

LINGUISTICS

- LING 477 THE STRUCTURE OF ENGLISH** 3
See EDUC477 for course description
- LING 480 INTRODUCTION TO SOCIOLINGUISTICS** 3
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 491 SEMANTICS I** 3
Introduction to linguistic theories of meaning. Survey of the semantic issues in reference, ambiguity, presupposition and implicature. Selected linguistic phenomena (e.g., tense, aspect, predication, thematic roles). Some elements of formal semantics.
PREREQ: LING101.
- LING 497 SOCIOLINGUISTICS OF ENGLISH IN INNER CITY** 3
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 498 TEACHING ENGLISH AS A SECOND LANGUAGE** 3
Investigation of the literature containing the traditional and modern techniques of teaching the pronunciation, grammar and vocabulary of American English; and devising and presenting lesson plans.
- LING 499 ISSUES IN TEACHING LIMITED ENGLISH PROFICIENCY STUDENTS** 3
Addresses theoretical and instructional issues related to teaching Limited English Proficient 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.
- LING 601 HISTORICAL LINGUISTICS** 3
The languages of the world, the Indo-European languages, the comparative method and linguistic evolution
PREREQ: Completion of two years of a college language course.
- LING 607 PHONOLOGY I** 3
Basic introduction to phonology, concentrating on principles of articulatory phonetics, IPA transcription system, distinctive feature theory, segmental phonological analysis and the writing of phonological rules.
- LING 608 PHONOLOGY II** 3
Continuation of LING607. More advanced phonological analysis and rule writing. Introduction to recent developments in nonsegmental phonology: autosegmental, metrical and prosodic theories.
PREREQ: LING607.
- LING 609 SYNTAX I** 3
Introduction to syntactic theory and analysis. Emphasis on argumentation and analysis rather than on the fine points of syntactic theory.
- LING 610 SYNTAX II** 3
Continuation of LING609. More advanced analysis of syntactic structures. Attention given to the theory of Government and Binding and to principles of universal grammar.
PREREQ: LING609
- LING 612 INTRODUCTION TO MORPHOLOGY** 3
Introduces major types of morphological phenomena, their analysis and current theoretical approaches to handling them
PREREQ: LING607.
- LING 617 LANGUAGE PLANNING** 3
Sociolinguistic study of the interaction between official and indigenous languages as well as the role of minority groups in national policy making. Highlights language as a cultural, political and social marker.
- LING 621 METHODS OF TEACHING FOREIGN LANGUAGES** 3
See FLT621 for course description.
- LING 622 LANGUAGE SYLLABUS DESIGN** 3
See FLT622 for course description.
- LING 624 SECOND LANGUAGE TESTING** 3
Study of the principles and techniques of second-language testing, including measurement of the four skills and of communicative competence. Bilingual measures. Discrete point versus integrative or pragmatic measures. Practice in item construction and analysis. May be cross-listed with FLT624.
- LING 633 INTRODUCTION TO ACOUSTIC PHONETICS** 3
Introduction to articulatory, acoustic, and perceptual characteristics of speech with emphasis on the acoustic properties of phonemes. While primarily a lecture course with assigned text, a few laboratory sessions will provide an introduction to computer-based methods used in instrumental studies of speech.
- LING 675 LANGUAGE ACQUISITION** 4
See EDUC675 for course description.
- LING 676 SECOND LANGUAGE ACQUISITION AND BILINGUALISM** 3
See EDUC676 for course description.
- LING 677 THE STRUCTURE OF ENGLISH** 3
See EDUC677 for course description.
- LING 680 INTRODUCTION TO SOCIOLINGUISTICS** 3
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** 3
Introduction to linguistic theories of meaning. Survey of the semantic issues in reference, ambiguity, presupposition and implicature. Selected linguistic phenomena (e.g., tense, aspect, predication and thematic roles). Some elements of formal semantics
PREREQ: LING101 or equivalent
- LING 697 SOCIOLINGUISTICS OF ENGLISH IN THE INNER CITY** 3
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** 3
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** 3
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.
- LING 801 OLD ENGLISH** 3
See ENGL801 for course description.
- LING 803 MIDDLE ENGLISH** 3
See ENGL803 for course description.
- LING 830 SYNTAX III** 3
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** 3
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 848 SEMINAR IN LANGUAGE DEVELOPMENT** 3
See EDUC848 for course description.
- LING 850 LINGUISTICS AND WRITING** 3
Survey of writing systems. Problems of text structure.
- LING 851 LINGUISTIC FIELD METHODS** 3
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** 3
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** 3
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** 3
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** 3
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** 3
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** 3
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** 3
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** 3
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** 3
A detailed analysis of current issues in second language acquisition based on extensive readings of research findings. Topics include monitor model, pidginization process, natural versus formal second language acquisition, and adult-versus-child acquisition.
- LING 890 STUDIES IN LINGUISTICS** 3
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** 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.
- LING 969 DOCTORAL DISSERTATION** 1-12 PF
Liberal Studies

LIBERAL STUDIES

- MALS 600 NATURE AND HUMAN NATURE** 3
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 FORCE, 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 623 MOZART AND NOVERRE** 3
Mozart's contributions to opera and how they compare favorably to Noverre's contribution to dance. Noverre's letters reveal his innovative ideas about dance while several of the final operatic masterpieces of Mozart are useful examples to study and understand his musical, sociological and philosophical environment.
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 will be 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 647 PHILOSOPHY OF TECHNOLOGY** 3
See PHIL647 for course description.
- MALS 648 ENVIRONMENTAL ETHICS** 3
See PHIL648 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

MARINE STUDIES

- MAST 200 THE OCEANS** 3
Geared to the non-science major. Integrates physical, chemical, geological and biological principles into an overview that addresses why and how the oceans work. Draws heavily on current ocean issues to illustrate processes and problems.
- MAST 314 COMPARATIVE TERRESTRIAL AND MARINE ECOLOGY** 3
See ENWC314 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 course instructor.
- MAST 466 INDEPENDENT STUDY** 1-3

- 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: MATH241 or MATH221; CHEM103 or CHEM111; PHYS201 or PHYS207.
- 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; hydrostatics; 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. For inservice educators.
 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: MAST634.
- MAST 617 METHODS IN MOLECULAR BIOLOGY LABORATORY 3**
 Provides practical experience in molecular biological techniques with emphasis on applications to marine related problems.
 COREQ: MAST616.
- MAST 618 MARINE MICROBIAL ECOLOGY 3**
 Examines role of microbes in the oceans and their impact on oceanographic processes and biogeochemical 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 624 BIOLOGICAL OCEANOGRAPHY 3**
 Broad, multidisciplinary approach to marine life and biological processes in the oceans and estuaries. Species composition and biogeography discussed in relation to physical, chemical and geological processes. Examines and quantifies organisms' physiological responses to the abiotic and biotic environment.
- MAST 626 TOPICS IN HALOPHYTE BIOLOGY 1**
 Analysis of current research in the biology of halophyte 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 COMPARATIVE ENVIRONMENTAL POLITICS 3**
 See UAPP627 for course description.
- MAST 629 TOPICS IN MARINE ECOLOGY 1-3**
 Selected topics in marine ecology and physiology. Topics may vary and will be announced in the registration booklets.
 RESTRICTIONS: Requires permission of instructor. May be repeated for credit when topics vary.
- MAST 631 MARINE GEOLOGY 3**
 See GEOL631 for course description
- MAST 633 IMAGE PROCESSING 3**
 See ELEG633 for course description.
- 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 Kolmogorov, turbulent diffusion and turbulence in density stratified flows. Applications to many engineering disciplines as well as to meteorology and oceanography.
- MAST 636 APPLIED OCEAN SCIENCE SEMINAR 1**
 Invited speakers from university, industry and government research laboratories will discuss the latest advances in modeling and measurement of physical and biological properties of the oceans and coastal regions. Use of satellite remote sensing data and acoustic data in studies of ocean currents, waves, air-sea interaction turbulence, pollutant dispersion and coastal productivity will be emphasized.
- 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 will gain a broad understanding of concepts in geological oceanography and marine geology.
- MAST 640 OPTO-ELECTRONICS 3**
 See ELEG640 for course description
- 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; physicochemical 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 650 CLAY MINERALOGY** 3
Crystallography, chemistry, physical properties, occurrence, origin and alterations of the clay and related minerals; theory and techniques of identification, characterization and quantitative analysis using x-ray diffraction and electron microscopy; and cation exchange and size characteristics of clay minerals. Discussion of related topics, colloidal chemistry, thixotropic behavior, etc. May be cross-listed with GEOL650 and/or PLSC650.
- MAST 670 UNITED STATES OCEAN AND COASTAL POLICY** 3
Provides an overview and assessment of the evolution of U.S. ocean and coastal policies, 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 ECON670
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 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 COASTAL AND MARITIME LAW** 3
Introduction to U.S. coastal and maritime law including legal issues of coastal title and boundaries, beach access, public trust doctrine, and carriage of goods by sea, torts against seamen, collisions, salvage, and marine pollution. May be cross-listed with POSC678 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 OF 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 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 800 DYNAMICAL PHYSICAL OCEANOGRAPHY** 3
Topics include basic definitions, conservation of mass, conservation of momentum, conservation of vorticity, horizontal frictionless flow, wind-driven circulation, stability and double diffusion, thermohaline circulation and tides.
RESTRICTIONS: Requires permission of instructor
- MAST 806 GEOPHYSICAL FLUID DYNAMICS I** 3
Development of the fundamental fluid dynamics used in analyzing flows in physical oceanography and meteorology. Fundamentals of vorticity dynamics and geostrophy, inviscid theory of Rossby waves, and Ekman boundary layers.
PREREQ: MEEG863 and MEEG864.
- 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 inter-annual 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 815 DEEP-SEA SEDIMENTATION** 3
Students will examine the formation of deep-sea sediments. Emphasis will be placed on the geographic distribution of sediments, the processes that developed these sediments, and how they relate to global paleoceanographic and paleoclimatic changes.
PREREQ: MAST631
RESTRICTIONS: Requires permission of instructor.

- 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. Ensuing 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 823 PHYTOPLANKTON BIOLOGY** 3
Comprehensive treatment of the structure, biochemistry, physiology and ecology of phytoplankton to understand its distribution and growth in the sea. Aspects include spatial and temporal variations of phytoplankton biomass and production; mathematical descriptions of growth, photosynthesis and nutrient uptake; mechanisms of physiological adaptation to environmental variables; and structural and biochemical bases of phytoplankton taxonomy and biogeography.
PREREQ: MAST624.
- 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 techniques.
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 seafloor 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 GEOL631 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, spectroscopic, 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 848 GEOCHEMICAL OCEANOGRAPHY** 3
Chemical origin and formation of the ocean; chemistry of marine sediments; transfer of chemicals to and within the sea (weathering and global cycles); marine precipitates; chemical principles of marine geological reactions (solubility and redox); sediment diagenesis and pore water chemistry; and use of stable and radioisotopes in the oceans.
PREREQ: Aquatic chemistry and physical chemistry.
- MAST 849 ORGANIC CHEMICAL OCEANOGRAPHY** 3
Covers descriptive organic chemical studies of seawater and processes that influence organic reactions in seawater. Laboratory devoted to methodology for analyses of organic compounds in seawater and marine organisms.
PREREQ: Organic chemistry.
- 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 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 PALEOCEANOGRAPHY** 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-lead discussion of current literature. May be cross-listed with GEOL857.
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 ECON875.
PREREQ: MAST675 or ECON675.
- MAST 880 PRINCIPLES OF APPLIED OCEAN SCIENCE** 3
Principles of ocean energy conversion, remote sensing, materials and corrosion, soil mechanics, foundations, structures, intensive aquatic production, coastal erosion and sedimentation are studied in the context of creative interdisciplinary research and applied in the analysis of a single major marine problem or opportunity using a "case study" approach. Normally involves a practicum.
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 884 BIOLOGICAL EFFECTS AT SURFACES** 3
Fundamentals of bioattachment for micro and macroorganisms. Conditioning films and holdfast mechanisms. Influence of chemical and electrical surface properties. Applications to marine fouling and its control, mariculture, degradation of heat transfer surfaces, dental plaque formation, biomedical implants and others.
RESTRICTIONS: Requires permission of instructor.

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 courses. 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 R

Reviews skills necessary for Pre-calculus and College Mathematics and Statistics courses. 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.

PREREQ: MATH010 or MATH012

RESTRICTIONS: Only four credits from any combination of MATH113, MATH114, MATH115, MATH117, MATH170 and MATH171 can count toward graduation

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 MATH010

RESTRICTIONS: Only four credits from any combination of MATH113, MATH114, MATH115, MATH117, 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: MATH010 or MATH012

RESTRICTIONS: Only four credits from any combination of MATH113, MATH114, MATH115, MATH117, MATH170, and MATH171 can count toward graduation

MATH 117 PRECALCULUS FOR SCIENTISTS AND ENGINEERS 4

Designed to prepare students for MATH 241. All topics covered in MATH 115 will be covered as well as additional topics in functions, trigonometry, linear systems, parabolas and sequences.

PREREQ: MATH010 or MATH012 or 2 years of high school algebra.

RESTRICTIONS: Only four credits from any combination of MATH114, MATH115, MATH117, MATH170, and MATH172 can count towards graduation

MATH 170 SELF-PACED COLLEGE MATHEMATICS AND STATISTICS 1-3

Stresses mathematical concepts and algebraic skills with an emphasis on applications in the areas of management, life and social sciences. Topics include various function classes and models, linear programming and statistics. Variable credit allows the student to complete the course at a slower pace.

PREREQ: MATH010 or MATH012

RESTRICTIONS: Only four credits from any combination of MATH113, MATH114, MATH115, MATH117, MATH170 and MATH171 can count toward graduation

MATH 171 SELF-PACED PRE-CALCULUS 1-3

Explores the various classes of functions and their graphs. Function classes include linear, quadratic, polynomial, rational, exponential, logarithmic and trigonometric. Emphasizes skills needed for calculus (MATH221). Variable credit option provides an opportunity to change the pace of the course

PREREQ: MATH010 or MATH012

RESTRICTIONS: Only four credits from any combination of MATH113, MATH114, MATH115, MATH117, MATH170 and MATH171 can count toward graduation

MATH 179 PROBLEM SOLVING STRATEGIES I 1

Designed to study a multitude of problem solving strategies such as working backwards, look for a pattern, etc. In particular, will emphasize the use of these strategies with the content that secondary mathematics teachers normally teach.

PREREQ: MATH241

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, 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

PREREQ: MATH115

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 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 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 THE ELEMENTARY SCHOOL I 3

Basic concept development in sets, numeration systems, functions, system of whole numbers and related algorithms, selected topics from number theory, and integers. Emphasis placed on problem solving and general number sense.

RESTRICTIONS: Requires School of Education Mathematics Competency Test.

MATH 252 MATHEMATICS FOR THE ELEMENTARY SCHOOL II 3

Basic concept development in rational numbers expressed as fractions and decimals, proportional reasoning, percent, properties of real numbers, basic statistical topics and probability

PREREQ: MATH251

MATHEMATICS

- MATH 253 MATHEMATICS FOR ELEMENTARY SCHOOL III** 3
Basic geometric concept development in classifying and analyzing basic two and three dimensional geometric shapes, the role of definitions, symmetry, congruence, similarity, Euclidean constructions, measurement topics including linear and regional, coordinate geometry and graphing in a plane
PREREQ: MATH252.
- MATH 300 STATISTICAL METHODS AND THEORY** 4
Exploratory data analysis, probability, estimation, classical statistical inference, regression, multiple regression. Laboratory covers use of statistical packages.
PREREQ: MATH210 and MATH243
- 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.
PREREQ: 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: MATH302.
RESTRICTIONS: For chemical engineering majors only.
- MATH 315 DISCRETE MATHEMATICS II** 3
Algorithmic graph theory, correctness and complexity of algorithms, recurrence relations, numerical algorithms, algorithms for polynomials (such as Horner's method)
PREREQ: MATH210 and MATH241
- 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 ELEG and CPEG students only.
- 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 ELEG and CPEG students only.
- MATH 349 ELEMENTARY LINEAR ALGEBRA** 3
Systems of linear equations, matrix algebra and determinants. Vector spaces, linear dependence and independence, basis and dimension. Linear transformations, matrix representation and similarity transformations. Includes use of the computer for analysis and solution of problems in linear algebra.
PREREQ: MATH230 or MATH242.
RESTRICTIONS: Credit not given for both MATH349 and either MATH341, MATH342 or MATH351
- 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.
PREREQ: MATH243.
RESTRICTIONS: Credit not given for both MATH351 and either MATH302, MATH341 or MATH349. Open to MEEG students 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 students only
- MATH 353 ENGINEERING MATHEMATICS III** 3
Numerical Methods in engineering, linear and non-linear algebraic equations, numerical solution of ordinary differential equations, Runge-Kutta methods, boundary value problems, finite differences, diffusion, Laplace equation, applications to engineering problems with programming.
PREREQ: MATH351
COREQ: MATH352
RESTRICTIONS: Open to MEEG students 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: MATH380
RESTRICTIONS: Requires permission of the Committee on Secondary School Mathematics. Not for major (B.A. or B.S.) or minor credit in mathematical 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: MATH379.
RESTRICTIONS: Requires permission of the Committee on Secondary School Mathematics. Not for major (B.A. or B.S.) or minor credit in mathematical 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 389 GRAPH THEORY** 3
Basic graph theory (paths and circuits, trees and forests, connectivity and coloring theorems) and network flow theory. Applications to areas such as economics, engineering, chemistry and sociology.
PREREQ: MATH210.
- MATH 401 INTRODUCTION TO REAL ANALYSIS** 3
A rigorous treatment of one variable calculus. Topics will include sequences of real numbers, limit theorems, monotone sequences, Cauchy sequences, Bolzano-Weierstrass Theorem, continuity, uniform continuity, differentiability and Riemann integral. A historical perspective on the development of these topics will be provided.
PREREQ: MATH245.
- MATH 426 INTRODUCTION TO NUMERICAL ANALYSIS AND ALGORITHMIC COMPUTATION** 3
Direct and iterative methods for solution of algebraic equations and systems of linear equations, matrix inversion, pseudo-inverses, algebraic eigenvalue problems, linear least-square problems and nonlinear equations. Stresses both numerical analysis and algorithmic aspects. May be cross-listed with CISC410.
PREREQ: MATH349 and CISC106
RESTRICTIONS: Requires familiarity with computing (e.g., programming language).
- MATH 428 ALGORITHMIC AND NUMERICAL SOLUTION OF DIFFERENTIAL EQUATIONS** 3
Algorithms for numerical integration and differentiation. Initial value problems; boundary value problems in ordinary differential equations; finite difference (explicit and implicit) methods; polynomial and spline approximation; finite elements and collocation; and introduction to numerical methods for partial differential equations. May be cross-listed with CISC411.
PREREQ: MATH426 or CISC410.
- MATH 450 STATISTICS FOR ENGINEERING AND PHYSICAL SCIENCES** 3
Combinatorial probability; distribution theory, estimation and hypothesis testing. Experimental design, analysis of variance and regression theory.
PREREQ: MATH243.
- MATH 451 ABSTRACT ALGEBRA I** 3
Basic properties of the integers and the rationals, fields of quotients, polynomial rings, root-finding, introduction to groups, rings and fields. A historical perspective on the development of the notion of number and algebraic structure will be provided
PREREQ: MATH349 and MATH245
- MATH 466 INDEPENDENT STUDY** 1-6
- MATH 503 ADVANCED CALCULUS FOR APPLICATIONS** 3
Change of variables, surface integrals, Stokes' theorem, Divergence Theorem, calculus of variations, Euler's equation, brachistochrone, isoperimetric problem. Fourier series, pointwise and mean square convergence, vibrating string. Fourier transform, inversion formula, heat equation on a half-line.
PREREQ: A 300 or higher level course on differential equations.

