policy Analysis 3
See POSC838 for course description.

UAPP 839  Administrative Law Survey 1
Introduces basic concepts and rules of administrative law and an understanding of the legal issues affecting public and nonprofit organizations in dealing with governmental agencies. Special attention placed on the impact politics has on efforts by administrators to comply with administrative law rules and regulations. No prior legal training or command of legal language necessary.

UAPP 840  History and Development of the Nonprofit Sector 3
Traces history and development of the nonprofit sector in the United States with a focus on social, economic, political and legal factors. Volunteerism and philanthropy are emphasized. The role of nonprofit organizations in furthering the goals of community development is explored.

UAPP 841  Management and Governance of Nonprofit Organizations 3
Provides an introduction to the leadership and management issues facing nonprofit executives and governing boards. Topics include board relationships and voluntary leadership, financial management and budgeting, human resource management, organizational marketing and strategic planning, records management and the use of information technology in management and governance.

UAPP 843  Global Governance: Theory and Cases 3
See POSC843 for course description.

UAPP 860  Internship Seminar 1
Prepares students for the Internship Fieldwork requirement of the Master of Public Administration program. Focuses on informational interview skills, resume preparation and personal statement development. Introduces job search strategies and provides an orientation to the Career Services Center. Helps students make decisions about specialization, internship and career objectives.

UAPP 861  Academic and Professional Development for UAPP Doctoral Students 1
Explores a range of topics related to academic processes and professional development for doctoral students. Topics may include: strategies for successful graduate study, advisor/committee strategies, topic selection, the research experience, writing skills, time/stress management strategies, conference presentations, publishing, job searches, professional organizations and networking. Guest speakers include various faculty members, students and alumni.
RESTRICTIONS: Open only to UAPP doctoral students.
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<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Description</th>
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<tbody>
<tr>
<td>UAPP 862</td>
<td>Teaching Practicum in Urban Affairs and Public Policy</td>
<td>3</td>
<td>In consultation with a SUAPP faculty member and based on the student's long-term goals and professional background, the student participates in the development (or revision) and teaching of a course. Exposes Ph.D. students who anticipate teaching careers to the pedagogical issues, and planning and implementation of course instruction. PREREQ: One semester of Ph.D. graduate study. RESTRICTIONS: Requires permission of academic advisor and faculty member sponsoring practicum.</td>
</tr>
<tr>
<td>UAPP 863</td>
<td>Doctoral Dissertation Proposal</td>
<td>3</td>
<td>Requirement of the doctoral program. A &quot;defensible dissertation proposal&quot; must be achieved for successful course completion. RESTRICTIONS: Ph.D. students only.</td>
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<td>UAPP 864</td>
<td>Internship Fieldwork</td>
<td>2</td>
<td>Three-month (or equivalent) compensated fieldwork, followed by the submission of a reflective paper. Requires prior approval of the SUAPP Internship Coordinator, completion of a work plan, and a professional performance evaluation by the site supervisor. PREREQ: UAPP860.</td>
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<tr>
<td>UAPP 866</td>
<td>Special Problem</td>
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<tr>
<td>UAPP 868</td>
<td>Research</td>
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<td>UAPP 869</td>
<td>Master's Thesis</td>
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<td>UAPP 870</td>
<td>Readings</td>
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<td>UAPP 872</td>
<td>Analytical Paper</td>
<td>3</td>
<td>Demonstrates the student's ability to analyze a particular policy or administrative problem and develop an appropriate response. RESTRICTIONS: A requirement of the M.A. and M.P.A. programs.</td>
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<tr>
<td>UAPP 964</td>
<td>Pre-Candidacy Study</td>
<td>3-12 PF</td>
<td>Research and readings in preparation of dissertation topic and/or qualifying examinations for doctoral students before admission to candidacy but after completion of all required course work. RESTRICTIONS: Not open to students who have been admitted to candidacy.</td>
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<tr>
<td>UAPP 969</td>
<td>Doctoral Dissertation</td>
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**University Courses**