MATH 508 INTRODUCTION TO COMPLEX VARIABLES AND APPLICATIONS 3

Introduction to analytic functions, contour integration, power series, residues and conformal mapping.
PREREQ: MATH243.

MATH 510 MODELING AND ANALYSIS OF ENVIRONMENTAL SYSTEMS 3

An elementary course to introduce basic analytical and numerical methods for studying mathematical problems arising in environmental sciences.

PREREQ: MATH242 or equivalent

RESTRICTIONS: Open to environmental science graduate students or by consent of instructor.

MATH 512 CONTEMPORARY APPLICATIONS OF MATHEMATICS 3

Aimed at providing hands-on learning experience in contemporary applications of mathematics. Involves work with investigators from industry, national laboratories and other departments. Mathematical topics may include ordinary and partial differential equations, systems of differential equations, transform, asymptotic and numerical methods

PREREQ: A 300 or higher level course on differential equations

MATH 518 MATHEMATICAL MODELS AND APPLICATIONS 3

Illustration and analysis of mathematical models for problems in the biological, physical and social sciences.

PREREQ: Either MATH230 or MATH349, and MATH300 or STAT370.

MATH 529 LINEAR PROGRAMMING: METHODS AND APPLICATIONS 3

Theory of linear programming (linear inequalities, convex polyhedra, duality), related topics (games, integer programming), main algorithms (simplex, dual) and representative applications in agriculture, economics, engineering, operations research and mathematics. Familiarity with computer implementation of LP methods acquired by individual (or small group) projects of applying LP to the students' chosen areas.

PREREQ: MATH349.

MATH 530 OPTIMIZATION AND GAME THEORY 3

Convex functions and sets, duality, fixed point theorems, elementary game theory and the theory of Nash and Walrasian equilibria; non-linear programming and the Kuhn-Tucker Theorem; dynamic optimization including dynamic programming and Pontryagin's Maximum Principle. Emphasis on applications and interpretation in terms of economic models. May be cross-listed with ECON530

PREREQ: MATH 302, MATH 349, ECON 301 and ECON 303.

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 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. Offers an 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 will become familiar with problem solving strategies that can be 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 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

Continuation of MATH600

PREREQ: MATH600

MATH 611 INTRODUCTION TO NUMERICAL ANALYSIS AND SCIENTIFIC COMPUTING 3

Introduction to numerical computing, analysis and solution of systems of linear equations, linear least-squares, eigenvalue problems, methods for unconstrained optimization, solution of systems of nonlinear equations. Experience with standard computer packages, code development and simulations of applied problems.

PREREQ: MATH503 or MEEG863 or PHYS207.

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 613 APPLIED SYMBOLIC COMPUTATION 3

See CISC623 for course description

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 queueing 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.

MATHEMATICS

- 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 non-linear 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 from year to year and will be 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
Existence and uniqueness for elliptic, parabolic and hyperbolic equations. Boundary and initial value problems for equations of hyperbolic and parabolic type in two independent variables. Classical approaches employed
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. Modern approaches will be emphasized.
PREREQ: MATH835 and MATH806
- 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 will be 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, Pólya 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, nondegenerate planes, coordinate systems, spreads and packings, conics and unitals, 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. Methods used will be algebraic, geometric and probabilistic.
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 I

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.

COREQ: MEDT390

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

MEDT 401 CLINICAL PHYSIOLOGICAL CHEMISTRY I 3

Application and theory of manual and automated techniques used in diagnostic and therapeutic medicine. Emphasis on clinical procedures for carbohydrates, proteins, lipids, nonprotein nitrogenous compounds, blood gases and pH, and electrolytes.

RESTRICTIONS: Open to medical technology majors only

MEDT 403 CLINICAL PHYSIOLOGICAL CHEMISTRY II 4

Application and theory of methodologies in enzymology, endocrinology and toxicology. Relationship of normal and abnormal laboratory findings in organ functional tests.

PREREQ: MEDT401.

MEDT 404 HEMATOLOGY I 2

Quantitative and qualitative study of the formed elements of the blood with emphasis on the normal state, as well as the study of normal and abnormal coagulation and hemostasis.

RESTRICTIONS: Open to medical technology majors only.

MEDT 405 HEMATOLOGY II 2

Study of the pathophysiology of erythrocytic and leukocytic disorders and the laboratory findings of these disorders.

PREREQ: MEDT404

MEDT 406 MEDICAL MICROBIOLOGY 3

Study of the occurrence and pathogenesis of human infections and microorganisms associated with humans in health and disease

RESTRICTIONS: Open to medical technology majors only.

MEDT 409 IMMUNOHEMATOLOGY I 1

Study of antigen and antibody systems of human red cells and compatibility testing of blood for transfusion.

RESTRICTIONS: Open to medical technology majors only

MEDT 411 CLINICAL PHYSIOLOGICAL CHEMISTRY LABORATORY I 2

Laboratory exercises that complement the topics covered in MEDT401

COREQ: MEDT401.

MEDT 413 CLINICAL PHYSIOLOGICAL CHEMISTRY LABORATORY II 2

Laboratory exercises that complement the topics covered in MEDT403

COREQ: MEDT403.

MEDT 414 HEMATOLOGY I LABORATORY 1

Study and implementation of laboratory procedures that correlate with the material taught in MEDT404

COREQ: MEDT404.

MEDT 415 HEMATOLOGY II LABORATORY 2

Study and implementation of laboratory procedures in hematology consistent with the material taught in MEDT405.

COREQ: MEDT405.

MEDT 416 MEDICAL MICROBIOLOGY LABORATORY 2

Laboratory study of microorganisms important in the normal flora and infectious diseases of humans

COREQ: MEDT406

MEDT 418 MEDICAL TECHNOLOGY SENIOR SEMINAR 0 PF

Readings, case studies, career planning and orientation for clinical education.

RESTRICTIONS: Requires Senior and major status

MEDT 419 IMMUNOHEMATOLOGY I LABORATORY 1

Laboratory procedures consistent with MEDT409.

COREQ: MEDT409.

MEDT 420 IMMUNOHEMATOLOGY II 1

Study of blood and component transfusions, their risks, complications and quality assurance. Also blood component therapy and testing of the neonate and adult

PREREQ: MEDT409

MEDT 421 IMMUNOHEMATOLOGY II LABORATORY 1

Laboratory procedures consistent with MEDT420.

COREQ: MEDT420.

MEDT 430 DIAGNOSTIC BACTERIOLOGY AND MEDICAL MYCOLOGY 2

Diagnostic bacteriology, emphasizing the correlation of in vitro and in vivo findings in the diagnosis and treatment of infectious disease, including human mycoses. Identification of pathogenic and nonpathogenic bacteria and fungi in clinical specimens.

PREREQ: MEDT406 and MEDT416.

COREQ: MEDT431.

MEDT 431 DIAGNOSTIC BACTERIOLOGY AND MEDICAL MYCOLOGY LABORATORY 2

Study and implementation of laboratory procedures that correlate with the material taught in MEDT430

COREQ: MEDT430

MEDT 461 LABORATORY PRACTICE AND LEADERSHIP I 1

Introduction to clinical laboratory practice and leadership with emphasis on management styles, motivational techniques, communication skills, organizational leadership and administration of personnel.

RESTRICTIONS: Requires permission of instructor

MEDT 466 INDEPENDENT STUDY 1-6

MEDT 471 LABORATORY PRACTICE AND LEADERSHIP II 1

Discussion of clinical laboratory practice and leadership. Emphasis on responsibilities relating to daily operation of the laboratory, including human resource management, financial planning, cost analysis, laboratory design, laboratory information systems, marketing, government regulations and accreditation.

PREREQ: MEDT461.

RESTRICTIONS: Requires permission of instructor

MEDT 472 CLINICAL URINALYSIS AND SEROLOGY PRACTICUM 1 PF

Clinical experience in the application of laboratory theory and techniques in urinalysis and serology.

PREREQ: MEDT380 and MEDT400.

MEDT 473 CLINICAL CHEMISTRY PRACTICUM 3 PF

Supervised experience in the application of laboratory theory and techniques in clinical chemistry

PREREQ: MEDT403 and MEDT413

MEDT 475 CLINICAL HEMATOLOGY PRACTICUM 3 PF

Supervised experience in the application of laboratory procedures in hematology

PREREQ: MEDT405 and MEDT415.

MEDT 477 CLINICAL MICROBIOLOGY PRACTICUM 3 PF

Supervised experience in the application of laboratory procedures in diagnostic microbiology.

PREREQ: MEDT430 and MEDT431.

MEDT 479 CLINICAL IMMUNOHEMATOLOGY PRACTICUM 3 PF

Supervised experience in the application of laboratory procedures in immunohematology.

PREREQ: MEDT420 and MEDT421.

MECHANICAL ENGINEERING

MEEG 101 INTRODUCTION TO MECHANICAL ENGINEERING 3

Introduces the mechanical engineering profession. Uses a team design project to illustrate the engineering design process. Introduces computational tools.

MEEG 112 STATICS 3

To recognize, idealize and solve problems involving rigid bodies in static equilibrium using scalar and vector techniques. Introduces free body diagrams, friction, center of gravity, moment of inertia. Emphasizes the role of statics in the design process.

COREQ: MATH242 and PHYS207

MEEG 202 COMPUTER-AIDED ENGINEERING DESIGN 3

Introduces computer-aided mechanical engineering by developing the student's ability to 1) think visually, 2) communicate spatial information to an engineering audience through parametric solid modeling drafting standards and 3) begin to recognize the connection between a virtual design and an actual component.

PREREQ: MEEG101

MEEG 211 DYNAMICS 3

Intermediate-level development of the kinematics and dynamics of particle systems and rigid bodies. Solution of engineering problems by force, momentum and energy methods with applications to mechanisms, machines, and vehicles. Computer problems.

PREREQ: MEEG112 and PHYS207.

MECHANICAL ENGINEERING

- 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 will also be 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 locus, bode plots, PID, digital implementation. Engineering case studies: experiments and demonstrations: Resonant frequency and response and analysis examples.
- 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 MEEG312
- 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**
Conductive, convective and radiative heat transfer. Finite difference methods for solving transient, multi-dimensional problems numerically. Analysis of fins and heat exchanges.
PREREQ: PHYS310
- MEEG 344 THERMODYNAMICS 3**
Properties of non-ideal gases. Properties of mixtures as applied to humidity and chemical equilibrium. Analysis and computer-aided optimization of air conditioning and combustion systems.
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**
In this capstone engineering practice course, student teams develop real engineering system designs; discover customer requirements; benchmark best practices; develop engineering specifications; generate concepts; and justify a specific concept. They then design, fabricate, assemble, test and improve an actual prototype.
PREREQ: MEEG304.
RESTRICTIONS: For majors only
- MEEG 411 STRUCTURAL 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 undersea 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 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 432 AERODYNAMICS 3**
Theoretical and computational aerodynamics. Review of fluid mechanics. Airfoils and finite wings in incompressible flow. Panel and vortex-lattice methods. Complex variable techniques. Boundary-layer theory.
PREREQ: MEEG 331.
- MEEG 433 BIOENGINEERING 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 to be covered 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 441 COMBUSTION 3**
Fundamentals and application of combustion. Topics include thermodynamics; chemical kinetics; explosives and oxidative characteristics of fuels; combustion-generated pollutants; ignition and flammability phenomena; detonation; laminar in premixed flames; gaseous diffusion flames; and droplet combustion.
PREREQ: MEEG344
- 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 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 will be explored through in vitro, in vivo and mathematical modeling studies of joint system mechanics.
- MEEG 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.
- MEEG 484 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 600 SEMINAR** 1 PF
- MEEG 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, plane problems in elasticity (Airy stress function) and elements of linear elastic fracture mechanics.
- MEEG 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.
- MEEG 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. Some coursework involves computer modeling of musculoskeletal systems.
 PREREQ: MEEG112 and MEEG211.
- MEEG 614 FRACTURE OF MATERIALS** 3
 See MEEG614 for course description
- MEEG 615 MECHANICAL PROPERTIES OF MATERIALS** 3
 See MEEG615 for course description.
- MEEG 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; hygrothermal effects; stress analysis, buckling, vibrations and impact
- MEEG 617 COMPOSITE MATERIALS** 3
 Fiber and matrix materials, fiber-matrix interface, polymer, metal, ceramic and carbon matrix composites, geometric aspects, elastic properties, lamination theory, strength of unidirectional composites, strength of laminates, durability, hybrid composites, flexible composites and textile structural composites.
- MEEG 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
- MEEG 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.
- MEEG 623 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.
- MEEG 624 CONTROL OF DYNAMIC SYSTEMS** 3
 Review of modeling and analysis of dynamic systems. Transient and steady-state responses. Introduction to the theory of feedback controls and stability for continuous time systems. Control system design studies via root-locus, frequency domain and state space methods. Brief introduction to digital controls
 PREREQ: MEEG211, MEEG311 and MATH352.
- MEEG 630 INTERMEDIATE FLUID MECHANICS** 3
 Algebra and analysis of Cartesian Tensors. Descriptions of motion, kinematics. Conservation equations. Constitutive theory, Newton-Stokes fluids. Irrotational flow of an inviscid fluid. Dimensional analysis. Some exact solutions of the Navier-Stokes equations. Asymptotic flows: creeping flow, flow in the boundary layer. Introduction to turbulent flow. One dimensional compressible flow
- MEEG 633 BIOENGINEERING FLUIDS AND TRANSPORT** 3
 Anatomy and physiology of pulmonary, cardiac, genitourinary, cerebrospinal and synovial systems. Applications of fluid, heat and mass transport fundamentals to analysis of these biological systems
- MEEG 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 to be covered 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.
- MEEG 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.
- MEEG 637 TWO-PHASE FLOW AND PARTICLE TECHNOLOGY** 3
 Modeling mass, momentum, heat transfer, and mixing in particle-laden flows, slurries, and bubbly flows. Issues in particle process industry such as particle separation, dispersion, agglomeration, transport and handling. Particle measurements and characterization.
 PREREQ: MEEG331.
- MEEG 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
- MEEG 641 COMBUSTION** 3
 Fundamentals and application of combustion. Topics include thermodynamics; chemical kinetics; explosives and oxidative characteristics of fuels; combustion-generated pollutants; ignition and flammability phenomena; detonation; laminar in premixed flames; gaseous diffusion flames; and droplet combustion
 PREREQ: Graduate standing in engineering or science.
- MEEG 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.
- MEEG 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.
- MEEG 655 PRINCIPLES OF COMPOSITES MANUFACTURING** 3
 The fundamental principles involved in composites manufacturing will be introduced. Modeling of such processes will be emphasized with applications of injection molding, compression molding, filament winding, pultrusion and resin transfer molding
 PREREQ: MEEG332 and MEEG342
- 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 modelings 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
 Linear algebra: generalized vector space, eigenvalue problem, diagonalization, quadratic forms. Field theory: divergence theorem, Stokes' theorem, irrotational fields. Sturm-Liouville theory, Bessel functions, Legendre polynomials. Partial differential equations: diffusion and Laplace equations by separation of variables and Sturm-Liouville theory, wave equation. Engineering applications.

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 812 ADVANCED CONTINUUM FRACTURE MECHANICS 3
 Linear Elastic Fracture Mechanics: stress concentration and stress intensity factors, weight functions, K-dominance, energy methods, conservation integrals, fracture criteria; Elastic-Plastic Fracture Mechanics: plastic zone size, cohesive models, HRR plastic field, three dimensional effects; Dynamic Fracture Mechanics: asymptotic fields, energy methods, dynamic fracture criteria, thermomechanical coupling; Interfacial Fracture Mechanics: experimental techniques in dynamic fracture.
 PREREQ: MEEG610 or MEEG813

MEEG 813 THEORY OF ELASTICITY 3
 Index notation. Concepts of stress and strain. Equations of equilibrium and compatibility and elastic constitutive response. Applications to problems in applied mechanics.

MEEG 814 THEORY OF PLASTICITY 3
 Experimental foundations. Additional stress and strain relations. Geometric representation of yield criteria. Elasto-plastic flow laws and energy theorems. Incremental solutions, slip line theory and creep.
 PREREQ: MEEG610 or MEEG813

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
 Theory of plates from three-dimensional equations of elasticity. Small deflection analysis of rectangular and circular plates. Thermoelastic effects. Analysis of orthotropic plates, multilayered plates and sandwich panels. Green's functions. Energy methods. Reissner variational theorem for plates of moderate thickness. Large deflections of plates.

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; Donnell 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 feedforward structural controls.
 PREREQ: MEEG211, MEEG311 and MATH352

MEEG 825 DYNAMIC BEHAVIOR OF MATERIALS 3
 Importance and historical development of stress waves in solids; 1D stress waves, Hugoniot elastic limit; longitudinal and shear waves, reflection and refraction; Rayleigh, Love, and Stoneley waves; wave guides; spherical waves, Lamb's problem, elastic unloading; inelastic waves and shock waves; dynamic fracture and shear banding of solids; wave propagation in anisotropic media; high speed experimental techniques.
 PREREQ: MEEG610 or MEEG813.

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 fluids, stability theorems, 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 will be introduced. Modeling of such processes will be emphasized and a specific project will be required. Assignments will include open-ended problems. Areas of manufacturing include: injection molding, compression molding, filament winding, pultrusion and resin transfer molding.

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, Pade approximants, straining, and multiple scales; similarity methods; catastrophe theory; and chaos. Engineering applications.

MEEG 868 RESEARCH 1-9

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 will be independent in character to encourage development of initiative.

MEEG 871 RANDOM VIBRATIONS 3
 Review of theory of statistics and probability. Introduction to random processes of spectral analysis. Characterization of random excitations and random responses of degree of freedom linear systems with application to engineering structures. Level crossing probability and fatigue damage estimate. Random vibration of nonlinear dynamic systems. Methods for analyzing nonlinear stochastic systems.
 PREREQ: CIEG311 (for CIEG students), MEEG311 (for MEEG students). Knowledge of MEEG824 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

Review of analysis of nonlinear dynamic systems. Lyapunov stability theory. Optimal control of nonlinear systems. Feedback linearization. Robust and adaptive sliding mode controls and the backstepping design of sliding mode control. Feedforward control of nonlinear systems. Discussion of current research topics of nonlinear controls and their engineering applications.

PREREQ: MEEG824 or equivalent, MEEG690 and MEEG691, 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 rappell, 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

Designed to prepare 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 new 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 3-4

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

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 methods.

PREREQ: CHEM103/104 or equivalent, MSEG302 or consent of instructor.

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 446 SENIOR RESEARCH 1-6

Student will 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 600 INTRODUCTION TO POLYMER SCIENCE AND ENGINEERING I 3

See CHEG600 for course description.

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

Crystal structure analysis by X-ray and electron diffraction. Characterization of materials by optical microscopy, scanning and transmission electron microscopy, thermal analysis and spectroscopy.

PREREQ: MSEG302.

MSEG 603 ANALYTICAL TECHNIQUES IN MATERIALS SCIENCE 3

Laboratory course in optical microscopy, X-ray diffraction, scanning and transmission electron microscopy, electron diffraction. X-ray fluorescence and microanalysis. Auger analysis and other spectroscopic techniques.

PREREQ: MSEG302 and MSEG602.

COREQ: MSEG602.

MSEG 604 PHASE TRANSFORMATIONS 3

Introduction to thermodynamic functions: enthalpy, entropy and free energy. Fick's first and second laws of diffusion. Liquid/solid and solid/solid phase equilibria and transformations. Nucleation and growth. Massive and martensitic transformations. Phase transformations in polymers, ceramics and electronic materials.

PREREQ: MSEG302.

MATERIALS SCIENCE

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

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 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 CIEG610.

MSEG 614 FRACTURE OF MATERIALS 3

Fracture mechanics, micromechanisms, nucleation and propagation of cracks, fracture toughness, ductile-brittle transitions, fatigue, stress, corrosion, irradiation effects and non-metallic materials. May be cross-listed with MEEG614.

MSEG 615 MECHANICAL PROPERTIES OF MATERIALS 3

Stress, strain, tensor notation and elementary elasticity. Plasticity and ductility based upon continuum mechanics. Ideal strength of crystalline, polymer and amorphous materials. Real materials: amorphous, polymers, ceramics, metals and composites. Dislocations, strengthening of solids. Mechanisms of fracture, fracture mechanics, fatigue, creep and stress rupture. May be cross-listed with MEEG615.

RESTRICTIONS: Requires graduate status

MSEG 616 CHEMISTRY AND PHYSICS OF SURFACES AND INTERFACES 3

See CHEG616 for course description

MSEG 666 SPECIAL PROBLEM 1-12

MSEG 803 EQUALIBRIA IN MATERIAL SYSTEMS 5 3

Classical thermodynamics of condensed systems (macroscopic description). Fundamental laws. Functions and equations of state. Equilibrium and stability criteria. Single component phase equilibrium, multi-component mixtures. Partialmolar properties, non-ideal mixtures. Equilibrium in multi-phase, multi-component systems. Phase Rule

PREREQ: MSEG302.

MSEG 804 KINETICS IN MATERIAL SYSTEMS 3

Theory of reaction kinetics. Transport mechanisms in solids. Nucleation and spinodal decomposition. Interfacial attachment and migration. Transition state theory applied to diffusion and phase transformation. Elementary non-equilibrium thermodynamics and phenomenological equations in material transport and phase transformation

PREREQ: MSEG302.

MSEG 806 PHYSICAL PROPERTIES OF SOLIDS 3

Bonding, structure and growth of crystalline solids, glasses and superlattices. Phonons. Energy bands and band gaps. Photons and photonic properties of solids. Defects in solids and their effects on electrical and optical properties. Carrier generation, transport and recombination. Solids in magnetic fields.

MSEG 807 PHYSICAL PROPERTIES OF MATERIALS II 3

Continuation of MSEG607 with emphasis on the electrical transport properties of material. Topics will 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

Transmission electron microscope, lens defects and resolution. Diffraction and Kikuchi pattern formation and analysis. Image formation: kinematical and dynamical theories of electron diffraction. Burgers' vector and other fault analysis. Convergent beam and microdiffraction techniques. High resolution electron microscopy

MSEG 866 SPECIAL PROBLEM 1-12

MSEG 868 RESEARCH 1-9

MSEG 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

MSEG 969 DOCTORAL DISSERTATION 1-12 PF

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 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 ARTH403 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 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 Gallery or other acceptable museum, related institution or organization in the United States. May be cross-listed with AMCS464.

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 materials including tools, supports and techniques of architectural painting, manuscript illumination and panel painting in encaustic, watercolor, and egg tempera from about 1500 BC to AD 1500. Major 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 and tempera 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 reconstruction 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 EAMC606 for course description.

RESTRICTIONS: Requires permission of instructor.

MSST 608 PUBLIC HISTORY: RESOURCES, RESEARCH, AND PRACTICE 3

See HIST608 for course description.

MSST 629 SEMINAR IN HISTORIC PRESERVATION 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 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 artists' materials. Topics: acrylic emulsion and acrylic solution alkyd resin, PVA paints; collage-assemblage; solvent-photo transfer; synthetic fiber canvas, paper, panels, oil pastels, paint sticks, felt-tip markers, colored inks and pencils; airbrush spray gun; and non-art materials. Potential health hazards. Conservation topics: pH, light-fastness, 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 cross-listed with ART685 and/or ARTC685.

RESTRICTIONS: Requires permission of instructor.

MSST 688 STUDIO MATERIALS AND TECHNIQUES OF PAINTING I 3

Major materials including tools, supports and techniques of architectural painting, manuscript illumination and panel painting in encaustic, watercolor, and egg tempera from about 1500 BC to AD 1500. Major topics include true fresco and egg tempera painting. Studio reconstructions, lectures and library research. May be cross-listed with ART688, ARTC688 and/or ARTH688.

RESTRICTIONS: 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 and tempera 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 reconstruction of masterworks, lectures and library research. May be cross-listed with ART689, ARTC689 and/or ARTH689.

RESTRICTIONS: Requires permission of instructor.

MSST 690 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 ART 690, ARTC690 and/or ARTH690.

RESTRICTIONS: Requires permission of instructor.

MSST 801 MUSEUM CURATORSHIP: COLLECTIONS MANAGEMENT 3

A course on collections management theory and practices that focuses 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.

RESTRICTIONS: 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.

RESTRICTIONS: Open to graduate students only. Includes field trips and team task force project.

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 Gallery, Winterthur Museum, Hagley Museum, Longwood Gardens or other acceptable institution. May be cross-listed with HIST804.

RESTRICTIONS: 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.

RESTRICTIONS: 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.

RESTRICTIONS: 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.

RESTRICTIONS: 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.

RESTRICTIONS: Open to graduate students only. Permission of instructor required.

MUSIC EDUCATION**MUED 179 FRESHMAN SEMINAR IN MUSIC EDUCATION 1**

Introduction to issues and approaches in music education. Helps students examine their own interests and aptitude for teaching while presenting discussion on current trends in the profession and attributes of successful teachers. Provides guidelines for developing student portfolios.

MUED 279 PRACTICUM IN MUSIC EDUCATION 3

Observation of differing elementary and secondary school music program structures; studies and observations of children's growth and development patterns in terms of music learning; and experience in music instructional methods.

RESTRICTIONS: Requires permission of instructor.

MUSIC EDUCATION

MUED 336 CHORAL CONDUCTING	2	
Specific problems in conducting choral literature. Comparative analysis of works to be conducted.		
PREREQ: MUSC335.		
RESTRICTIONS: For vocal music education majors		
MUED 337 INSTRUMENTAL CONDUCTING	2	
Specific problems in conducting instrumental literature. Practical application of conducting techniques through supervised conducting of instrumental ensembles.		
PREREQ: MUSC335.		
RESTRICTIONS: For instrumental music education majors.		
MUED 366 INDEPENDENT STUDY	1-3	
MUED 379 MUSIC IN THE ELEMENTARY AND JUNIOR HIGH (OR MIDDLE) SCHOOL	3	
Introduction to music materials and approaches through clinical experiences		
PREREQ: MUED279.		
COREQ: MUED337.		
RESTRICTIONS: For music majors		
MUED 390 MUSIC IN THE ELEMENTARY SCHOOL	3	
Introduction to music materials and approaches through clinical experiences		
RESTRICTIONS: For elementary education and child development majors.		
MUED 479 SECONDARY MUSIC MATERIALS AND APPROACHES	3	
Procedures and materials used for teaching music in the secondary school.		
PREREQ: MUED379 and MUED337		
RESTRICTIONS: Requires permission of instructor.		
MUED 574 MUSIC CONCEPTS IN THE ELEMENTARY SCHOOL	3	
Methods and materials for developing children's understanding of music concepts by involvement in listening to, performing and describing musical sound events		
RESTRICTIONS: For experienced teachers.		
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MUSIC		
MUSC 061 PRIVATE STUDY	1-8	R
RESTRICTIONS: Requires audition and departmental placement tests. Credits do not apply toward bachelor's degree.		
MUSC 062 PRIVATE STUDY	1-8	R
PREREQ: MUSC061.		
RESTRICTIONS: Credits do not apply toward bachelor's degree.		
MUSC 095 BASIC HARMONY AND EAR-TRAINING	3	
R Designed to establish or re-establish basic harmony and ear-training skills.		
RESTRICTIONS: For beginning music majors and minors. Requires Musicality Test. Credits do not apply toward degree.		
MUSC 100 RECITAL ATTENDANCE	0	PF
A recital experience; see Department of Music Student Handbook for details.		
RESTRICTIONS: May be repeated.		
MUSC 101 APPRECIATION OF MUSIC	3	
Introduction to Western music literature through a nontechnical presentation of various musical styles and forms.		
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		
MUSC 103 INTRODUCTION TO OPERA	3	
Explores the world of opera including categories of singers; types of operas, e.g., opera seria, opera buffa, singspiel; and the roles of the chorus. Includes experience seeing an opera performed live.		
MUSC 104 INTRODUCTION TO OPERA II	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 present.		
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: MUSC105		
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		
MUSC 108 UNIVERSITY SINGERS	1	
Members enter by audition. University Singers is a chorus of sopranos and altos that performs its own concerts and may also perform with other choirs.		
RESTRICTIONS: May be repeated for credit		
MUSC 109 CHORAL UNION	1	
Members enter by audition. Choral Union is a chorus of 100+ voices that rehearses en masse on Monday nights. The Union performs large-scale choral works. Smaller sections perform independently as well.		
RESTRICTIONS: May be repeated for credit.		
MUSC 110 CHORALE	1	
Members enter by audition. Chorale is the university's most select chorus of mixed voices.		
RESTRICTIONS: May be repeated for credit.		
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		
MUSC 114 SYMPHONIC BAND	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 CALLIOPE concert.		
RESTRICTIONS: Requires audition. May be repeated for credit.		
MUSC 115 WIND ENSEMBLE: ORCHESTRAL WINDS AND PERCUSSION	1	
The Wind Ensemble is 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: The Wind Ensemble requires audition and may be repeated for credit.		
MUSC 116 JAZZ ENSEMBLE	1	
Study and performance of the diverse styles characteristic of the medium.		
RESTRICTIONS: Requires audition. May be repeated for credit.		
MUSC 117 UNIVERSITY ORCHESTRA	1	
Rehearsal and performance of representative works for orchestra		
RESTRICTIONS: Requires audition. May be repeated for credit.		
MUSC 118 PERCUSSION ENSEMBLE	1	
Study and performance of works for percussion instruments.		
RESTRICTIONS: Requires audition. May be repeated for credit.		
MUSC 121 GAMELAN ENSEMBLE	1	
Gamelan is the largest instrumental ensemble from Southeast Asia, and is considered the "orchestra of the Eastern world." This is a performing ensemble, dealing with traditional and contemporary Japanese and Balinese literature.		
RESTRICTIONS: Open to anyone without prior musical experience. May be repeated for credit.		
MUSC 125 COLLEGIUM MUSICUM	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		
MUSC 161 PRIVATE STUDY	1-8	
The student adds to the course title the branch of study elected: piano, organ, voice or an orchestral instrument.		
RESTRICTIONS: Contact department to register for correct number of credit hours. Requires audition.		

- MUSC 162 PRIVATE STUDY** 1-8
The student adds to the course title the branch of study elected: piano, organ, voice or an orchestral instrument.
PREREQ: MUSC161.
RESTRICTIONS: Contact department to register for correct number of credit hours.
- MUSC 171 DICTION: ENGLISH AND ITALIAN** 1
Study of pronunciation rules for singing in English and Italian. Includes practicum.
COREQ: Enrollment in applied study
- MUSC 173 CLASS VOICE** 1
Fundamentals and techniques of singing.
RESTRICTIONS: For nonmajors.
- MUSC 174 CLASS VOICE: BEGINNING** 1
Fundamentals of singing for the nonvocal music major. Study of basic technique, repertoire and function of vocal mechanism.
RESTRICTIONS: Requires permission of instructor for nonmajors. Requires one semester of University vocal experience.
- MUSC 175 CLASS PIANO: ELEMENTARY I** 1
Beginning piano primarily for the vocal or instrumental music major. Basic techniques, reading, transposition and playing by ear.
PREREQ: MUSC105 or corequisite of MUSC195. Preference for enrollment given to music majors.
RESTRICTIONS: None
- MUSC 176 CLASS PIANO: ELEMENTARY II** 1
A continuation of MUSC175. Scale and arpeggio playing, keyboard harmony, repertoire of pieces appropriate to technical ability.
PREREQ: MUSC175 and MUSC195
- MUSC 177 CLASS GUITAR I** 1
Introduction to the fundamentals of guitar technique and note reading for non-music majors. Topics include guitar history, repertoire, scales and exercises with an emphasis on classical as well as folk music. Music Education majors may also find this course particularly useful for classroom teaching.
- MUSC 178 CLASS GUITAR II** 1
A continuation of Class Guitar I with a stronger emphasis on ensemble playing and development of a repertoire.
PREREQ: MUSC177.
- MUSC 179 ORGAN CLASS** 1
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 APPLIED JAZZ STYLES/TECHNIQUES I** 2
Private studio instruction covering techniques and interpretation used in jazz performance. Examines a cross-section of styles and repertoire.
RESTRICTIONS: Requires audition.
- MUSC 185 EAR TRAINING AND SIGHT SINGING I** 2
Techniques of sight singing and music reading skills. Development of ability in the aural recognition of melody, harmony and rhythm.
COREQ: MUSC195
RESTRICTIONS: Requires permission of instructor
- MUSC 186 EAR TRAINING AND SIGHT SINGING II** 2
Techniques of sight singing and music reading skills. Development of ability in the aural recognition of melody, harmony and rhythm.
PREREQ: MUSC185 and MUSC195
COREQ: MUSC196.
- MUSC 193 SIGHT READING AT THE KEYBOARD I** 1
Techniques for improving coordination and musical comprehension when playing from sight at the keyboard.
RESTRICTIONS: For keyboard majors.
- MUSC 194 SIGHT READING AT THE KEYBOARD II** 1
Continuation of MUSC193.
PREREQ: MUSC193.
- MUSC 195 HARMONY I** 3
Review of music fundamentals. Diatonic harmony including part-writing with keyboard application. Chord structures and functional relationships. Basic melodic and contrapuntal compositional techniques. Writing, playing and analysis.
COREQ: MUSC185.
- MUSC 196 HARMONY II** 3
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
COREQ: MUSC186
- MUSC 197 JAZZ HARMONY** 3
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.
- MUSC 198 SEMINAR IN MUSIC COMPOSITION** 1
An exploration of contemporary classical music and ethnic musics, score and part preparation, practical steps towards mounting composition performances, notational computer software, career opportunities, PR and business-related skills and publishing.
RESTRICTIONS: Open only to Music Theory/Composition majors.
- MUSC 199 SEMINAR IN MUSIC COMPOSITION** 1
An exploration of contemporary classical music and ethnic musics, score and part preparation, practical steps towards mounting composition performances, notational computer software, career opportunities, PR and business-related skills and publishing.
PREREQ: Open only to Music Theory/Composition majors.
- MUSC 205 MUSIC OF THE NON-WESTERN WORLD** 3
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.
PREREQ: MUSC105
- MUSC 206 MUSIC OF CHINA, KOREA AND JAPAN** 3
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** 3
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.
PREREQ: MUSC105
- MUSC 208 HISTORY OF THE AMERICAN MUSICAL THEATRE** 3
The 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 in class and compared to a series of criteria found in successful modern shows. Comparison of older and current works. May be cross-listed with THEA208.
- MUSC 209 HISTORY OF SPANISH MUSIC** 3
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** 3
Chronological study of music of Britain with emphasis on English music from 1485 to present. Explores 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** 3
Survey of selected works in music history with emphasis on selected basic terminology, forms and style changes, through score reading and listening.
PREREQ: MUSC195
- MUSC 212 HISTORY OF LITURGY AND HYMNS** 3
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 214 STRINGED INSTRUMENTS CLASS: VIOLIN, VIOLA, CELLO, BASS** 1
Development of performing and teaching skills.
RESTRICTIONS: Open to only to students whose major requires this course.

MUSIC

- MUSC 215 HIGH BRASS INSTRUMENTS CLASS** 1
Development of performing and teaching skills.
RESTRICTIONS: MUSC215 and MUSC216 to be taken consecutively in one academic year. Open only to students whose major requires this course.
- MUSC 216 LOW BRASS INSTRUMENTS CLASS** 1
Development of performing and teaching skills.
RESTRICTIONS: MUSC215 and MUSC216 to be taken consecutively in one academic year. Open only to students whose major requires this course
- MUSC 217 WOODWIND INSTRUMENTS CLASS I** 1
Development of performing and teaching skills
RESTRICTIONS: MUSC217 and MUSC218 to be taken consecutively in one academic year. Open only to students whose major requires this course.
- MUSC 218 WOODWIND INSTRUMENTS CLASS II** 1
Development of performing and teaching skills.
RESTRICTIONS: MUSC217 and MUSC218 to be taken consecutively in one academic year. Open only to students whose major requires this course.
- MUSC 219 PERCUSSION INSTRUMENTS** 1
Development of performing and teaching skills.
RESTRICTIONS: Open only to students whose major requires this course
- MUSC 241 ACCOMPANYING CHAMBER MUSIC: PIANO** 1
Accompanying vocalists and instrumentalists in the performance of chamber music with keyboard.
PREREQ: Sight-Reading Placement Test
RESTRICTIONS: First course of a six-semester sequence. Requires permission of instructor.
- MUSC 242 ACCOMPANYING CHAMBER MUSIC: PIANO** 1
Accompanying vocalists and instrumentalists in the performance of chamber music with keyboard.
PREREQ: MUSC241
RESTRICTIONS: Requires permission of instructor.
- MUSC 261 PRIVATE STUDY** 1-8
The student adds to the course title the branch of study elected: piano, organ, voice or an orchestral instrument. Includes a one-contact-hour studio class.
PREREQ: MUSC162
RESTRICTIONS: Contact department to register for correct number of credit hours.
- MUSC 262 PRIVATE STUDY** 1-8
The student adds to the course title the branch of study elected: piano, organ, voice or an orchestral instrument. Includes a one-contact-hour studio class.
PREREQ: MUSC261
RESTRICTIONS: Contact department to register for correct number of credit hours.
- MUSC 271 DICTION: GERMAN** 1
A study of pronunciation rules for singing in German. Includes practicum.
COREQ: Enrollment in applied study.
- MUSC 272 DICTION: FRENCH** 1
A study of pronunciation rules for singing in French. Includes practicum
COREQ: Enrollment in applied study.
- MUSC 275 CLASS PIANO: INTERMEDIATE I** 1
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.
- MUSC 276 CLASS PIANO: INTERMEDIATE II** 1
A continuation of MUSC275.
PREREQ: MUSC275.
- MUSC 279 INTRODUCTION TO THE ORGAN** 2
Designed to provide information about the organ: its history, use and literature as well as tonal and mechanical aspects of its design.
- MUSC 281 APPLIED JAZZ STYLES/TECHNIQUES II** 2
Private studio instruction covering techniques and interpretation used in jazz performance. Examines a cross-section of styles and repertoire.
PREREQ: MUSC181.
RESTRICTIONS: Requires audition.
- MUSC 285 ADVANCED EAR TRAINING AND SIGHT SINGING I** 2
Continuation of MUSC185 and MUSC186
PREREQ: MUSC186 and MUSC196
COREQ: MUSC295.
- MUSC 286 ADVANCED EAR TRAINING AND SIGHT SINGING II** 2
Continuation of MUSC185, MUSC186 and MUSC285.
PREREQ: MUSC285 and MUSC295
COREQ: MUSC296.
- MUSC 287 MUSIC TECHNOLOGY I** 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.
- 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.
- MUSC 293 JAZZ IMPROVISATION I** 3
A comprehensive study of jazz improvisation vocabulary and techniques which will result in the student being able to improvise in a stylistically acceptable manner over a given set of chord progressions.
PREREQ: MUSC197.
- MUSC 294 JAZZ IMPROVISATION II** 3
An advanced study of jazz improvisation vocabulary and techniques which will result in the student being able to improvise in a stylistically acceptable manner.
PREREQ: MUSC293
- 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
COREQ: MUSC286.
- 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
COREQ: MUSC286.
- MUSC 298 SEMINAR IN MUSIC COMPOSITION** 1
An exploration of contemporary classical music and ethnic musics, score and part preparation, practical steps towards mounting composition performances, notational computer software, career opportunities, PR and business-related skills, and publishing
RESTRICTIONS: Open only to Music Theory/Composition majors.
- MUSC 299 SEMINAR IN MUSIC COMPOSITION** 1
An exploration of contemporary classical music and ethnic musics, score and part preparation, practical steps towards mounting composition performances, notational computer software, career opportunities, PR and business-related skills, and publishing
RESTRICTIONS: Open only to Music Theory/Composition majors.
- MUSC 301 JUNIOR RECITAL** 0 PF
A 30-minute public recital.
RESTRICTIONS: Requires Junior status
- 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.
PREREQ: MUSC101 or permission of instructor.
- MUSC 303 CHAMBER MUSIC LITERATURE** 3
Chamber music written for various combinations from the Baroque period to the present
PREREQ: MUSC211, or MUSC101 and MUSC102.
- MUSC 305 THE SYMPHONY** 3
The development of the symphony from the early 18th century to the present.
PREREQ: MUSC211 or MUSC101.