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<tr>
<td>UNIV 101</td>
<td>First Year Experience I</td>
<td>1 PF</td>
<td>Provides an integrated, content-based, co-curricular experience for LIFE cluster students. Fosters academic and social competencies necessary for university success and provides structured, regular time for LIFE cluster students to meet with peer mentors and faculty. RESTRICTIONS: For freshmen only.</td>
</tr>
<tr>
<td>UNIV 102</td>
<td>First Year Experience II</td>
<td>1 PF</td>
<td>Continuation of UNIV101. PREREQ: UNIV101.</td>
</tr>
<tr>
<td>UNIV 103</td>
<td>First Year Experience III</td>
<td>1 PF</td>
<td>Continuation of UNIV102. PREREQ: UNIV102.</td>
</tr>
<tr>
<td>UNIV 111</td>
<td>UST Freshman Seminar: Finding Your Way</td>
<td>1 PF</td>
<td>Aids University Studies freshmen in achieving a successful transition from high school to the University of Delaware. Self-exploration exercises and exposure to the many majors at UD enable each student to develop a plan of action for selecting and seeking admission to the desired major. RESTRICTIONS: Open only to UST first-time freshmen.</td>
</tr>
<tr>
<td>UNIV 112</td>
<td>Skilmod: Academic Self Management</td>
<td>1 PF</td>
<td>Focuses on self-organization and growth in a college environment. Students investigate the nature of a university, learn how to maximize their productivity through time-management and careful decision-making and examine what a liberal arts education can mean to them.</td>
</tr>
<tr>
<td>UNIV 113</td>
<td>Skilmod: Study Skills</td>
<td>1 PF</td>
<td>Teaches strategies for understanding and remembering college lectures and test materials. Strategies include identifying the underlying discourse structure of the field, summarizing, comprehension monitoring and transforming notes into test formats. Students practice on their own course materials.</td>
</tr>
<tr>
<td>UNIV 114</td>
<td>Skilmod: Critical Thinking</td>
<td>1 PF</td>
<td>Teaches strategies of good reasoning in humanities, social sciences and other liberal arts areas. Students learn how to become independent, well-informed thinkers and how to make persuasive arguments, using their own course materials.</td>
</tr>
<tr>
<td>UNIV 115</td>
<td>Skilmod: Problem Solving</td>
<td>1 PF</td>
<td>Teaches problem-solving strategies for college courses in chemistry, physics, economics, engineering, etc. Students learn methods for breaking problems into manageable components and for using example problems strategically. Students apply these techniques to courses they are currently taking.</td>
</tr>
<tr>
<td>UNIV 260</td>
<td>Experiential Teaching</td>
<td>0-3 PF</td>
<td>Experiential teaching as group tutor, peer facilitator/instructor, workshop guide, or undergraduate teaching assistant. Leadership skills developed and applied in laboratory, problem-based learning (PBL), or peer-led team learning mode of instruction in an undergraduate course. Evaluation based on preparation and engagement in teaching and leadership process. RESTRICTIONS: Requires permission of instructor. May not substitute for major courses required in department curriculum.</td>
</tr>
<tr>
<td>UNIV 262</td>
<td>Experiential Learning</td>
<td>0-6</td>
<td>Learning experience on or off campus. Other types of learning out of class and beyond existing department courses. Such experiences as non-major required discovery learning, service learning, fieldwork, co-op, apprenticeship, and internship. RESTRICTIONS: Requires permission of instructor. May not substitute for major courses required in department curriculum.</td>