- 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 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 or MUSC101
- 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
- MUSC 313 MUSIC HISTORY: 1825 TO THE PRESENT** 3
The Romantic era, Impressionism and the 20th century. Musical thought and style from 1825 to the present
PREREQ: MUSC211 or MUSC101
- MUSC 321 ENSEMBLE: INSTRUMENTAL, PIANO, OR VOCAL** 1
Performance of chamber literature for instrument, piano or voice.
RESTRICTIONS: May be repeated for credit.
- MUSC 327 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: Open to Juniors and Seniors
- 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
- MUSC 331 ORCHESTRATION** 2
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
- MUSC 335 BASIC CONDUCTING** 2
The principles of conducting and score reading.
PREREQ: MUSC286 and MUSC296
- 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 341 ACCOMPANYING CHAMBER MUSIC: PIANO** 1
Accompanying vocalists and instrumentalists and in the performance of chamber music with keyboard.
PREREQ: MUSC242
- MUSC 342 ACCOMPANYING CHAMBER MUSIC: PIANO** 1
Accompanying vocalists and instrumentalists and in the performance of chamber music with keyboard
PREREQ: MUSC341
- 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. Comparison of older and current works. May be cross-listed with THEA345.
- MUSC 361 PRIVATE STUDY** 1-8
The student adds to course title the branch of study elected: piano, organ, voice or an orchestral instrument. Includes a one-contact-hour studio class.
PREREQ: MUSC262.
RESTRICTIONS: Contact department to register for correct number of credit hours.
- MUSC 362 PRIVATE STUDY** 1-8
The student adds to course title the branch of study elected: piano, organ, voice or an orchestral instrument. Includes a one-contact-hour studio class.
PREREQ: MUSC361.
RESTRICTIONS: Contact department to register for correct number of credit hours.
- MUSC 363 KEYBOARD LITERATURE I** 3
Style, structure and technical performance of keyboard music from the 17th century to the present.
PREREQ: MUSC262
- MUSC 364 KEYBOARD LITERATURE II** 3
Intensive study of one composer or style period from the keyboard repertoire. Content varies from year to year.
PREREQ: MUSC363.
- 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.
- MUSC 388 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 the influence of professional organizations. Emphasis on framework for interaction among writers, artists, performers, publishers, record companies, producers.
- 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
See ARSC390 for course description. May be cross-listed with ENGL391.
- MUSC 392 CONTRAPUNTAL WRITING** 2
Contrapuntal techniques with emphasis on 16th- and 18th-century styles and forms
PREREQ: MUSC295
- 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.
RESTRICTIONS: Requires two years of class or private piano.
- MUSC 394 KEYBOARD HARMONY II** 2
An advanced practical course for the development of facility in applying knowledge of harmony to the keyboard.
PREREQ: MUSC393
- MUSC 395 FORM ANALYSIS** 3
Structure of homophonic and polyphonic music representing different periods of musical history
PREREQ: MUSC296.
- MUSC 397 CONTEMPORARY HARMONY** 3
Styles, harmonic principles and techniques in 20th century music
PREREQ: MUSC296
- 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
RESTRICTIONS: Requires permission of instructor.
- MUSC 401 SENIOR RECITAL** 0 PF
A 60-minute public recital.
RESTRICTIONS: Requires Senior status.
- MUSC 407 CONTEMPORARY MUSIC LITERATURE** 3
Analysis of styles and techniques of contemporary composers beginning with compositions of the late 1950s
PREREQ: MUSC313 or permission of instructor.
- MUSC 420 ADVANCED COMPOSITION** 3
Creative writing in the vocal and instrumental media with individual and group criticism.
PREREQ: MUSC397.
RESTRICTIONS: May be repeated for up to nine credit hours

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: MUSC485		
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 Faure, Debussy, Duparc and Poulenc. RESTRICTIONS: Requires Junior or Senior status.		
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.		
MUSC 441 ACCOMPANYING CHAMBER MUSIC: PIANO	1	
Accompanying vocalists and instrumentalists and in the performance of chamber music with keyboard PREREQ: MUSC342.		
MUSC 442 ACCOMPANYING CHAMBER MUSIC: PIANO	1	
Accompanying vocalists and instrumentalists and in the performance of chamber music with keyboard PREREQ: MUSC441		
MUSC 443 CHAMBER MUSIC PERFORMANCE	1	
Survey of chamber music literature through performance. Emphasis is placed on the development of 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. RESTRICTIONS: Requires permission of instructor.		
MUSC 461 PRIVATE STUDY	1-8	
The student adds to course title the branch of study elected: piano, organ, voice or an orchestral instrument. Includes a one-contact-hour studio class PREREQ: MUSC362. RESTRICTIONS: Contact department to register for correct number of credit hours.		
MUSC 462 PRIVATE STUDY	1-8	
The student adds to course title the branch of study elected: piano, organ, voice or an orchestral instrument. Includes a one-contact-hour studio class. PREREQ: MUSC461 RESTRICTIONS: Contact department to register for correct number of credit hours.		
MUSC 464 INTERNSHIP	1-3	
Students are placed with performing arts organizations or music businesses both within and outside the state. Requires participation in Careers Colloquium, an informal series of lectures/roundtable discussions with guests currently employed in the music industry or with performing arts organizations. RESTRICTIONS: Open to music management studies minors only.		
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.		
MUSC 485 PEDAGOGY OF THEORY	3	
Materials, organization, techniques and problems of teaching high school and basic college theory courses. Attention to sight singing, ear training, keyboard and form and analysis materials. Observation and teaching of theory courses at the Freshman and Sophomore levels. PREREQ: MUSC286 and MUSC296		
MUSC 489 OPERA WORKSHOP	1-3	
Dramatic and musical preparation of operatic roles through the production of a complete opera/operaetta. RESTRICTIONS: Admission by audition, with permission of private instructor, and preference given to vocal performance majors.		
MUSC 561 ADVANCED PRIVATE STUDY	1-4	
Advanced instruction in voice or instrument. The student adds to course title the branch of study elected: piano, organ, voice, or an orchestral instrument, e.g., Private Study (Piano). PREREQ: MUSC462.		
MUSC 601 MASTER'S RECITAL	2	PF
A sixty-minute public recital PREREQ: MUSC662 COREQ: MUSC662		
MUSC 603 CHAMBER MUSIC LITERATURE	3	
Survey of chamber music literature from the 17th century to the present. 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.		
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 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. RESTRICTIONS: Requires satisfactory score on music history graduate placement exam.		
MUSC 620 LARGE ENSEMBLE	1	
Participation as a performer in a large ensemble. RESTRICTIONS: Entry audition required.		
MUSC 621 CHAMBER ENSEMBLE	1	
Participation as a performer in a chamber ensemble. RESTRICTIONS: 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. RESTRICTIONS: Requires permission of instructor.		
MUSC 637 ADVANCED INSTRUMENTAL CONDUCTING	3	
Advanced conducting techniques for directors of instrumental performing groups. RESTRICTIONS: Requires permission of instructor		
MUSC 638 LARGE ENSEMBLE PRACTICUM	1	
Participation in a large ensemble and seminar with ensemble director. RESTRICTIONS: Requires permission of instructor.		
MUSC 640 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 RESTRICTIONS: 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	1-4	
Advanced instruction in voice or instrument. The student adds to course title the branch of study elected: piano, organ, voice or an orchestral instrument, e.g., Private Study (Piano) RESTRICTIONS: Requires audition.		
MUSC 662 ADVANCED PRIVATE STUDY	1-4	
Advanced instruction in voice or instrument. The student adds to course title the branch of study elected: piano, organ, voice or an orchestral instrument, e.g., Private Study (Piano). PREREQ: MUSC661.		
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. RESTRICTIONS: Requires permission of instructor.		
MUSC 676 SEMINAR IN MUSIC EDUCATION	3	
Advanced topics in music education. RESTRICTIONS: 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. RESTRICTIONS: 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.
RESTRICTIONS: 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 695 ADVANCED ANALYTICAL TECHNIQUES** 3
Examination of structural, melodic, rhythmic, harmonic and textural aspects of selected music literature and their significance in artistic performance.
RESTRICTIONS: Requires satisfactory score on music theory graduate placement exam
- MUSC 869 MASTER'S THESIS** 1-6

NUTRITION AND DIETETICS

- NTDT 103 INTRODUCTION TO NUTRITION PROFESSIONS** 1 PF
Career opportunities in dietetics and nutrition. Provides information about undergraduate programs and the competencies required of dietitians and nutritional scientists. Introduces opportunities for undergraduate research. Introduction to concepts of a profession and relevant professional organizations.
RESTRICTIONS: Open to Freshmen and Sophomores.
- NTDT 200 NUTRITION CONCEPTS** 3
Functions and sources of nutrients, dietary adequacy, energy balance and metabolism with emphasis on health promotion. Includes weight control, evaluation of popular diets, vegetarianism, eating disorders, alcohol, other current issues and concerns in nutrition.
- NTDT 201 FOOD CONCEPTS** 3
Food selection and preparation as related to the chemical and physical properties of food. Includes composition and structure of foods, functions of ingredients and methods to achieve desirable sensory and nutritional attributes of foods.
RESTRICTIONS: Open to APN, DIET, NS and IST majors and minors only
- NTDT 222 NUTRITION CONTROVERSIES** 1
Explores topical issues in nutrition via discussion format
COREQ: NTDT200
- NTDT 240 INTRODUCTION TO CLINICAL DIETETICS** 3
Orientation to clinical dietetics; basic skills required for nutritional care; nutritional assessment, dietary counseling, clinical simulations, nutritional care plans and composition of basic therapeutic diets.
PREREQ: NTDT200
- NTDT 255 MULTICULTURAL FOOD HABITS** 3
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.
- NTDT 256 MULTICULTURAL FOODS LABORATORY** 1
Sampling of foods of diverse cultural groups utilizing demonstrations by restaurateurs and individuals as well as class preparation. Field trips to markets and ethnic food stores.
COREQ: NTDT255
- NTDT 305 NUTRITION IN THE LIFESPAN** 3
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** 3
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** 3
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** 3
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 325 LABORATORY IN QUANTITY FOOD PRODUCTION AND SERVICE** 1
Laboratory experience in quantity food production and delivery systems with emphasis on equipment, principles of safe food handling, quality standards and controls and menu planning
COREQ: NTDT321.
- NTDT 326 ONSITE FOOD PRODUCTION** 3
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** 1
Development of quantity food production kitchen design. Considerations include material flow, equipment requirements, functional areas, safety and sanitation, and energy and water resources.
PREREQ: NTDT325
COREQ: NTDT321.
- NTDT 330 NUTRITION COUNSELING** 3
Theories, skills and techniques of nutrition interviewing and counseling applied to changing food behaviors.
PREREQ: NTDT200 and NTDT201
- NTDT 350 NUTRITION AND OLDER ADULTS** 3
Discussion of the physiology of aging on fundamental nutrition processes, food and nutrient requirements and intakes, assessment of nutritional status, and nutrition related problems of older adults.
PREREQ: NTDT200 and BISC106 or BISC276.
- NTDT 366 INDEPENDENT STUDY** 1-6
- NTDT 400 MACRONUTRIENTS** 3
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** 3
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 qly to Senior dietetics majors.
- NTDT 420 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; and neonatal nutritional needs and current infant feeding practices.
PREREQ: NTDT400 and BISC276.
- NTDT 421 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: NTDT400 and a course in statistics.
- NTDT 430 NUTRITION CLINIC PRACTICUM** 1-3
Experience in on-going 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** 3
Preparation of upper division students to become peer mentors for an introductory nutrition course. Internet discussion forums used to increase interaction in a large classroom setting. Offers pre-professional practice opportunities for nutrition majors.
PREREQ: NTDT400.
- NTDT 440 NUTRITION AND DISEASE** 3
Examination of the metabolic and physiological aberrations in selected conditions and implications for medical nutrition therapy
PREREQ: NTDT400 and BISC106 or BISC276.

NUTRITION AND DIETETICS

- NTDT 445 TEACHING METHODS: NUTRITION/FOODS 3**
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 3**
Roles and responsibilities of clinical dietitians. Healthcare team concepts, regulations and computer applications. Skills required for patients' nutritional management. Diet progressions, dysphasia, adaptive feeding, food allergies/intolerance. Pathophysiology, diet/disease relationships and diet therapy for obesity diseases, diabetes and cardiovascular disease.
PREREQ: NTDT400, BISC276
COREQ: NTDT421
- NTDT 451 MEDICAL NUTRITION THERAPY II 3**
Continuation of Medical Nutrition Therapy I. Pathophysiology, diet and disease relationships and diet therapy for diseases: renal, gastrointestinal, cancer, AIDS, inborn errors of metabolism. Critical care nutrition, institutional and home care, nutritional management of physiological stress and trauma
PREREQ: NTDT450
- NTDT 452 TOPICS IN NUTRITION AND DIETETICS 1-3**
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 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. Means of affecting change in nutrition knowledge and practice
PREREQ: NTDT400 and NTDT321
- NTDT 464 COMMUNITY NUTRITION FIELD EXPERIENCE 2**
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: NTDT322 and NTDT440.
COREQ: NTDT460
- NTDT 466 INDEPENDENT STUDY 1-6**
- 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: NTDT651
RESTRICTIONS: Open to dietetic internship students only.
- NTDT 610 FUNDAMENTALS OF NUTRITION AND METABOLISM 3**
Review of metabolic processes related to nutrition and current research related to macronutrient and micronutrient functions
RESTRICTIONS: Undergraduate preparation in biochemistry, physiology and basic nutrition
- 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 NUTRITION RESEARCH METHODS 2**
Discussion and experience with selected methods and techniques in nutrition research
PREREQ: Upper-division course work in nutrition, biochemistry and physiology
- NTDT 624 MONOGASTRIC NUTRITION 3**
See ANSC624 for course description
- 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 NUTRITION EDUCATION 3**
Identification of objectives for nutrition education; selection and use of methods, materials and resources for different age levels; and integration of nutrition into the total health and consumer aspects of school, nonschool and adult programs.
PREREQ: NTDT200
- NTDT 650 CURRENT PERSPECTIVE 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 influencing ethical, legal and professional responsibilities of dietitians
- NTDT 651 CURRENT PERSPECTIVES IN DIETICS 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 868 RESEARCH 1-6**
- NTDT 869 MASTER'S THESIS 1-6**

NURSING

- NURS 100 NEW STUDENT CONNECTIONS** 1 PF
Assists new students in utilizing university resources, student services and technology. Interdisciplinary approach which promotes study habits and professionalism within the healthcare professions and introduces students to the roles of various healthcare professionals.
- NURS 101 HUMAN ANATOMY** 2
Introduction to the study of human anatomy which provides a foundation for the future study of human physiology and other related courses. Includes a clinically relevant, fundamental overview of the human body using a "systems" approach.
RESTRICTIONS: Open to nursing majors only.
- NURS 205 SOCIETAL CONTEXT OF NURSING** 3
Introduces conceptual frameworks for nursing practice within a pluralistic society. Utilizes historical perspective to examine the current status of nursing within the healthcare system. Discusses importance of professionalism, including ethical and legal responsibilities.
PREREQ: BISC208, CHEM105, CHEM106, ENGL110, STAT200 and SOCI200-level or above
COREQ: NURS215
RESTRICTIONS: Open to nursing majors only.
- NURS 212 PATHOPHYSIOLOGICAL CONCEPTS** 3
Application of sciences to maintenance of, and alterations in, homeostasis. Pathophysiological concepts relate to stress, inflammation, immunity, neoplasia, pain and alterations in fluid/electrolytes balance, blood flow and respiration. Exploration of disorders common throughout an individual's life span.
PREREQ: BISC208, BISC276, CHEM105, CHEM106, ENGL110, STAT200, and SOCI200-level or above.
COREQ: BISC300
RESTRICTIONS: Open to nursing majors only.
- NURS 215 BASIC NURSING PRACTICE SKILLS** 1
Introduces basic client care skills. Emphasis on the intellectual, interpersonal and psychomotor skills foundational to nursing practice.
PREREQ: BISC208, CHEM105, CHEM106, ENGL110, STAT200 and SOCI200-level or above.
COREQ: NURS205
RESTRICTIONS: Open to nursing majors only.
- NURS 220 CONCEPTS OF NURSING PRACTICE** 3
Introduction to the nursing profession which includes psychomotor, cognitive and affective skills integral to basic nursing practice. The nursing process, professional ethics and basic clinical skills are covered.
PREREQ: ENGL110.
COREQ: PSYC201 and HESC155
RESTRICTIONS: Open to nursing majors only.
- 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** 3
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 will be discussed as individuals, members of families, and as parts of cultural and global communities. Clinical experiences in the laboratory and healthcare facilities provide opportunities to practice physical and health assessment skills and teaching/health promotion techniques.
PREREQ: BISC207, CHEM105, CHEM106, NURS220 and a course in anatomy
COREQ: IFST201, NTDT200, NURS222 and NURS240
RESTRICTIONS: Open to nursing majors only.
- NURS 240 SCIENTIFIC BASIS OF NURSING** 5
Examines pathophysiological concepts and prototype diseases. Laboratory practicum to provide practice of psychomotor skills.
PREREQ: BISC207, CHEM105, CHEM106, NURS220 and a course in anatomy.
COREQ: BISC276, BISC300, NURS222 and NURS230.
RESTRICTIONS: Open to nursing majors only.
- NURS 306 DETERMINANTS OF WELLNESS** 5
Selected concepts/theories pertinent to promotion of optimal health of well clients of all ages from diverse sociocultural backgrounds within the context of family, community and healthcare system.
PREREQ: BISC276, BISC300, IFST201, NTDT200, NURS205, NURS215, NURS212, PSYC201 and STAT200
COREQ: NURS312, NURS314 and NURS315.
RESTRICTIONS: Open to nursing majors only.
- NURS 308 RESTORATIVE NURSING PRACTICE I** 4
Concepts/theories pertinent to promotion of optimal health of clients experiencing common and/or recurring health problems.
PREREQ: NURS306, NURS312, NURS314 and NURS315.
COREQ: NURS317; NURS318 or NURS319; and NURS332
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, NTDT200, NURS205, NURS215, NURS212, PSYC201 and STAT200.
COREQ: NURS306, NURS314 and NURS315.
RESTRICTIONS: Open to nursing majors only. Nursing majors must take three credits. BRN majors must take four credits.
- NURS 314 PSYCHOPATHOLOGY** 2-3
Delineates psychopathological processes across the life span. Emphasis on the etiology, manifestations and treatment options of selected psychopathological processes. Addresses current trends and issues in the mental health field.
PREREQ: BISC276, BISC300, IFST201, NTDT200, NURS205, NURS215, NURS212, PSYC201 and STAT200.
COREQ: NURS306, NURS312 and NURS315.
RESTRICTIONS: BRN major - Admission to BRN Program. Open to nursing majors only. Nursing majors must take two credit hours; BRN majors must take three credit hours.
- NURS 315 PRACTICUM I** 4
Experiences for incorporation and application of selected concepts/theories underlying nursing care for well clients of all ages, from diverse sociocultural backgrounds, within the context of family, community and healthcare systems. Comprises 112 clinical hours.
PREREQ: BISC276, BISC300, IFST201, NTDT200, NURS205, NURS215, NURS212, PSYC201 and STAT200.
COREQ: NURS312, NURS314, and NURS306.
RESTRICTIONS: Open to nursing majors only.
- NURS 317 PRACTICUM II** 3
Experiences for incorporation and application of selected concepts/theories underlying nursing care that promotes optimal health of adult clients with common and/or recurring health problems. Emphasizes assessment and planning steps of nursing process. Comprises 84 clinical hours.
PREREQ: NURS306, NURS312, NURS314 and NURS315
COREQ: NURS308; NURS318 or NURS319; and NURS332
RESTRICTIONS: Open to nursing majors only.
- NURS 318 PRACTICUM III** 3
Experiences for incorporation and application of selected concepts/theories underlying nursing care that promotes optimal health of children with common and/or recurring health problems. Emphasizes assessment and planning steps of nursing process. Comprises 84 clinical hours.
PREREQ: NURS306, NURS312, NURS314 and NURS315.
COREQ: NURS308, NURS317 and NURS332
RESTRICTIONS: Open to nursing majors only.
- NURS 319 PRACTICUM IV** 3
Experiences for incorporation and application of selected concepts/theories underlying nursing care that promotes optimal health of adults with mental illness. Emphasizes assessment and planning steps of nursing process. Comprises 84 clinical hours.
PREREQ: NURS306, NURS312, NURS314 and NURS315.
COREQ: NURS308, NURS317 and NURS332
RESTRICTIONS: Open to nursing majors only.
- NURS 332 PHARMACOLOGICAL NURSING RESPONSIBILITY** 3
Uses the conceptual framework of human needs to focus on the therapeutic and adverse biological, psychological and social reactions to pharmacological agents; drug use and medication abuse; client teaching; pertinent laboratory tests; current research findings. Nursing responsibilities emphasized with the nursing process.
PREREQ: NURS306, NURS312, NURS314, and NURS315.
COREQ: NURS308; NURS317; NURS318 or NURS319.
RESTRICTIONS: Open to nursing majors only.

- NURS 340 CURRENT PERSPECTIVES IN NURSING 2**
 Introduces nursing theory and conceptual foundations for practice within a pluralistic society. Provides overview of principles of nursing education and practice at the baccalaureate level. Focuses on healthcare needs within diverse practice settings, emphasizing emerging legal and ethical responsibilities, economic and sociocultural influences.
 RESTRICTIONS: Admission to BRN program
- NURS 342 NURSING INFORMATICS 2**
 Addresses the current utilization of evolving technologies in nursing/client education, practice, administration and research
 RESTRICTIONS: Admission to BRN program.
- NURS 343 TRANSITION TO BACCALAUREATE NURSING 1**
 Addresses issues related to the socialization and transition to baccalaureate nursing education and practice. Complements content of NURS340 and NURS342. Incorporates the practical application of evolving technologies with emphasis on nursing/client education. Introduces University and BRN program resources.
 PREREQ: NURS340 and NURS342
- NURS 344 WELLNESS AND HEALTH ASSESSMENT 2**
 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 system. Includes key elements of a biopsychosociocultural health history and health assessment of individuals across the life course
 PREREQ: NURS343.
- NURS 352 NURSING CARE OF ADULTS I 2**
 Selected concepts and theories related to restoring and maintaining optimal health of patients experiencing common acute and/or chronic health problems.
 PREREQ: NURS220, NURS230, NURS240 and NURS222.
 COREQ: NURS353.
 RESTRICTIONS: Open to nursing majors only.
- NURS 353 CLINICAL APPLICATION OF ADULT NURSING CARE I 3**
 Clinical experiences in the hospital, community and laboratory which reinforce information presented in NURS352
 PREREQ: NURS222, NURS230 and NURS240.
 COREQ: NURS352.
 RESTRICTIONS: Open to nursing majors only.
- NURS 354 PSYCHOSOCIAL NURSING 2**
 Presents selected concepts and theories related to restoring and maintaining optimal health of patients experiencing psychopathology.
 PREREQ: NURS220, NURS222, NURS230 and NURS240.
 COREQ: NURS355.
 RESTRICTIONS: Open to nursing majors only.
- NURS 355 CLINICAL APPLICATIONS: PSYCHOSOCIAL NURSING 3**
 Application experiences in the hospital, community and laboratory which reinforce the information presented in NURS354
 PREREQ: NURS220, NURS222, NURS230 and NURS240
 COREQ: NURS354
 RESTRICTIONS: Open to nursing majors only.
- NURS 356 CHILDREN/FAMILIES NURSING CARE 2**
 Presents selected concepts and theories related to the nursing care of infants, children and adolescents and their families
 PREREQ: NURS222, NURS230 and NURS240.
 COREQ: NURS357
 RESTRICTIONS: Open to nursing majors only
- NURS 357 CLINICAL APPLICATION: CHILDREN AND FAMILIES NURSING CARE 3**
 Application experiences in the hospital, community and laboratory which reinforce information presented in NURS356
 PREREQ: NURS222, NURS230 and NURS240.
 COREQ: NURS356.
 RESTRICTIONS: Open to nursing majors only.
- NURS 358 CHILDBEARING FAMILY NURSING CARE 2**
 Presents selected concepts and theories related to the nursing care of the childbearing family.
 PREREQ: NURS222, NURS230 and NURS240.
 COREQ: NURS359.
 RESTRICTIONS: Open to nursing majors only.
- NURS 359 CLINICAL APPLICATION: CHILDBEARING FAMILY NURSING CARE 3**
 Application experiences in the hospital, community and laboratory which reinforce information presented in NURS358.
 PREREQ: NURS222, NURS240 and NURS230
 COREQ: NURS358.
 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: NURS220, NURS222, NURS230 and NURS240.
 COREQ: STAT200.
 RESTRICTIONS: Open to nursing majors only
- NURS 366 INDEPENDENT STUDY 1-6**
- NURS 405 INTRODUCTION TO NURSING RESEARCH 2-3**
 Introduction to nursing research methods basic to identification of researchable nursing problems and to evaluation of existing nursing research for consumership.
 PREREQ: Nursing major - NURS308, NURS317, NURS318 or NURS319, and NURS332 BRN major NURS441.
 COREQ: Nursing major - NURS408, NURS417, NURS418 or NURS419.
 RESTRICTIONS: Nursing majors must take three credit hours; BRN majors must take two credit hours. Open to nursing majors only.
- NURS 408 RESTORATIVE NURSING PRACTICE II 4**
 Concepts and theories pertinent to promotion of optimal health of clients with selected and less common health problems.
 PREREQ: NURS308, NURS317, NURS318 or NURS319 and NURS332
 COREQ: NURS417; NURS418 or NURS419; and NURS405.
 RESTRICTIONS: Open to nursing majors only
- NURS 409 PROFESSIONALISM IN NURSING PRACTICE 2**
 Concepts, theories and issues that influence nurses' legal, ethical and professional responsibilities to nursing and to the public
 PREREQ: NURS405; NURS408; NURS417; NURS418 or NURS419.
 COREQ: NURS420.
 RESTRICTIONS: Open to nursing majors only.
- NURS 410 THE HOSPITALIZED CHILD 3**
 See IFST410
 PREREQ: IFST221 or PSYC325
- 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.
 PREREQ: NURS352, NURS353, NURS354, NURS355, NURS356, NURS357, NURS358, NURS359 and NURS362. No prerequisites for BRN major.
 COREQ: NURS452, NURS453, NURS454 and NURS455.
 RESTRICTIONS: Open to nursing majors only. May be repeated for up to six credit hours.
- NURS 412 ISSUES IN ADULT HEALTH AND DEVELOPMENT 3**
 Multidisciplinary approach provides broad exposure to the aging process through classroom experiences and one-on-one interaction with older adults participating in an affiliated health promotion program. Emphasizes age-related physiological, psychological and social changes and variability in the aging process.
- NURS 417 PRACTICUM V 3**
 Experiences for incorporation and application of selected concepts and theories underlying nursing care that promotes optimal health for adult clients with less common health problems. Emphasizes implementation and evaluation steps of nursing process. Comprises 84 clinical hours.
 PREREQ: NURS308; NURS317; NURS318 or NURS319; and NURS332.
 COREQ: NURS408; NURS418 or NURS419; and NURS405
 RESTRICTIONS: Open to nursing majors only.
- NURS 418 PRACTICUM VI 3**
 Experiences for incorporation and application of selected concepts/theories underlying nursing care that promotes optimal health of children with common and/or recurring health problems. Emphasizes implementation and evaluation steps of nursing process. Comprises 84 clinical hours.
 PREREQ: NURS308; NURS317; NURS318 or NURS319; and NURS332
 COREQ: NURS408, NURS417 and NURS405.
 RESTRICTIONS: Open to nursing majors only.

NURS 419 PRACTICUM VII 3
 Experiences for incorporation and application of selected concepts and theories underlying nursing care that promotes optimal health of adults with mental illness. Emphasizes implementation and evaluation steps of nursing process. Comprises 84 clinical hours.
 PREREQ: NURS308, NURS317, NURS318 or NURS319, and NURS332.
 COREQ: NURS408, NURS417 and NURS405.
 RESTRICTIONS: Open to nursing majors only.

NURS 420 PRACTICUM VIII 6
 Selected experiences for the exploration and application of the basic concepts and theories of nursing leadership and management that facilitate transition to the professional role of the nurse. Comprises 168 clinical hours.
 PREREQ: NURS405, NURS408, NURS417, and NURS418 or NURS419
 COREQ: NURS409
 RESTRICTIONS: Open to nursing majors only.

NURS 441 LEARNING LABORATORY: HEALTH ASSESSMENT 1
 Demonstrates and integrates physical and psychological assessment skills on selected clients in the laboratory setting. Incorporates the practical application of evolving technologies in nursing practice and administration. Includes orientation to BRN Role Practicum.
 PREREQ: NURS344

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: NURS344.

NURS 443 BRN ROLE PRACTICUM 3
 A preceptored clinical experience focused upon the integration of concepts learned in baccalaureate nursing education.
 PREREQ: NURS441, NURS442.
 RESTRICTIONS: NURS445 and NURS456 required as prerequisites or corequisites

NURS 445 NURSING RESEARCH APPLICATIONS 1
 Demonstrates the practical application of technology in selected steps of the research process. Explores the process of research utilization as a mechanism to develop a research based nursing practice.
 PREREQ: NURS405, NURS441 and NURS442.
 RESTRICTIONS: NURS443 and NURS446 required as prerequisites or corequisites

NURS 446 LEADERSHIP AND ORGANIZATIONAL BEHAVIOR 2
 Introduces organizational theory and structure, nursing care delivery systems and components of leadership. Focuses on the role of the nurse-leader in organizing, teaching, decision making, evaluating, planning change and managing conflict.
 PREREQ: NURS441.

NURS 452 ADULT NURSING CARE II 3
 Presents selected concepts and theories for the interdisciplinary management of adult patients with critical and/or complex healthcare problems
 PREREQ: NURS220, NURS222, NURS230, NURS240, NURS352 and NURS353.
 COREQ: NURS453
 RESTRICTIONS: Open to nursing majors only.

NURS 453 CLINICAL APPLICATION OF ADULT NURSING CARE II 3
 Application experiences in the hospital, community and laboratory which reinforce information presented in NURS452
 PREREQ: NURS220, NURS222, NURS230, NURS240, NURS352 and NURS353
 COREQ: NURS452
 RESTRICTIONS: Open to nursing majors only.

NURS 454 NURSING OF POPULATIONS 2
 Presents selected concepts (community health promotion, epidemiology, coalition building, healthcare policy) and theories related to the nursing care of populations across the lifespan.
 PREREQ: NURS352, NURS353, NURS354, NURS355, NURS356, NURS357, NURS358, NURS359 and NURS362
 COREQ: NURS455
 RESTRICTIONS: Open to nursing majors only.

NURS 455 CLINICAL APPLICATION: NURSING OF POPULATIONS 4
 Application experiences in the community and laboratory which reinforce information presented in NURS454.
 PREREQ: NURS352, NURS353, NURS354, NURS355, NURS356, NURS357, NURS358, NURS359 and NURS362
 COREQ: NURS454
 RESTRICTIONS: Open to nursing majors only

NURS 466 INDEPENDENT STUDY 1-6

NURS 474 PROFESSIONAL PRACTICE IN HEALTHCARE 2
 Explores professional issues related to the current and future roles of healthcare professionals and serves as a capstone course
 PREREQ: NURS452, NURS453, NURS454 and NURS455.
 COREQ: NURS475
 RESTRICTIONS: Open to healthcare majors only.

NURS 475 SENIOR PRECEPTORSHIP 6
 Comprehensive application of concepts and skills learned throughout the nursing curriculum which facilitate the transition to the professional role of the nurse.
 PREREQ: NURS452, NURS453, NURS454 and NURS455.
 COREQ: NURS474.
 RESTRICTIONS: Open to nursing majors only.

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 611 MULTIDISCIPLINE CROSSCULTURAL HEALTHCARE 1-6
 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 in the host country.
 RESTRICTIONS: Open to Seniors and graduate students.

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

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 804 ADVANCED PRACTICE ROLES FOR HEALTHCARE PROVIDERS 3
 Focuses on roles and issues affecting healthcare providers engaged in advanced practice. Roles are analyzed in relation to current issues and concepts of advanced practice. May be cross-listed with HSAD804.
 RESTRICTIONS: Permission required from department

NURS 810 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 816 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.
 PREREQ: NURS820
 COREQ: NURS820
 RESTRICTIONS: Open to majors only. Permission required from department.

NURS 817 PRECEPTORSHIP I 3
 Focuses on clinical topics in primary care relevant to each practitioner concentration
 PREREQ: All required clinical courses except NURS827
 RESTRICTIONS: Open to nursing majors only. Permission of department required.

NURS 819 FINANCIAL MANAGEMENT IN HEALTH SERVICES ORGANIZATIONS 3
 Provides the basic principles and concepts of effective management of budgets for healthcare units. Includes analysis of the environment and departmental organization and their impact on healthcare. May be cross-listed with HSAD819.
 RESTRICTIONS: Permission of department required.

NURS 820 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 821 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 822 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 823 MANAGEMENT OF WOMEN'S HEALTHCARE 3**
 Focuses on gynecological and reproductive primary healthcare. Emphasizes management of gynecologic health needs and the normal reproductive cycle.
 PREREQ: NURS820 and NURS821.
 RESTRICTIONS: NURS804 and NURS822 required as prerequisites or corequisites
- NURS 824 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: NURS820 and NURS821
 RESTRICTIONS: NURS804 and NURS822 required as prerequisites or corequisites
- NURS 825 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: NURS820 and NURS821
 COREQ: NURS804 and NURS822
 RESTRICTIONS: NURS804 and NURS822 required as prerequisites or corequisites
- NURS 826 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: NURS820 and NURS821.
 COREQ: NURS804 and NURS822
 RESTRICTIONS: NURS804 and NURS822 required as prerequisites or corequisites.
- NURS 827 PRECEPTORSHIP II 3**
 Emphasizes clinical decision making in an interdisciplinary environment with the nurse practitioner as the principal provider of primary care.
 RESTRICTIONS: NURS817 required as either a prerequisite or corequisite
- NURS 828 NURSE PRACTITIONER SEMINAR 1**
 Emphasizes the role of the nurse practitioner in the current health care system. Issues such as marketing, practice acts, reimbursement, and prescriptive privileges are discussed.
 PREREQ: All required clinical courses except NURS827
- NURS 829 ADVANCED MANAGEMENT OF WOMEN'S HEALTHCARE 3**
 Focuses on the delivery of primary care to women with acute and chronic obstetric and gynecologic problems
 PREREQ: NURS823.
- NURS 830 ADVANCED MANAGEMENT OF CHILDREN AND ADOLESCENT HEALTHCARE 3**
 Focuses on the delivery of primary health care to specific populations. Emphasizes special problems of the neonate and high risk children and adolescents
 PREREQ: NURS824.
- NURS 831 COMPREHENSIVE ASSESSMENT OF OLDER PERSONS 3**
 Provides a conceptual foundation for geriatric/gerontological clinical nurse specialists and nurse practitioners. Involves assessing older adults and their families and assisting them with a continuum of health promotion, disease prevention and disease management care.
 RESTRICTIONS: NURS804 and NURS821 required as either prerequisites or corequisites.
- NURS 832 HEALTH PROMOTION AND DISEASE PREVENTION/MANAGEMENT FOR OLDER PERSONS 3-4**
 Builds on NURS831 by providing opportunities for students to gain knowledge and skills related to primary, secondary and tertiary prevention of disease and disabilities in older persons.
 PREREQ: NURS831
- NURS 836 HEALTH ADMINISTRATION THEORIES 3**
 Theories of administration, organization and management, their interaction with other health discipline theories and their influence on management of healthcare agencies includes the interaction of theories with attainment of institutional goals. May be cross-listed with HSAD836
 RESTRICTIONS: NURS804 required as prerequisite or corequisite
- NURS 837 HEALTH PLANNING STRATEGIES 3**
 Analyzes organizational systems and roles of managers and administrators. Students identify organizational needs, formulate goals and objectives appropriate to healthcare agencies and identify strategies appropriate to accomplishing goal attainment with ethical constraints of healthcare. May be cross-listed with HSAD837.
 RESTRICTIONS: NURS804 required as prerequisite or corequisite.
- NURS 838 HEALTH SERVICES EVALUATION 3**
 Emphasizes the role of managers and administrators in personnel development, promotion of research in clinical settings and development and implementation of quality improvement initiatives and their implications for healthcare. May be cross-listed with HSAD838.
 RESTRICTIONS: NURS804 required as prerequisite or corequisite.
- NURS 840 CARDIOPULMONARY NURSING I 3-4**
 Explores the scientific basis of prevention programs for cardiopulmonary problems as well as of therapy for newly diagnosed or acute problems. Emphasizes assessment and therapeutic intervention
 RESTRICTIONS: NURS804 and NURS821 required as prerequisites or corequisites.
- NURS 841 CARDIOPULMONARY NURSING II 3-4**
 Focuses on theoretical and clinical investigations of cardiopulmonary nursing problems requiring long-term care or follow-up of adult clients in a variety of community settings. Emphasizes assessment, health maintenance and rehabilitation
 PREREQ: NURS840.
- NURS 845 ONCOLOGY/IMMUNE DEFICIENCY NURSING I 3-4**
 Explores the scientific basis of prevention programs and of therapy for newly diagnosed or acute oncological/immune deficiency problems in adults. Emphasizes assessment and therapeutic intervention.
 RESTRICTIONS: NURS804 and NURS840 required as prerequisites or corequisites
- NURS 846 ONCOLOGY/IMMUNE DEFICIENCY NURSING II 3-4**
 Focuses on theoretical and clinical investigations of oncology/immune deficiency nursing problems requiring long-term care or follow-up of adult clients in a variety of community settings. Emphasizes assessment, health maintenance, home/hospice care and survivorship.
 PREREQ: NURS845
- NURS 850 NURSING OF WOMEN AND NEWBORNS I 3-4**
 Explores the biopsychosocial needs of women and newborns. Emphasizes interventions by the advanced practice nurse to maintain or restore steady state in low risk clients
 RESTRICTIONS: NURS804 and NURS821 required as prerequisites or corequisites.
- NURS 851 NURSING OF WOMEN AND NEWBORNS II 3-4**
 Explores the biopsychosocial needs of women and newborns. Emphasizes interventions by the advanced practice nurse to maintain or restore steady state in clients with highly complex healthcare needs
 PREREQ: NURS850.
- NURS 854 NURSING OF CHILDREN I 3-4**
 Explores the scientific basis for the routine healthcare guidance required by children and their families. Focuses primarily on the acutely ill child.
 RESTRICTIONS: NURS804 and NURS821 required as prerequisites or corequisites.
- NURS 855 NURSING OF CHILDREN II 3-4**
 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: NURS 854.
- NURS 860 CLINICAL NURSE SPECIALIST ADVANCED CLINICAL PRACTICE 2 PF**
 Provides the opportunity for students in the clinical nurse specialist concentration to enhance proficiency as clinical experts within their chosen specialty area.
 PREREQ: NURS831, NURS840, NURS845, NURS850, NURS854 or NURS871
 RESTRICTIONS: Open to majors only. Permission required from department.
- NURS 864 HEALTH SERVICES ADMINISTRATION PRACTICUM 1-3**
 In conjunction with his/her 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: NURS836, NURS837, or NURS838 is required as a corequisite or prerequisite.