</tr>
<tr>
<td>UNIV 268</td>
<td>Undergraduate Research</td>
<td>1-6</td>
<td>Undergraduate research conducted on or off campus, out of class, and under the supervision of a faculty member. RESTRICTIONS: Requires permission of instructor. May not fulfill course requirements in a major curriculum except by departmental permission.</td>
</tr>
<tr>
<td>UNIV 301</td>
<td>Peer Mentor Practicum I</td>
<td>1 PF</td>
<td>Seminar for peer mentors working in the LIFE program. Covers issues in peer mentor activities and LIFE clusters.</td>
</tr>
<tr>
<td>UNIV 302</td>
<td>Peer Mentor Practicum II</td>
<td>1 PF</td>
<td>Continuation of UNIV301. PREREQ: UNIV301.</td>
</tr>
<tr>
<td>UNIV 303</td>
<td>Peer Mentor Practicum III</td>
<td>1 PF</td>
<td>Continuation of UNIV302. PREREQ: UNIV302.</td>
</tr>
<tr>
<td>UNIV 320</td>
<td>Contemporary Issues for Resident Assistants</td>
<td>1 PF</td>
<td>Introduces new resident assistants to issues affecting college students. All topics covered focus on the needs of the new resident assistant in the Office of Residence Life. RESTRICTIONS: Must be a resident assistant.</td>
</tr>
<tr>
<td>UNIV 360</td>
<td>Experiential Teaching</td>
<td>0-3 PF</td>
<td>Teaching experience as group tutor, peer facilitator/instructor, workshop guide, or undergraduate teaching assistant. Leadership skills developed and applied in laboratory, problem-based learning (PBL), or peer-led team learning mode of instruction in an undergraduate course. Evaluation based on preparation and engagement in teaching and leadership process. RESTRICTIONS: Requires permission of instructor. May not substitute for major courses required in department curriculum.</td>
</tr>
<tr>
<td>UNIV 362</td>
<td>Experiential Learning</td>
<td>0-6</td>
<td>Learning experience on or off campus. Other types of learning out of class and beyond existing department courses. Such experiences as non-major required discovery learning, service learning, fieldwork, co-op, apprenticeship, and internship. RESTRICTIONS: Requires permission of instructor. May not substitute for major courses required in department curriculum.</td>
</tr>
<tr>
<td>UNIV 363</td>
<td>Experiential Learning Sustaining</td>
<td>0 PF</td>
<td>Experiential learning under the supervision of a faculty mentor. RESTRICTIONS: Limited to students appointed as Experiential Learning Scholars within the Discovery Learning Experience. Must have approval of the Associate Director of Undergraduate Studies.</td>
</tr>
<tr>
<td>UNIV 364</td>
<td>Experiential Internship</td>
<td>3 PF</td>
<td>Internship experience of fifty hours combined with a seminar emphasizing career development, reflection, and personal learning skills. Internship must be arranged and Learning Contract signed prior to first class meeting. Open to major and non-major related internships, paid or volunteer. RESTRICTIONS: May not substitute for major courses required in department curriculum.</td>
</tr>
</tbody>
</table>
UNIV 368 UNDERGRADUATE RESEARCH 1-6
Undergraduate research conducted on or off campus, out of class, and under the supervision of a faculty member.
RESTRICTIONS: Requires permission of instructor. May not fulfill course requirements in a major curriculum except by departmental permission.

UNIV 369 UNDERGRADUATE RESEARCH SUSTAINING 0 PF
Research apprenticeship with faculty mentor.
RESTRICTIONS: Limited to those appointed as Undergraduate Research Scholars in the Undergraduate Research Program. Must have approval of the Coordinator of Undergraduate Research.

UNIV 401 SENIOR THESIS 2-4
Senior thesis for students working toward a degree with distinction.
RESTRICTIONS: Total credits for UNIV401 and UNIV402 not to exceed six.

UNIV 402 SENIOR THESIS 2-4
Continuation of UNIV401.
RESTRICTIONS: Total credits for UNIV401 and UNIV402 not to exceed six.

UNIV 460 EXPERIENTIAL TEACHING 0-3 PF
Teaching experience as group tutor, peer facilitator/instructor, workshop guide, or undergraduate teaching assistant. Leadership skills developed and applied in laboratory, problem-based learning (PBL), or peer-led team learning mode of instruction in an undergraduate course. Evaluation based on preparation and engagement in teaching and leadership process.
RESTRICTIONS: Requires permission of instructor. May not substitute for major courses required in department curriculum.

UNIV 462 EXPERIENTIAL LEARNING 0-6
Learning experience on or off campus. Other types of learning out of class and beyond existing department courses. Such experiences as non-major required discovery learning, service learning, fieldwork, co-op, apprenticeship, and internship.
RESTRICTIONS: Requires permission of instructor. May not substitute for major courses required in department curriculum.

UNIV 468 UNDERGRADUATE RESEARCH 1-6
Undergraduate research conducted on or off campus, out of class, and under the supervision of a faculty member.
RESTRICTIONS: Requires permission of instructor. May not fulfill course requirements in a major curriculum except by departmental permission.

UNIV 490 HONORS TUTORIAL: HUMANITIES 3
Designated faculty direct the studies of up to four students per semester. Readings of classical works in the humanities described. Group as well as individual discussions.
RESTRICTIONS: Requires 3.4 GPA, junior standing or above, and permission of the Honors Program.

UNIV 491 HONORS TUTORIAL: NATURAL/SOCIAL SCIENCE 3
Designated faculty direct the studies of up to four students per semester. Reading of classical works in the social and natural sciences described. Group as well as independent discussions.
RESTRICTIONS: Requires 3.4 GPA, junior standing or above and permission of the Honors Program.

UNIV 495 HONORS SEMINAR 3
Topics vary; usually interdisciplinary.
RESTRICTIONS: Requires 3.4 GPA, junior status or above, and permission of the Honors Program. May be repeated for credit with a different topic and instructor.

UNIV 500 LEAVE OF ABSENCE 0 NR

UNIV 600 LEARNING 0 PF
Explores cognitive, affective and social aspects of the learning process through research and reflection on learning and teaching literature in higher education. Students develop skills to facilitate learning in their respective disciplines. Modern information technologies and library resources access essential.
RESTRICTIONS: May be repeated with different Learning Module.

UNIV 601 PEDAGOGY 0 PF
Presents research-based teaching principles and innovative teaching methodologies. Offers practical orientation to enhance pedagogical effectiveness in respective disciplines. Opportunity to observe and reflect on Outstanding UD faculty’s instructional practices. Modern information technologies and library resources access essential.
RESTRICTIONS: May be repeated with different Pedagogy Module.

UNIV 602 FACULTY ROLES 0 PF
Introduces the range of faculty roles and responsibilities at different types of institutions. Assists with identifying ideal academic settings and understanding the possibilities and responsibilities commensurate to such appointments. Modern information technologies and library resources access essential.

UNIV 603 ACADEMIC JOB SEARCH 0 PF
Prepares for insertion into the academic workplace by focusing on CV construction, teaching portfolio preparation, and refining interviewing skills. Modern information technologies and library resources access essential.

UNIV 899 MASTER’S SUSTAINING 0 FT

UNIV 999 PH.D. SUSTAINING 0 FT

WOMEN’S STUDIES

WOMS 200 CULTURAL INTRODUCTION TO SEXUALITIES AND GENDER STUDIES 3
See SGST200 for course description.

WOMS 201 INTRODUCTION TO WOMEN’S STUDIES 3
Study of the causes and conditions determining women’s status in society, as evidenced in institutional structures and personal relations between men and women. Taught from multidisciplinary perspectives.

WOMS 202 INTRODUCTION TO INTERNATIONAL WOMEN’S STUDIES 3
Examines how public policies and traditional customs affect women’s lives around the world. Focuses on the effects of political and economic status, social norms, and institutional structures on women’s conditions in family life, education, and employment.

WOMS 203 CONTEMPORARY MORAL PROBLEMS 3
See PHI202 for course description.

WOMS 205 WOMEN IN THE ARTS AND HUMANITIES 3
Interdisciplinary survey of women’s contributions to the arts and humanities, also including literary/artistic images of women, contributions of minority and non-Western women, and study of the relationship between women’s social-economic roles and cultural expressions.