NURS 868 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
 PREREQ: NURS810.
 COREQ: NURS864

NURS 869 MASTER'S THESIS 1-6

NURS 871 PSYCHIATRIC MENTAL HEALTH NURSING I 3

Emphasizes theory and research related to assessment, diagnosis, clinical management and psychopharmacologic intervention in mental illness. Didactic and clinical components allow for the development of subspecialization.
 PREREQ: EDUC813 or PSYC829.

NURS 872 PSYCHIATRIC MENTAL HEALTH NURSING II 3

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: NURS871

NURS 886 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 887 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 facilitators and barriers to research/research utilization, models of research utilization, and methods of quality management.
 PREREQ: NURS810.

RESTRICTIONS: Open to majors only. Permission required from department

NURS 890 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

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 Queueing 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 615 ADVANCED PRICES AND STATISTICS 3

See FREC615 for course description.

ORES 650 URBAN TRANSPORTATION SYSTEMS 3

See CIEG650 for course description

ORES 664 OPERATIONS RESEARCH INTERNSHIP 1-6 PF

Supervised, on-the-job experience, performing technical work for clients including OR applications, econometrics and statistical applications
 RESTRICTIONS: Requires permission of instructor.

ORES 690 OPERATIONS RESEARCH SEMINAR 0 PF

Seminars to be given by faculty and by visiting academia, industry and government persons. Graduate students provide topical insights in significant methods and results of current research in operations research.

ORES 801 OPERATIONS RESEARCH PRINCIPLES 3

Models and principles of basic interest to the theory and practice of operations research. Classic models of inventory and queueing theories, maintenance and replacement of equipment and government planning. Contemporary models from research literature of energy management, urban planning, artificial intelligence and flexible manufacturing systems.
 COREQ: MATH529, STAT601 or MATH630

ORES 802 OPERATIONS RESEARCH APPLICATIONS 3

Applications of models and principles of basic interest to the theory and practice of operations research. Classic models of inventory and queueing theories, maintenance and replacement of equipment and government planning. Contemporary models from research literature of energy management, urban planning, artificial intelligence and flexible manufacturing systems.
 COREQ: MATH529, STAT601 or MATH630.

ORES 806 RESEARCH TECHNIQUES AND PROCEDURES 3

See FREC806 for course description

ORES 810 INTERNATIONAL AGRICULTURAL TRADE SPECIAL TOPICS 3

See FREC810 for course description.

ORES 827 ADVANCED PRODUCTION ECONOMICS 3

See FREC827 for course description.

ORES 834 SEMINAR IN RESOURCE ECONOMICS 3

See FREC834 for course description.

ORES 868 RESEARCH 1-6

ORES 869 MASTER'S THESIS 1-6

ORES 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.

ORES 969 DOCTORAL DISSERTATION 1-12 PF

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.
 RESTRICTIONS: May be repeated for up to four credit hours.

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

PHILOSOPHY

- 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 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**
Rational decision-making using only elementary logic and high-school algebra. Decisions under ignorance: max-min rules for preference orderings. Decisions under risk: probability, utility, and the expected-utility rule. Game theory: equilibrium strategies; prisoner's dilemma. Social choices: voting paradoxes and Arrow's theorem.
- 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 229 THE NATURE OF SCIENCE 3**
See CSCC229 for course description.
- PHIL 241 ETHICAL ISSUES IN HEALTHCARE 3**
See CSCC241 for course description.
- 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**
See CSCC246 for course description.
- PHIL 250 ENGINEERING ETHICS 3**
Concrete ethical problems in engineering practice, both professional/entrepreneurial and in industrial research settings. Other topics include the social responsibilities of engineering societies. May be cross-listed with CSCC250.
- PHIL 301 ANCIENT 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**
Scepticism 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 BAMS307 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 cross-listed with JWST308.
PREREQ: Recommended: PHIL208/JWST208 Introduction to Jewish Philosophy.
- 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**
Ancient China: Confucianism, Taoism and the 100 Schools. The Buddhist conquest of China: Buddhism in China and Chinese Buddhism. Medieval Syntheses: Neo-Confucianism. The Response to the West: Maoism and Modern Confucianism.
- 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, Algazali, Averroes, Maimonides, Aquinas, and more. Topics include science and religion, divine command theory, talking about God, among others.
- 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 317 AMERICAN PHILOSOPHY 3**
Classical American philosophers, including Emerson, Thoreau, 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 322 EXISTENTIALISM 3**
Study of the origins and development of existential philosophy. Emphasis on the fundamental insight into the nature of man that separates the existentialists from the rest of the Western philosophical tradition. Sources include Pascal, Kierkegaard, Nietzsche and Sartre.
- PHIL 327 RACE, GENDER, SCIENCE 3**
Critical examination of scientific research on and arguments for and against the biological reality of race, sex and gender. Analyzes social constructivism about such categories as well as constructivist claims about the nature and objectivity of science. May be cross-listed with BAMS327 and/or WOMS327.
- PHIL 330 PHILOSOPHY OF MIND 3**
Coverage of central issues in the philosophy of mind including such topics as the relation between mind and body, the nature of thought, consciousness, perception, personal identity and the relation of cognitive psychology, neuroscience and computer science to the philosophy of mind. May be cross-listed with CGSC330.

- PHIL 340 CROSS CULTURAL ENVIRONMENTAL ETHICS 3**
Critical and global study of the ethics of human-environment relations as suggested by the science of ecology, Western philosophy, physical science, the world views of Judaism, Christianity, Islam, Hinduism, Buddhism, Taoism, Native American traditions, African traditions, ecofeminism and American law
- PHIL 341 ETHICS OF ENGINEERING PROFESSION 1**
Introduction to cases involving engineers' moral responsibilities; emphasis on making reasonable ethical choices. May be cross-listed with CSCC341.
- PHIL 344 SCIENCE AND RELIGION 3**
Examines the relationship between science and religion and focuses on: whether our current cosmological picture of the Big Bang allows for a Creator; the rationality of miracle reports; whether the scientific image of humanity is compatible with a religious worldview; the biological evolution/creation debate. May be cross-listed with SCEN344.
- PHIL 345 PHILOSOPHY OF HISTORY 3**
Nature and limits of our knowledge of the past, categories of explanation used by historians and the aim of historical inquiry. Speculation about the "meaning" of history and the structure of historical process.
- PHIL 366 INDEPENDENT STUDY 1-3**
- PHIL 389 TOPICS: WOMEN AND HEALTH ISSUES 3**
See WOMS 389 for course description.
- PHIL 390 HONORS COLLOQUIUM 3**
See ARSC390 for course description.
- PHIL 392 HONORS COLLOQUIUM 3**
Racism, sexism and speciesism. May be cross-listed with WOMS392.
- PHIL 444 MEDICAL ETHICS 3**
Seminar focuses on such topics as experimentation with human subjects, genetic engineering and the moral problems of health care. May be cross-listed with CSCC444.
RESTRICTIONS: For students of philosophy and health professions.
- PHIL 448 ENVIRONMENTAL ETHICS 3**
Ethical problems associated with environmental protection, local, national, and international. Relations to social and political movements. Seminar format.
- PHIL 454 PHILOSOPHY OF SOCIAL SCIENCE 3**
Critical examination of the central historical and contemporary questions about the concepts, methods, social structure and purposes of social science inquiry. May be cross-listed with ANTH465.
PREREQ: A theory of methodology course in a social science, or an epistemology or philosophy of science course.
- PHIL 463 ETHICAL THEORY 3**
Justification of ethical beliefs, alternative criteria of moral rightness and the meaning of moral concepts.
PREREQ: PHIL202 or PHIL203.
- PHIL 465 SENIOR SEMINAR 3**
Various authors and themes; e.g., Plato, Kant, epistemology, philosophy of mind
RESTRICTIONS: May be repeated once for credit when topics vary.
- PHIL 466 INDEPENDENT STUDY 1-3**
- PHIL 647 PHILOSOPHY OF TECHNOLOGY 3**
Philosophical reflections on working with tools in the broadest sense; definitions; studies of processes, products and uses; and ethical, cultural and political critiques. Seminar format. May be cross-listed with CSCC647, MALS647 and/or UAPP647.
- 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 MALS648 and/or UAPP648.
- 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. Course is 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 will 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, will concentrate 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 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 undeclared 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.

PHYSICS AND ASTRONOMY

- PHYS 207 FUNDAMENTALS OF PHYSICS I** 4
 First course in a sequence with PHYS208 and PHYS209 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 and PHYS209 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 209 FUNDAMENTALS OF PHYSICS III** 3
 Final course in a sequence with PHYS207 and PHYS208 that provides an introduction to physics for those in the physical sciences and engineering. Emphasis is on waves and quantum physics. Material on waves will include the harmonic oscillator, mechanical and electromagnetic waves, and the basics of Fourier series. The quantum physics material will include the Bohr model, diffraction and interference of electrons, photoelectric effect, blackbody radiation, Compton scattering, and the Schrodinger equation.
 PREREQ: PHYS208.
 COREQ: MATH243 suggested.
- 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 306 COMPUTATIONAL METHODS OF PHYSICS** 3
 Introduction to basic computational techniques in physics with application to a number of modern topics of current interest to physicists.
 PREREQ: MATH243.
 COREQ: MATH302.
 RESTRICTIONS: Knowledge of a programming language is essential.
- 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: MATH302.
- 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 366 INDEPENDENT STUDY** 1-3
- PHYS 419 CLASSICAL MECHANICS I** 3
 Intermediate course which 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 Schrodinger 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: PHYS209, MATH302 and MATH349.
- PHYS 449 INTRODUCTION TO RESEARCH** 1-6
 Undergraduate research on an assigned problem carried out under the supervision of the staff.
- PHYS 466 INDEPENDENT STUDY** 1-3
- PHYS 600 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 will be used during the course.
- PHYS 603 ELECTRICITY AND MAGNETISM I** 3
 First course in a two-part sequence with PHYS604 which provides a detailed treatment of electrostatics and magnetostatics at the intermediate level. Topics include Maxwell's equations in the static limit, multipole expansions, capacitors and electrostatic energy, analytical and numerical solutions to boundary-value problems, dielectric and magnetic media, and steady currents.
 PREREQ: PHYS202 or PHYS208; MATH302.
 COREQ: MATH503 suggested.
- PHYS 604 ELECTRICITY AND MAGNETISM II** 3
 Second course in a two-part sequence with PHYS603 which provides a detailed treatment of electromagnetic theory at the intermediate level. Maxwell's equations are developed and applied to electromagnetic waves in vacuum, material media, and wave guides. Includes application to electromagnetic radiation and special relativity.
 PREREQ: PHYS603.
- PHYS 607 METHODS OF MATHEMATICAL PHYSICS** 3
 Mathematical subjects commonly employed in physics with examples taken from physics. Linear vector spaces. Fourier series, orthogonal function expansions and eigenvalue problems.
 PREREQ: PHYS620 and MATH302.
- PHYS 608 METHODS OF MATHEMATICAL PHYSICS** 3
 Mathematical subjects commonly employed in physics with examples taken from physics. Complex variables and asymptotic analysis.
 PREREQ: PHYS607.
- PHYS 610 QUANTUM MECHANICS** 3
 Wave-particle duality. The Schrodinger equation. One-dimensional problems. Spherically symmetric potentials. Orbital angular momentum. Applications including hydrogenic atoms.
 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 PHYS209.
- 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 that are used extensively in quantum and statistical physics.
 PREREQ: MATH302 and PHYS419.
- PHYS 621 FUNDAMENTALS OF MODERN PHYSICS** 3
 Comprehensive and critical discussion of the phenomenological bases of atomic, electronic, and nuclear physics and their assimilation into a wave mechanical view of the microscopic world.
 PREREQ: MATH302.
- 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 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 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 or equivalent

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 and PHYS645 or equivalents

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 cross-listed with ELEG809.
PREREQ: PHYS604

PHYS 810 ELECTROMAGNETIC THEORY 3

Geometric optics limit of Maxwell's equations, Lienard-Wiechert fields, radiation fields, radiation damping, Wheeler-Feynman theory. May be cross-listed with ELEG810.
PREREQ: PHYS604 and PHYS809

PHYS 811 QUANTUM MECHANICS 3

Continuation of PHYS610. Approximation methods. Introductory scattering theory. Spin matrix formulation of quantum mechanics. Applications to atoms, molecules, nuclei and crystals.
PREREQ: PHYS607 and PHYS610
COREQ: PHYS608

PHYS 812 QUANTUM MECHANICS 3

Continuation of PHYS811. Approximation methods. Symmetries. Semi-classical radiation theory. Identical particles and many-particle wave functions. Collision theory. Applications to atoms, molecules, nuclei and crystals.
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 cross-listed 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 838 ADVANCED TREATMENT OF SELECTED TOPICS 3

Selected topics taken from the following list: 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 868 RESEARCH 1-9

PHYS 869 MASTER'S THESIS 1-6

PHYS 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.

PHYS 969 DOCTORAL DISSERTATION 1-12 PF

PHYSICAL THERAPY

PHYT 466 INDEPENDENT STUDY 1-6

PHYT 600 PHYSICAL THERAPY AS A PROFESSION 1

The ethics, licensure laws and practice of physical therapy will be explored. The Guide to Physical Therapy Practice will be introduced and the importance to effective practice discussed.
RESTRICTIONS: Open to physical therapy graduate students only. Requires permission of instructor.

PHYT 604 FUNCTIONAL ANATOMY AND BIOMECHANICS 4

Gives a description of normal and abnormal human movement. Emphasis on joint structure and function and gait using arthrokinematic and osteokinematic analysis. Evaluation procedures such as EMG, cinematography and computer simulations utilized.
PREREQ: PHYT622
RESTRICTIONS: Requires permission of instructor

PHYT 605 CLINICAL INTERNSHIP 1-9 PF

Full- or part-time clinical experiences at various health care facilities.
RESTRICTIONS: Open to MPT Program students only with completion of prior professional coursework.

PHYT 606 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 608 MUSCULOSKELETAL EVALUATION AND TREATMENT 4

In-depth analysis of evaluation and treatment strategies of spinal and extremity joints, muscles and connective tissue. Emphasizes research on the physiological basis of immobilization and remobilization. The diagnoses, prognosis, treatment, consultation and basis for referral of orthopedic and musculoskeletal disorders is examined.
PREREQ: PHYT604, PHYT622 and PHYT626.
RESTRICTIONS: Open to physical therapy graduate students only.

PHYT 609 NEUROPHYSIOLOGICAL EVALUATION AND TREATMENT 3

In-depth analysis of evaluation and treatment strategies of neurologically involved patients. Emphasizes research on the physiological basis of traction, mobilization and exercise.
PREREQ: All first-year MPT courses
RESTRICTIONS: Open to MPT Program students only

PHYT 610 PSYCHOSOCIAL ASPECTS OF DISABILITIES 2

Discusses the psychosocial characteristics of patient populations and therapists that impact on the rehabilitative process. Time management, death and dying, sexuality, love and hate and other topics are discussed.
PREREQ: All previous MPT courses

PHYT 611 CLINICAL MANAGEMENT PRACTICES 1

Discusses concepts of administration and issues in the management of hospital clinics, private practice and consultative ventures.
PREREQ: All first-year MPT courses.
RESTRICTIONS: Open to MPT Program students only.

PHYT 613 ADVANCED ORTHOPEDICS 3 PF

Discusses various schools of orthopedic intervention.
PREREQ: All previous MPT courses.
RESTRICTIONS: Open to MPT Program students only.