WOMS 206 WOMEN AND WORK 3
Covers a variety of topics including women in traditional and non-traditional occupations, gender-based discrimination (wage inequities, sexual harassment, exclusionary policies), the contributions of women to the economy and the role of law in shaping conditions for women in the workplace. May be cross-listed with SOCI206.

WOMS 207 WOMEN, POWER AND SUCCESS 3
Research, theory and possible strategies related to expanding the horizons in achieving“power” and “success” in women’s lives. Topics include socializing girls to be successful, evaluating personal strengths and goals, and a new model of women and power.

WOMS 208 CURRENT ISSUES IN SEXUALITY AND GENDER 1-3
Lecture Series
See SGST208 for course description.
RESTRICTIONS: May be repeated for credit when topics vary.

WOMS 210 WOMEN AND RELIGION 3
Examines the impact of Near Eastern and Judeo-Christian scriptures on women in the family and society, especially focusing on women’s roles as mystics and leaders within and outside of institutional religion. Also covers recent feminist approaches to religion.
May be cross-listed with PHI210.

WOMS 211 MEN, CONFLICT AND SOCIAL CHANGE 3
Examination of male roles and images in society, utilizing an interdisciplinary social science perspective. Topics include the family, work, military, violence and the implications of feminism for men. Issue oriented.
May be cross-listed with SOCI211.

WOMS 212 MOTHERHOOD IN CULTURE AND POLITICS 3
Examines contemporary cultural and political issues related to motherhood and mothering experience, including definitions and cultural significance of motherhood, experiences of childbirth, effects of new reproductive technologies, surrogate mothering and “maternal thinking,” also efforts to avoid motherhood through contraception and abortion and related legal controversies.

WOMS 213 MEN AND WOMEN IN AMERICAN SOCIETY 3
See SOCI213 for course description.

WOMS 215 QUEER SEXUAL IMAGERY IN THE VISUAL ARTS 3
See MSST215 for course description.

WOMS 216 INTRODUCTION TO FEMINIST THEORY 3
See PHI216 for course description.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>WOMS 222</td>
<td>LANGUAGE AND GENDER</td>
<td>3</td>
</tr>
<tr>
<td>WOMS 223</td>
<td>FOOD, GENDER AND CULTURE</td>
<td>3</td>
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<tr>
<td>WOMS 233</td>
<td>WOMEN, BIOLOGY AND MEDICINE</td>
<td>3</td>
</tr>
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<td>WOMS 240</td>
<td>WOMEN AND VIOLENCE</td>
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<tr>
<td>WOMS 250</td>
<td>TOPICS IN INTERNATIONAL WOMEN’S STUDIES</td>
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<tr>
<td>WOMS 260</td>
<td>WOMEN: CULTURAL REPRESENTATIONS</td>
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<tr>
<td>WOMS 290</td>
<td>WOMEN AND GENDER IN INTERNATIONAL FILMS</td>
<td>1 PF</td>
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<tr>
<td>WOMS 291</td>
<td>WOMEN’S HISTORY THROUGH FILM</td>
<td>1</td>
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<tr>
<td>WOMS 298</td>
<td>RESEARCH ON RACE, ETHNICITY AND CULTURE</td>
<td>1 PF</td>
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<tr>
<td>WOMS 299</td>
<td>RESEARCH ON WOMEN</td>
<td>1 PF</td>
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<tr>
<td>WOMS 300</td>
<td>WOMEN IN AMERICAN HISTORY</td>
<td>3</td>
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<tr>
<td>WOMS 301</td>
<td>GAY AND LESBIAN FILM</td>
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<tr>
<td>WOMS 302</td>
<td>WOMEN IN MUSIC: AN ALTERNATE SURVEY</td>
<td>3</td>
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<tr>
<td>WOMS 305</td>
<td>THE EVOLUTION OF HUMAN SEX ROLES AND REPRODUCTION</td>
<td>3</td>
</tr>
<tr>
<td>WOMS 311</td>
<td>RENAISSANCE WOMEN, SOCIETY AND ART</td>
<td>3</td>
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<tr>
<td>WOMS 315</td>
<td>THIRD WORLD WOMEN IN POLITICS</td>
<td>3</td>
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<tr>
<td>WOMS 318</td>
<td>STUDIES IN FILM</td>
<td>3</td>
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<tr>
<td>WOMS 320</td>
<td>VARYING AUTHORS AND GENRES</td>
<td>3</td>
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<tr>
<td>WOMS 321</td>
<td>TOPICS: CHINESE LITERATURE IN TRANSLATION</td>
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<tr>
<td>WOMS 322</td>
<td>TOPICS: CLASSICAL LITERATURE IN TRANSLATION</td>
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<tr>
<td>WOMS 323</td>
<td>INTRODUCTION TO WOMEN AND POLITICS</td>
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<tr>
<td>WOMS 326</td>
<td>TOPICS: HISPANIC LITERATURE IN TRANSLATION</td>
<td>3</td>
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<tr>
<td>WOMS 327</td>
<td>RACE, GENDER, SCIENCE</td>
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<tr>
<td>WOMS 328</td>
<td>TOPICS: JAPANESE LITERATURE IN TRANSLATION</td>
<td>3</td>
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<tr>
<td>WOMS 329</td>
<td>TOPICS: ITALIAN LITERATURE IN TRANSLATION</td>
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<tr>
<td>WOMS 330</td>
<td>VARYING AUTHORS, THEMES AND MOVEMENTS</td>
<td>3</td>
</tr>
<tr>
<td>WOMS 333</td>
<td>PSYCHOLOGY OF WOMEN</td>
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<tr>
<td>WOMS 334</td>
<td>AFRICAN AMERICAN WOMEN’S HISTORY</td>
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<tr>
<td>WOMS 350</td>
<td>GENDER AND CRIMINAL JUSTICE</td>
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</tr>
<tr>
<td>WOMS 352</td>
<td>STUDIES IN NINETEENTH-CENTURY LITERATURE</td>
<td>3</td>
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<tr>
<td>WOMS 353</td>
<td>TWENTIETH CENTURY BRITISH LITERATURE</td>
<td>3</td>
</tr>
<tr>
<td>WOMS 355</td>
<td>WOMEN IN CROSS-CULTURAL PERSPECTIVE</td>
<td>3</td>
</tr>
<tr>
<td>WOMS 363</td>
<td>INDEPENDENT STUDY</td>
<td>1-6</td>
</tr>
<tr>
<td>WOMS 372</td>
<td>POPULAR CULTURE IN URBAN JAPAN</td>
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</tr>
<tr>
<td>WOMS 375</td>
<td>TOPICS: RUSSIAN AND SOVIET CULTURE IN TRANSLATION</td>
<td>3</td>
</tr>
<tr>
<td>WOMS 380</td>
<td>WOMEN WRITERS</td>
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</tr>
<tr>
<td>WOMS 381</td>
<td>WOMEN IN LITERATURE</td>
<td>3</td>
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<tr>
<td>WOMS 382</td>
<td>STUDIES IN MULTICULTURAL LITERATURE IN ENGLISH</td>
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</tr>
<tr>
<td>WOMS 383</td>
<td>TOPICS: CHINESE CULTURE IN TRANSLATION</td>
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</tr>
<tr>
<td>WOMS 385</td>
<td>WOMEN AND THE ECONOMY</td>
<td>3</td>
</tr>
</tbody>
</table>
WOMS 389 **TOPICS: WOMEN AND HEALTH ISSUES**
Varying special topics related to women's health. Topics may include, but are not limited to: the relationship between women, health and development; theoretical contributions of feminism to thinking about relationship between gender and health; women's health conditions in various parts of the world. May be cross-listed with PHIL389.

RESTRICTIONS: May be repeated for credit when topics vary.