PHYT 614 SPORTS PHYSICAL THERAPY 3 PF

Analyzes the various competencies required in the practice of sports physical therapy. Clinical skill acquired.
PREREQ: All previous MPT courses.
RESTRICTIONS: Open to MPT Program students only

PHYSICAL THERAPY

- PHYT 615 ADVANCED NEUROTHERAPEUTICS 3**
Discusses an integration of the various neurodevelopmental approaches to the treatment of the neurological patient
PREREQ: All previous MPT courses.
RESTRICTIONS: Open to MPT Program students only.
- PHYT 616 PEDIATRICS SEMINAR 3 PF**
Discusses selected problems encountered by the pediatric population. Studies the evaluation, treatment and research basis of these problems.
RESTRICTIONS: Open to MPT Program students only.
- PHYT 617 PATIENT MANAGEMENT II 3**
Continuation of PHYT 602. Teaches the theory and skills necessary for the physical therapy management of patients commonly seen in rehabilitation settings
PREREQ: PHYT602
RESTRICTIONS: Open to MPT Program students only
- PHYT 618 LIFE SPAN DEVELOPMENT 3**
A study of human development and aging from birth through death. Emphasis on motor, sensory and cognitive functions and dysfunction.
PREREQ: All first-year MPT courses
- PHYT 619 ADVANCED SEMINAR 2**
Lectures pursue various topics in greater depth and develop advanced clinical skills. Examples include burn and wound care, hand therapy, geriatrics and ob-gyn. Individualized clinical experiences may be arranged.
PREREQ: All previous MPT courses
RESTRICTIONS: Open to MPT Program 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 621 PRACTICE CLINIC 3 PF**
Student participation in faculty practice clinic treating referrals for physical therapy. All students participate in the clinic at least one semester
RESTRICTIONS: Open to MPT Program students only.
- PHYT 622 CLINICAL GROSS ANATOMY 6**
Emphasis on structural and functional aspects of regions of body under study by means of human cadaver, bones, surface anatomy, lectures, computer technology and demonstrations. Clinical significance of anatomical structures is stressed.
RESTRICTIONS: Open to first-year physical therapy graduate students only
- PHYT 623 CLINICAL NEUROSCIENCES 4**
A study of the structure and function of the human nervous system with major emphasis on the cause-effect relationships between lesions and their symptoms. Emphasis on the neural mechanisms controlling movement.
PREREQ: PHYT622.
- 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 will be 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.
PREREQ: PHYT622.
- PHYT 630 HUMAN MOVEMENT CONTROL 3**
Examines theoretical, methodological and empirical issues required for an understanding of the control and coordination of human movement. Readings and group discussion of the implication of issues raised in the literature. Development of a proposal to study an aspect of motor behavior.
PREREQ: Neuroanatomy/neurophysiology or equivalent.
- 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.
PREREQ: PHYT622.
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
PREREQ: PHYT622
- 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.
PREREQ: PHYT631
- PHYT 634 PHYSICAL AGENTS AND ELECTROTHERAPY 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.
PREREQ: All previous physical therapy graduate courses.
- 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 across the lifespan. Implications for physical therapy are emphasized.
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.
PREREQ: All prior physical therapy graduate courses.
- 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.
PREREQ: 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 dysfunction. 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.
PREREQ: PHYT623.
RESTRICTIONS: Open to physical therapy graduate students only.
- PHYT 805 REHABILITATION 4**
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.
PREREQ: PHYT623 and PHYT631.
- PHYT 806 GERIATRICS 4**
The personal-social, biological, socioeconomic and physiological factors accompanying the aging process will be examined and their impact on physical therapy intervention explored.
PREREQ: All prior physical therapy graduate courses
RESTRICTIONS: Open to physical therapy graduate students only.
- PHYT 807 ADVANCED SEMINAR 5**
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.
PREREQ: All prior physical therapy graduate courses

PHYT 808 SPINE MANAGEMENT	4
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. PREREQ: PHYT604, PHYT608, PHYT622 and PHYT624.	
PHYT 809 PSYCHOSOCIAL ASPECTS OF HEALTH AND DISEASE	4
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. PREREQ: All prior physical therapy graduate courses.	
PHYT 810 CLINICAL MANAGEMENT	3
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 being used by clinicians. PREREQ: All prior physical therapy graduate courses RESTRICTIONS: Open to physical therapy graduate students only.	
PHYT 811 PEDIATRICS	4
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. PREREQ: All prior physical therapy graduate courses. RESTRICTIONS: Open to physical therapy graduate students only.	
PHYT 812 PEDIATRIC INTEGRATED CLINICAL EXPERIENCE	1
Mentored clinical experience in pediatric healthcare facilities. PREREQ: All prior physical therapy graduate courses	
PHYT 821 ORTHOPEDIC INTEGRATED CLINICAL EXPERIENCE	3
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. PREREQ: All previous physical therapy graduate courses. RESTRICTIONS: Open to physical therapy graduate students only.	
PHYT 822 GERIATRIC INTEGRATED CLINICAL EXPERIENCE	3
Student participation in local physical therapy settings evaluating and treating geriatric clients under the supervision of a licensed physical therapist. All students participate in this experience for one semester. PREREQ: All previous physical therapy graduate courses.	
PHYT 831 CLINICAL INTERNSHIP I: ACUTE CARE	3
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. PREREQ: All prior physical therapy graduate courses. RESTRICTIONS: Open to physical therapy graduate students only.	
PHYT 832 CLINICAL INTERNSHIP II: REHABILITATION	3
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, team conferences with related disciplines, and discharge planning. PREREQ: All prior physical therapy graduate courses. RESTRICTIONS: Open to physical therapy graduate students only.	
PHYT 833 CLINICAL INTERNSHIP III: ELECTIVE	3
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. PREREQ: All prior physical therapy graduate courses. RESTRICTIONS: Open to physical therapy graduate students only.	
PHYT 868 RESEARCH	1-9
RESTRICTIONS: Requires permission of instructor.	
PHYT 869 MASTER'S THESIS	1-6
PREREQ: All previous MPT courses. RESTRICTIONS: Requires permission of instructor.	

PLANT AND SOIL SCIENCES

PLSC 100 PLANTS AND HUMAN CULTURE	3
Historical survey of interrelationships between plants and diverse human cultures. Examines Asian, African, Mediterranean, North/South American peoples (ancient and modern) to provide a broad multicultural perspective and commentary on modern American values about plants and their environment.	
PLSC 101 BOTANY I	4
Introductory botany stressing fundamental concepts and processes in plants. Topics include cell structure and function, anatomy, genetics, reproduction, physiology, taxonomy, phylogeny and ecology.	
PLSC 105 INTRODUCTORY FORESTRY	3
Distribution, ecology, value, measurement and management of forest systems. PREREQ: PLSC101.	
PLSC 133 ORNAMENTAL HORTICULTURE	3
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.	
PLSC 140 PEOPLE AND PLANTS: FEAST OR FAMINE	3
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.	
PLSC 151 INTRODUCTION TO CROP SCIENCE	3
Plant structure and plant processes with practical application to the production and management of commercial crops. RESTRICTIONS: Credit not allowed if preceded by PLSC401	
PLSC 154 TOPICS IN PRODUCTION AND MANAGEMENT OF ORNAMENTAL PLANTS	1-6
Topics combine theory and practice in the areas of turf and ornamental horticulture. RESTRICTIONS: Not for major credit except as elective.	
PLSC 170 SOILS AND ENVIRONMENTAL QUALITY	3
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	
PLSC 171 NEW STUDENT COLLOQUIUM	1 PF
Focuses on academics, careers and resources as important components in achieving success in the plant and soil sciences. Practical skills, helpful in mastering the first year in the plant and soil sciences majors. RESTRICTIONS: Open to first year majors only.	
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	4
Fundamentals of soil including origin, composition and classification; physical, chemical and biological properties; significance of soil properties to use and management, and to soil-plant relationships. PREREQ: CHEM101.	
PLSC 211 HERBACEOUS LANDSCAPE PLANTS	3
Survey of herbaceous plants including annuals, perennials and bulbs; plant identification, culture, selection, design and maintenance 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 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 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 305	ENVIRONMENTAL SOIL MANAGEMENT	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 413	PRINCIPLES OF PLANT DISEASE CONTROL	3	Principles of plant disease control by exclusion, eradication and resistance. Plant protection with emphasis on fungicides, bacteriocides, and nematocides and their use. PREREQ: PLSC303.
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 414	PLANT CELL AND TISSUE CULTURE	4	Principles of culturing plants in vitro. Topics for both lecture and laboratory include cell suspensions, anther culture, embryo rescue, micropropagation and regeneration via organogenesis and embryogenesis PREREQ: PLSC101
PLSC 310	ANIMAL AND PLANT GENETICS LABORATORY	1	See ANSC310 for course description.	PLSC 416	PLANT VIROLOGY	4	Epidemiology, detection, identification and control of plant viruses and virus-like agents. PREREQ: PLSC303.
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 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 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 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. PREREQ: PLSC410 COREQ: PLSC410
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 422	PLANT PROPAGATION	3	Practical and physiological aspects of the propagation of economic plants including both sexual and asexual methods PREREQ: PLSC201.
PLSC 331	LANDSCAPE CONSTRUCTION SYSTEMS	4	Introduction to principles involved in contour grading, site drainage, lighting and irrigation design related to landscaping.	PLSC 429	INTRODUCTORY MYCOLOGY	4	A survey of the structure, classification and possible relationship of major groups of fungi with stress on representative organisms and a working knowledge of terminology. Practical laboratory experience in the culture and identification of fungi RESTRICTIONS: Requires permission of instructor.
PLSC 332	BASIC LANDSCAPE DESIGN	4	Application of design principles to actual field problems, drafting and presenting techniques PREREQ: PLSC212.	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, PLSC306.
PLSC 344	FOREST ECOLOGY	2	See ENWC344 for course description PREREQ: BISC208.	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 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 440	INTEGRATED PEST AND DISEASE MANAGEMENT	3	See ENWC440 for course description
PLSC 366	INDEPENDENT STUDY	1-6		PLSC 444	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 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 446	PLANT CELL BIOLOGY	3	Examines the cell as an integrated system of localized protein-protein interactions. Strongly comparative with focus on underlying principles/methods. Topics include protein structure, folding, targeting, modification and interactions, membranes, cell walls, cytoskeleton, molecular motors, cell cycle, signal transduction, apoptosis and pathogenesis. PREREQ: CHEM213
PLSC 402	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 450	PLANTING DESIGN	3	Comprehensive solution of landscape problems. Field application of principles of construction and design. PREREQ: PLSC211, PLSC212 and PLSC332
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 454	MANAGEMENT OF LANDSCAPE ENTERPRISES	4	How to establish and finance a landscape management business; how to hire, supervise, evaluate, discipline and terminate personnel; how to manage time, select equipment, construct bids and contracts and maintain landscaped areas. PREREQ: PLSC211 and PLSC212
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, photomorphogenesis and photoperiodism and growth hormones, considered at the fundamental level of operation. PREREQ: PLSC201 or BISC208, and CHEM213				

PLSC 455 ISSUES IN HORTICULTURE 3
 An introduction to current and emerging issues facing the horticultural professions. Ethics, professionalism, environment, politics, horticultural technology and practices will be the foci of discussion groups, student oral and written presentations, case studies, guest lecturers 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.

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
 Plant growth spanning net dry matter assimilation, growth habit plasticity, and photosynthetic efficiency; yield components, dry matter partitioning, respiratory and other losses of dry matter. Constraints upon photosynthetic efficiency (light absorption, water/carbon dioxide exchange and nutritional stress). Mineral uptake efficiency. Yield potential and heterosis in crop plants.
 PREREQ: PLSC410

PLSC 603 SOIL PHYSICS 3
 See BREG603 for course description.

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 cross-listed with CHEM608.
 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 614 PLANT CELL AND TISSUE CULTURE 4
 Principles of culturing plants in vitro. Topics for both lecture and laboratory include cell suspensions, anther culture, embryo rescue, micropropagation and regeneration via organogenesis and embryogenesis.
 PREREQ: PLSC101

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.
 PREREQ: PLSC410.
 COREQ: PLSC410.

PLSC 629 INTRODUCTORY MYCOLOGY 4
 Survey of the structure, classification and possible relationship of major groups of fungi with emphasis on representative organisms and a working knowledge of terminology. Practical laboratory experience in the culture and identification of fungi
 RESTRICTIONS: Requires permission of instructor

PLSC 630 COLLECTIONS MANAGEMENT AND CURATION 3
 Organization and maintenance of curatorial records including; plant records and labelling, organization of seed plants (phylogeny), nomenclature, policy statements and management concerns.
 PREREQ: PLSC402
 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, PLSC306.

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
 Examines the cell as an integrated system of localized protein-protein interactions. Strongly comparative with focus on underlying principles/methods. Topics include protein structure, folding, targeting, modification and interactions, membranes, cell walls, cytoskeleton, molecular motors, cell cycle, signal transduction, apoptosis and pathogenesis.
 PREREQ: CHEM213

PLSC 650 CLAY MINERALOGY 3
 See MAST650 for course description.

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
 Roll 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 800 CURRENT TOPICS IN PLANT SCIENCE 1-3
 Discussion of selected topics and recent literature in plant science.

PLANT AND SOIL SCIENCES

- 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 assimilation
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**
A lecture and laboratory course 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 will be 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**
- 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.

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 106 INTRODUCTION TO POLITICAL SCIENCE: ISSUES 3**
Selected problems of politics drawn from comparative and international politics, American government and political theory.
RESTRICTIONS: Cannot be substituted for POSC150
- POSC 150 AMERICAN POLITICAL SYSTEM 3**
Constitutional principles, structure and functions of the political process in the United States.
- 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 260 HUMANITIES COLLOQUIUM 3**
See ASRC260 for course description.
- 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 and effects of global monetary, trade, financial and investment systems. Both relations among advanced countries, and between the advanced and poor countries will be 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 3

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 will be 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 3

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 3

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 WOMS323.

POSC 324 VOTING AND ELECTIONS 3

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 3

This interdisciplinary course introduces alternative/complementary disciplinary approaches to the study of human movement between states. It is offered on a rotational basis by faculty involved in the University of Delaware migration group. May be cross-listed with GEOG329, HIST329 and/or SOCI329.

POSC 330 POLITICAL TERRORISM 3

Selectively examines cases, trends and organizations which have made the violence termed terrorism so salient. Also examines whether governments, including the U.S., are responding appropriately to the challenge.

RESTRICTIONS: Not open to Freshman except with consent of instructor.

POSC 331 PLANETARY MANAGEMENT SEMINAR AND LABORATORY 3

See GEOG331 for course description.

POSC 333 COMMUNISM, FASCISM AND DEMOCRACY 3

Ideology and environmental backgrounds. Understanding of the operating nature and causes of these aspects of contemporary Western political life.

POSC 334 LIBERALISM AND CONSERVATISM 3

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 3

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 3

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 for a democratic society. May be cross-listed with COMM340.

POSC 341 ENVIRONMENT OF MULTINATIONAL CORPORATIONS 3

See BUAD341 for course description.

POSC 343 SOCIETY, POLITICS AND HEALTHCARE 3

Interdisciplinary study of the political, social, economic and humanistic issues of health-care 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 CSCC343 and/or SOCI343.

POSC 350 POLITICS AND THE ENVIRONMENT 3

The political context of environmental issues; air and water pollution, population control, and conservation.

POSC 355 URBAN POLITICS AND COMMUNITY DEVELOPMENT 3

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 360 HUMANITIES COLLOQUIUM 3

See ASRC360 for course description.

POSC 362 DIPLOMACY 3

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 3

Introduction to the development of international law and international organization.

POSC 366 INDEPENDENT STUDY 1-6

POSC 372 EAST CENTRAL EUROPEAN POLITICS 3

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) will be emphasized.

POSC 377 ARAB-ISRAELI POLITICS 3

Development of the Arab-Israeli conflict analyzed from the Dreyfus Affair and the Balfour Declaration to current events.

POSC 380 INTRODUCTION TO LAW 3

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 3

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 390 HONORS COLLOQUIUM 3

See ASRC390 for description.

- POSC 400 PRACTICUM IN TEACHING POLITICAL SCIENCE 3 PF**
 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 402 CIVIL LIBERTIES I 3**
 Individual constitutional rights of expression, religion, "fundamental rights" (such as privacy and travel) and equal protection as developed by the U.S. Supreme Court. Role of the Supreme Court in American government.
- POSC 404 THE JUDICIAL PROCESS 3**
 Structure, process and personnel of American courts; factors influencing decisions and judicial policy making.
- POSC 405 CONSTITUTIONAL LAW OF THE UNITED STATES 3**
 Constitutional principles regulating organization and function of federal government. United States Supreme Court decisions placed in a socio-political context.
- POSC 406 CIVIL LIBERTIES II 3**
 Constitutional rights of the accused in the U.S. judicial system, especially as developed through Supreme Court cases.
- POSC 407 AMERICAN PRESIDENCY 3**
 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 3**
 Analysis of the organization of the international system, its structure, operating principles, formal and informal components.
- POSC 409 CONTEMPORARY PROBLEMS OF WORLD POLITICS 3**
 Critical areas of international politics. Topics vary by instructor. May be cross-listed with JWST409.
 RESTRICTIONS: May be repeated once when topics vary.
- POSC 411 POLITICS AND POVERTY 3**
 Relationship of 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 3**
 Principles, foreign policies and administration of the former Soviet government and its most important successor states.
- POSC 413 PROBLEMS IN AMERICAN GOVERNMENT 3**
 Contemporary problems in American government and politics. May be cross-listed with WOMS413.
 RESTRICTIONS: May be repeated for credit once when topics vary.
- POSC 414 PROBLEMS IN AMERICAN FOREIGN POLICY 3**
 Contemporary problems in American foreign policy and policy making.
 RESTRICTIONS: May be repeated for credit once when topics vary.
- POSC 415 FORCE AND WORLD POLITICS 3**
 Interrelationship of military and foreign policy; military strategies, arms control and disarmament; and the American experience.
- POSC 418 CONSTITUTIONAL ISSUES IN AMERICAN PUBLIC SCHOOLS 3**
 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 419 HUMAN ROLE IN ENVIRONMENTAL CHANGE 3**
 Explores the impact that human activity has on earth systems and how the behavior of earth systems affects human activity. Topics include climate change, biodiversity, conservation, western water management and industrial ecology. Offered only in partnership with the Biosphere 2 Center in Arizona.
- POSC 420 INTRODUCTION TO POLITICAL ECONOMY 3**
 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 3**
 Study of the theories and practices of effective political leadership in both contemporary and historical contexts. Will include case materials and may include non-U.S. cases for study.
- POSC 423 CONGRESS AND PUBLIC POLICY 3**
 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 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.
- POSC 425 ADVANCED TOPICS IN POLITICS AND BROADCAST JOURNALISM 3**
 See COMM425 for course description.
- POSC 426 LATIN AMERICAN POLITICAL SYSTEMS 3**
 Impact of social and economic change on the political processes.
- POSC 427 POLITICS IN CHINA 3**
 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 3**
 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 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 431 LATIN AMERICAN POLITICS: COUNTRIES 3**
 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 3**
 Structure and process of the political system of the USSR and its most important successor states (Russia, Ukraine, Byelarus, Kazakhstan and others).
- POSC 433 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 434 POLITICAL THOUGHT I 3**
 From Plato to Machiavelli.
- POSC 435 POLITICAL THOUGHT II 3**
 From Machiavelli to present.
- POSC 436 POLITICS AND LITERATURE 3**
 Class, civil rights, feminism, revolution and other political issues examined through novels, film and other literary works. May be cross-listed with FLIT436 and/or WOMS436.
- POSC 437 WHO GOVERNS: PERSPECTIVES ON POLITICAL POWER 3**
 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 439 PROBLEMS IN AFRICAN POLITICS 3**
 Examination of selected topics in contemporary African politics. Will focus in-depth on aspects of politics and society in a specific region of Africa or will investigate in greater detail issues confronting Africa today such as economic structural adjustment, democratization and state-society relations. May be cross-listed with BAMS439.
- POSC 441 PROBLEMS OF WESTERN EUROPEAN POLITICS BY COUNTRY 3**
 Intensive examination of European politics from the perspective of a specific country, e.g., Spain, England and France.
 RESTRICTIONS: Offered only in conjunction with travel abroad programs. May be repeated for credit when topics vary.
- POSC 442 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 443 CHINA AND THE WORLD 3**
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 3**
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, US foreign policy and media influence upon both. May be cross-listed with COMM444.
- POSC 445 HUMAN RIGHTS AND WORLD POLITICS 3**
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 3**
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 highlights recent and current human rights violations in foreign nations.
- POSC 448 THEORIES OF INTERNATIONAL RELATIONS 3**
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, interdependency, radical, neo-realist and post-structuralist perspectives.
- POSC 450 PROBLEMS OF LATIN AMERICAN POLITICS 3**
Current political issues in selected Latin American countries.
- POSC 452 PROBLEMS IN URBAN POLITICS 3**
Contemporary problems and political relationships in urban communities. May be cross-listed with JWST452.
- 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 bureaucracy 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 457 MANAGEMENT AND NONPROFIT ORGANIZATIONS 3**
Explores the historical and theoretical context of non-profit organizations. Discusses how non-profit organizations are organized and structured in the pursuit of their mission. Designed to prepare students for a career as an administrator in a non-profit organization.
- POSC 458 COMMUNITY SERVICE FIELDWORK 3**
Allows students to earn academic credit for fieldwork experiences in public or private community service agencies. Students will 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**
- POSC 468 UNDERGRADUATE RESEARCH 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.
RESTRICTIONS: May be repeated once for credit when topics vary. May only count toward Political Science or International Relations major one time.
- POSC 499 CAPSTONE IN POLITICAL SCIENCE 1**
Designed to integrate students' accrued knowledge and skills in Political Science. Emphasizes analytical, written and oral communication skills.
RESTRICTIONS: Offered in conjunction with a 400-level POSC course.
- POSC 604 INTERNATIONAL LAW 3**
See MAST673 for course description.
- POSC 605 TOPICS IN LAW AND COURTS 3**
Content of this research seminar will vary from year to year. Possible topics may be comparative public law, jurisprudence, constitutionalism. A major research paper is required.
- 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. Will focus in-depth on aspects of politics and society in a specific region of Africa or will 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 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 3**
 See UAPP659 for course description
- POSC 678 COASTAL AND MARITIME LAW 3**
 See MAST678 for course description.
- POSC 679 SHIPPING AND PORT MANAGEMENT 3**
 See MAST679 for course description.
- POSC 681 METROPOLITAN INFRASTRUCTURE AND TRANSPORTATION 3**
 See UAPP681 for course description.
- POSC 683 REGIONAL POLICY ANALYSIS 3**
 See UAPP683 for course description
- POSC 685 PERSONNEL AND HUMAN RESOURCE ISSUES: CURRENT TOPICS 3**
 See UAPP685 for course description.
- POSC 686 STATE AND LOCAL GOVERNMENT 3**
 See UAPP686 for course description
- POSC 687 STATE GOVERNMENT MANAGEMENT AND POLICY 3**
 See UAPP687 for course description.
- POSC 688 TOPICS IN STATE AND LOCAL MANAGEMENT 3**
 See UAPP688 for course description
- POSC 800 SEMINAR: THEORY AND DESIGN OF POLITICAL INQUIRY 3**
 Introduce basic topics of political inquiry including philosophies of science, epistemologies and theory building, and research design. Conceptual and normative issues are explored. Each participant has an opportunity to write a research proposal that is then critiqued by members of the class and the instructor.
- POSC 801 RESEARCH METHODS FOR POLITICAL AND POLICY SCIENCES 3**
 Seminar helps students understand and evaluate alternative research methods and research design. Each participant has an opportunity to write a research proposal that is then critiqued by members of the class and the instructor.
- POSC 802 SEMINAR: DEVELOPING AND TRANSITIONAL SYSTEMS 3**
 Issues, concepts, and scholarship regarding the politics of the developing and transitional countries of Africa, Asia, Eastern Europe and Latin America in a global governance context. Topics may include democratic transition and consolidation, comparative democracy, political economy of liberal economic reform, religion and political culture, new nationalisms and ethnic conflict, and international systemic influences on all the above
- POSC 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 UAPP803.
- POSC 804 SEMINAR: POST-INDUSTRIAL SYSTEMS 3**
 Issues, concepts, and scholarship regarding the politics of advanced industrial nations of Europe, North America and East Asia in a global governance context. Topics may include state theory and the new institutionalism, political culture and nationalism, the welfare state and reform, party systems, civil society and new social movements, regional integration and transnational dimensions of policy processes
- POSC 805 SEMINAR: PUBLIC LAW 3**
 Core seminar for the field of law and courts. Provides a broad overview of the range, depth and variety of approaches of current research within this field
 RESTRICTIONS: Graduate students only.
- POSC 806 NORMATIVE ISSUES IN GLOBAL GOVERNANCE 3**
 Examines normative issues in contemporary global governance from perspective of diverse ethical traditions and/or political philosophy.
- POSC 808 AMERICAN POLITICAL INSTITUTIONS 3**
 Explores major themes, viewpoints, issues and topics pertaining to the American political system. Themes include stability, change, conflict, American exceptionalism, American political thought, alternative perspectives on democracy, analysis of political parties, interest groups, Congress, the presidency and the courts
- POSC 810 SEMINAR: COMPARATIVE GOVERNMENT 3**
 Focuses on the evolution of the study of politics within national states, the principal theoretical approaches in studying politics cross-nationally and major scholarly controversies. Students review a broad spectrum of comparative research and writing
- POSC 811 TOPICS IN COMPARATIVE GOVERNMENT 3**
 Focuses on selected topics in Comparative Government and Politics.
- POSC 813 SEMINAR: AMERICAN FOREIGN POLICY 3**
 Overview of contemporary American foreign policy and policy making, as well as the analytical, conceptual and methodological problems associated with foreign policy analysis.
- POSC 814 POLITICAL ECONOMY OF THE ENVIRONMENT 3**
 See UAPP810 for course description.
- POSC 815 PUBLIC MANAGEMENT STATISTICS 3**
 See UAPP815 for course description.
- POSC 816 ADVANCED SOCIAL STATISTICS 3**
 Provides advanced training in applied social statistics. Topics include analysis of variance, regression analysis, analysis of covariance, multi-dimensional cross-classifications and future analysis. Lectures supplemented by laboratory work involving computer statistical packages and simulations. May be cross-listed with UAPP816
- POSC 817 FINANCING ALTERNATIVES IN THE PUBLIC SECTOR 3**
 See UAPP817 for course description.
- POSC 818 ENVIRONMENTAL POLICY AND ADMINISTRATION 3**
 U.S. environmental policy and administration of air and water pollution control programs. Secondary consideration given to population control, energy and natural resource development and conservation, as well as intergovernmental relations in environmental program implementation. May be cross-listed with MAST871 and/or UAPP818.
- POSC 819 MANAGEMENT DECISION MAKING IN PUBLIC AND NONPROFIT SECTORS 3**
 See UAPP819 for course description.
- POSC 820 INTERNATIONAL PERSPECTIVES ON ENERGY & ENVIRONMENT 3**
 Policy analysis and political economy at international energy and environmental issues and problems. Encompasses international and multi-national government and private sector organizations, as well as non-governmental, non-profit organizations. May be cross-listed with UAPP820.
- POSC 821 PROSEMINAR: TECHNOLOGY, ENVIRONMENT AND SOCIETY 3**
 See UAPP821 for course description
- POSC 825 COMPARATIVE PUBLIC ADMINISTRATION 3**
 A reading and discussion seminar concentrating on the development of administration and bureaucratic elites in developed and developing countries. Attention given to French, British and German bureaucracies and the problems of ethics, decentralization, planning, political influences and external controls. May be cross-listed with UAPP825
- POSC 829 TAXATION AND FISCAL POLICIES 3**
 See UAPP829 for course description