WOMS 390 **HONORS COLLOQUIUM**
See PHIL390 for description. May be cross-listed with IFST390.

WOMS 392 **HONORS COLLOQUIUM**
See PHIL392 for course description.

WOMS 401 **FOUNDATIONS OF HUMAN SEXUALITY**
See IFST401 for course description.

WOMS 402 **TOPICS IN CONSTITUTIONAL LAW**
See POSC401 for course description. RESTRICTIONS: May be repeated for credit when topics vary.

WOMS 407 **SOCIOLOGY OF SEX AND GENDER**
See SOCI407 for course description and restrictions.

WOMS 409 **DOMESTIC VIOLENCE SERVICES**
See IFST409 for course description. PREREQ: IFST235 or SOCI201 or WOMS201. RESTRICTIONS: Open to juniors and seniors only.

WOMS 410 **CRITICAL ISSUES IN FEMINIST SCHOLARSHIP**
Capstone course for majors. Culminates in a senior conference. One of the following options must be completed: 400-level seminar course cross-listed with WOMS; a women's studies internship (WOMS498), study abroad program with a WOMS component in the senior year, or a WOMS thesis (WOMS411) or equivalent such as an art portfolio or performance piece.

RESTRICTIONS: Senior majors and minors. Requires approval of women's studies advisor and course instructor. Students who select the cross-listed seminar option, study abroad option, thesis option or equivalent, or internship option must register for the appropriate courses.

WOMS 411 **SEMINAR IN AMERICAN HISTORY**
See HIST411 for course description.

WOMS 413 **PROBLEMS IN AMERICAN GOVERNMENT**
See POSC413 for course description.

WOMS 415 **RACE, CLASS AND GENDER**
See SOCI415 for course description.

WOMS 418 **RACE, GENDER AND POVERTY**
See SOCI418 for course description. PREREQ: SOCI201.

WOMS 420 **WOMEN'S STUDIES SENIOR THESIS**
3-6
Senior thesis for women's studies majors or minors. COREQ: Students enrolled in WOMS420 must also take WOMS410 the same semester or the following semester.

RESTRICTIONS: Women's studies majors or minors and permission of the WOMS program.

WOMS 430 **FAMILY LIFE EDUCATION**
See IFST430 for course description.

WOMS 436 **POLITICS AND LITERATURE**
See POSC436 for course description.

WOMS 439 **WOMEN AND REVOLUTION IN AFRICA**
See HIST439 for course description.

WOMS 440 **TOPICS IN INTERPERSONAL AND ORGANIZATIONAL COMMUNICATION**
See COMM440 for course description.

WOMS 442 **TOPICS IN ORGANIZATIONAL COMMUNICATION**
See COMM442 for course description.

WOMS 444 **SEMINAR: WOMEN IN THE ISLAMIC MIDDLE EAST**
See HIST444 for course description.

WOMS 460 **WOMEN IN INTERNATIONAL DEVELOPMENT**
See SOCI460 for course description.

WOMS 465 **STUDIES IN LITERATURE GENRES, TYPES AND MOVEMENTS**
See ENGL465 for course description.

WOMS 466 **INDEPENDENT STUDY**
1-6

WOMS 472 **SEMINAR IN MEDIEVAL HISTORY**
See HIST471 for course description.

WOMS 475 **SEMINAR IN MODERN EUROPEAN HISTORY**
See HIST475 for course description.

WOMS 480 **SEMINAR**
See ENGL480 for course description.

WOMS 484 **WOMEN IN SPORTS**
See HESC484 for course description.

WOMS 498 **INTERNSHIP IN WOMEN'S STUDIES**
Students work 115 hours per semester in an agency or program associated with women's issues. Academic knowledge applied to actual working situations. Seminar discussions focus on internship experience in light of academic research and theory.

RESTRICTIONS: Requires permission of instructor.

WOMS 610 **CRITICAL ISSUES IN FEMINIST SCHOLARSHIP**
Provides a survey introduction to women's studies for graduate students.