- POSC 830 SEMINAR: INTERNATIONAL RELATIONS 3**
 Surveys broad range of international relations theory including realism, neo-realism, interdependence, unit-level analysis, regime theory, world system theories, post-structuralism, feminism and normative theory. Epistemological and conceptual problems associated with international relations research are explored.
- POSC 833 SEMINAR: NORMATIVE POLITICAL THEORY 3**
 Department's core seminar in political philosophy which attempts to acquaint the student with major themes in political thought from "Plato to the present." Within that framework there is normally emphasis placed on the thought of one or two individuals
- POSC 835 ORGANIZATION AND MANAGEMENT IN PUBLIC AND NONPROFIT SECTORS 3**
 See UAPP835 for course description.
- POSC 837 HUMAN RESOURCES MANAGEMENT IN PUBLIC AND NONPROFIT SECTORS 3**
 See UAPP837 for course description.
- POSC 838 PUBLIC POLICY ANALYSIS 3**
 Seminar covers an overview of the policy process and considers all topics central to an understanding of policy making in the United States. May be cross-listed with MAST838 and/or UAPP838
- POSC 839 FINANCIAL MANAGEMENT IN PUBLIC AND NONPROFIT SECTORS 3**
 See UAPP833 for course description
- POSC 840 INTERNATIONAL POLITICAL ECONOMY 3**
 Considers the political underpinnings and effects of the interaction of political and economic processes at the global level. Reviews schools of thought and various topics including long cycles, foreign investment, monetary and trade regimes, and the political dilemmas of growth and stagnation
- POSC 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 MAST843 and/or UAPP843
- POSC 868 RESEARCH 3**
 To be taken by M.A. students seeking to satisfy the program's research requirement through the research paper option.
- POSC 869 MASTER'S THESIS 1-6**
- POSC 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
- POSC 969 DOCTORAL DISSERTATION 1-12 PF**

PSYCHOLOGY

- PSYC 201 GENERAL PSYCHOLOGY 3**
 A foundation course in the application of the scientific method to problems of human behavior and experience.
- 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: PSYC201
- 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: PSYC201
- PSYC 309 MEASUREMENT AND STATISTICS 3**
 Theory and the application of statistical techniques to psychological data
 PREREQ: One course in basic college mathematics and PSYC201.
- PSYC 310 SENSATION AND PERCEPTION 3**
 Theories and experimental study of sensation and perception
 PREREQ: PSYC201 and PSYC309.

- PSYC 312 LEARNING AND MOTIVATION 3**
 Experimental study of contemporary theories of learning and motivation.
 PREREQ: PSYC201 and PSYC309
- 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: PSYC201
- PSYC 317 SEXUAL BEHAVIOR AND MOTIVE 3**
 An objective view of sex from physiological, psychological, sociological and anthropological studies. Readings include Masters and Johnson, Freud, Kinsey, Reiss, and Ford and Beach. Practical sexual information, e.g., contraception, also discussed, sometimes by outside experts.
 PREREQ: PSYC201 and PSYC309
- PSYC 324 INDUSTRIAL PSYCHOLOGY 3**
 Psychological factors in selection, training, fatigue, morale, attitudes, accidents, and other aspects of worker efficiency.
 PREREQ: PSYC201 and PSYC309
- 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: PSYC201
- 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: PSYC201 or any 300-level psychology course.
- PSYC 334 ABNORMAL PSYCHOLOGY 3**
 Disorders of behavior and consciousness including the various psychoses, psychoneuroses, mental deficiency, and other conditions.
 PREREQ: PSYC201
- 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: PSYC201 and PSYC309
- 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: PSYC201 and PSYC309
 RESTRICTIONS: If both PSYC325 and PSYC350 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: PSYC201 and PSYC309
- PSYC 366 INDEPENDENT STUDY 1-6**
- PSYC 370 RESEARCH IN PERSONALITY 3**
 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: PSYC201 and PSYC309
 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**
 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: PSYC201 and PSYC309
 RESTRICTIONS: If both PSYC334 and PSYC380 are taken, only PSYC334 will count for major credit. Open to psychology majors and minors only.

PSYCHOLOGY

- PSYC 390 SOCIAL PSYCHOLOGY 3**
An analysis of theory and research in social psychology including the topics of social cognition, attitudes, interpersonal, group and intergroup relations. Student-designed research projects including data analysis.
PREREQ: PSYC201 and PSYC309.
RESTRICTIONS: If both PSYC303 and PSYC390 are taken, only PSYC303 will count for major credit. Open to psychology majors and minors only.
- PSYC 403 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: PSYC309 and PSYC303 or PSYC390.
- PSYC 404 EDUCATIONAL PSYCHOLOGY: COGNITIVE ASPECTS 3**
See EDUC414 for course description.
RESTRICTIONS: Does not count toward the six credits of 400-level psychology courses required for the major.
- 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: PSYC309; and PSYC303 or PSYC390.
- 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.
RESTRICTIONS: Requires permission of instructor.
- 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: PSYC201 and PSYC309.
- PSYC 413 EDUCATIONAL PSYCHOLOGY: SOCIAL ASPECTS 3**
See EDUC413 for course description.
RESTRICTIONS: Does not count toward the six credits of 400-level psychology courses required for the major.
- PSYC 414 DRUGS AND THE BRAIN 3**
Topics covered include drug treatment of mental illness, and drug abuse/addiction.
PREREQ: PSYC309; PSYC 314
RESTRICTIONS: PSYC380 or PSYC334 recommended in addition to prerequisites.
- PSYC 415 HISTORY AND SYSTEMS OF PSYCHOLOGY 3**
Psychology from the early Greeks through the more important "schools" of the 20th century.
PREREQ: Two of the following: PSYC310, PSYC312, PSYC314 or PSYC340 as well as one of: PSYC350, PSYC370, PSYC380 or PSYC390.
- 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: PSYC309; and PSYC390 or PSYC303.
- PSYC 417 ANIMAL BEHAVIOR 3**
Seminar on naturalistic and experimental investigations of species-typical behavior.
PREREQ: PSYC309
- PSYC 418 HUMAN EMOTIONS 3**
Emotions, cognition and behavior. Role of emotions in personality and social relationships. Includes laboratory/tutorial session with analysis and presentation of scenes from dramatic literature to illustrate integration of emotion, cognition and action.
PREREQ: PSYC309; and PSYC301 or PSYC370 or PSYC325 or PSYC350.
- PSYC 424 APPLIED SOCIAL PSYCHOLOGY 3**
The application of basic principles of interpersonal behavior to everyday life. Topics covered include persuasion, reciprocity, employee motivation, organizational development, liking and authority.
PREREQ: PSYC309, and PSYC303 or PSYC390.
- 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: PSYC325 or PSYC350
- PSYC 441 COMPUTERS AND COGNITION 3**
Introduction to computer models of cognitive processes. Computer models gave rise to the interdisciplinary area of cognitive science. Course covers basic types of models that have been used and a discussion of their psychological plausibility. May be cross-listed with CGSC441
PREREQ: PSYC340.
- PSYC 443 TOPICS IN ORGANIZATIONAL COMMUNICATION 3**
See COMM442 for course description.
- PSYC 444 THE PSYCHOLOGY OF AESTHETICS 3**
Psychological and psychobiological theories and empirical investigations of aesthetic experience.
PREREQ: PSYC309; and PSYC310 or PSYC314.
- PSYC 445 TOPICS IN ADOLESCENT PSYCHOLOGY 3**
Analysis of the physiological, psychological and social factors influencing psychological development from late childhood through adolescence.
PREREQ: PSYC309; and PSYC325 or PSYC350.
- PSYC 460 ASSESSMENT OF YOUNG CHILDREN 3**
See IFST452 for course description.
- PSYC 462 LANGUAGE ACQUISITION 4**
See EDUC462 for course description.
- PSYC 466 INDEPENDENT STUDY 1-6**
- PSYC 468 RESEARCH 3-6**
- PSYC 481 CLINICAL PSYCHOLOGY 3**
Introduction to clinical theories, research and practices. Diagnosis, classification and treatment of behavior disorders.
PREREQ: PSYC309; and PSYC334 or PSYC380.
RESTRICTIONS: Open to psychology majors and minors only.
- PSYC 482 CONTROVERSIES IN ABNORMAL PSYCHOLOGY AS PORTRAYED IN MOVIES 3**
Uses movies to illustrate certain types of psychiatric diagnoses and a text presenting journal articles representing pro and con views about controversies concerning these disorders. Students discuss the disorders and controversies using the fictionalized characters and events as illustrations.
PREREQ: PSYC380 or PSYC334.
RESTRICTIONS: Course limited to psychology majors or minors, Juniors and Seniors.
- PSYC 490 SOCIAL INTERDEPENDENCE 3**
Presents theoretical and empirical approaches of social psychology to the study of conflict versus cooperation between mutually dependent people. Cooperation/conflict is analyzed in terms of the effects of environmental influence, the reward structure of the relationship, and the interpersonal values of participants.
PREREQ: PSYC309
RESTRICTIONS: Open to Junior and Senior psychology majors and minors only.
- PSYC 491 PSYCHOLOGY OF TEMPORAL ORIENTATION 3**
The psychology of temporality is the scientific study of how temporal frames of reference regarding the past, present and future affect a variety of basic human processes. The purpose of this course is to learn more about these concepts and in the process, learn something about human behavior.
PREREQ: PSYC309; and PSYC303 or PSYC390 or PSYC301.
RESTRICTIONS: Open to psychology majors and minors only.
- PSYC 606 ANIMAL BEHAVIOR 3**
Seminar on naturalistic and experimental investigations of species-typical behavior.
RESTRICTIONS: Requires permission of instructor.
- PSYC 612 HUMAN PSYCHOPHYSIOLOGY 3**
Introduction to psychophysiological recording techniques. Elementary anatomy and physiology of the human nervous system. Application of psychophysiological techniques to the investigation of psychopathology, information processing and social psychology. Laboratory demonstration of polygraphic measurement of autonomic and CNS variables with small computer analysis.
PREREQ: PSYC309
RESTRICTIONS: Requires permission of instructor.
- PSYC 626 NEUROSCIENCE I 4**
See BISC626 for course description.

PSYC 627 NEUROSCIENCE II	3
See BISC627 for course description.	
PSYC 630 NEURONS AND NETWORKS	3
Introduction to computational neuroscience: computing by real and artificial neurons and networks and the modeling of brain function. Covers theoretical background and involves hands-on projects to explore processing of sensory information, pattern discrimination, learning, memory and the generation of movement. May be cross-listed with CGSC630. RESTRICTIONS: Requires permission of instructor.	
PSYC 642 MENTAL REPRESENTATION AND MEMORY	3
Human memory can be conceptualized in terms of representation and information storage within various interrelated mental systems. Critically evaluates research on human memory and representation within the context of major cognitive models. May be cross-listed with CGSC642. RESTRICTIONS: Requires permission of instructor.	
PSYC 668 RESEARCH	1-6
PSYC 675 LANGUAGE ACQUISITION	4
See EDUC675 for course description.	
PSYC 692 SOCIAL SKILLS TRAINING FOR CHILDREN	3
See EDUC692 for course description.	
PSYC 804 SEMINAR: HUMAN DEVELOPMENT	3
Selected research literature in developmental psychology. May be cross-listed with EDUC837. RESTRICTIONS: Requires permission of instructor.	
PSYC 807 GROUP AND INTERPERSONAL PROCESSES	3
Addresses basic theoretical and empirical knowledge of group processes, structures and interactions. RESTRICTIONS: Requires permission of instructor.	
PSYC 809 RESEARCH DESIGN	3
An overview of methodological issues in the conduct of psychological research, including correlational, experimental, and quasi-experimental studies. Special emphasis on clinical and personality research. RESTRICTIONS: Requires permission of instructor.	
PSYC 813 SEMINAR IN INTERGROUP RELATIONS	3
Cognitive, motivational and cultural factors involved in the creation of and reduction of intergroup bias and conflict. Emphasis on theoretical and applied perspectives. RESTRICTIONS: Requires permission of instructor.	
PSYC 817 INDIVIDUAL INTELLIGENCE TESTING	3
See EDUC817 for course description.	
PSYC 819 PSYCHOTHERAPY I	3
Survey of theories, schools and techniques of psychotherapy and critical review of relevant research. RESTRICTIONS: Requires permission of instructor.	
PSYC 820 PSYCHODIAGNOSTICS: OBJECTIVE TRAIT AND BEHAVIORAL ASSESSMENT	3
Theory and techniques of psychological classification, structured personality assessment, and behavioral assessment. Administration, scoring and interpretation of the MMPI and other self-report inventories. Behavior observation in clinical settings. Clinical vs. statistical prediction. RESTRICTIONS: Requires permission of instructor.	
PSYC 823 LEARNING AND DEVELOPMENT	3
See EDUC823 for course description.	
PSYC 827 ADVANCED PSYCHOTHERAPY II	3
Schools, theories and techniques of psychotherapy including research on psychotherapy and review of evaluative studies. Supervised practice. PREREQ: PSYC819. RESTRICTIONS: Requires permission of instructor.	
PSYC 829 ADVANCED PSYCHOPATHOLOGY	3
Nosology and etiology of the behavior disorders of non-organic origin. Theories of psychopathology, including various modes of conceptualizing psychopathology, i.e., medical vs. behavioral and psychosocial models. Reliability and validity of psychodiagnosis; and relevant research and problems of experimental clinical research with institutionalized populations. RESTRICTIONS: Requires permission of instructor.	

PSYC 834 SUPERVISED PRACTICE IN CLINICAL PSYCHOLOGY I	1-3	PF
Limited diagnostic and therapeutic practice in clinical setting under professional supervision. RESTRICTIONS: Requires permission of instructor.		
PSYC 835 SUPERVISED PRACTICE IN CLINICAL PSYCHOLOGY II	1-3	PF
Continuation of PSYC834. RESTRICTIONS: Requires permission of instructor.		
PSYC 836 SUPERVISED PRACTICE IN CLINICAL PSYCHOLOGY III	1-3	PF
Continuation of PSYC834 and PSYC835. PREREQ: PSYC834 and PSYC835. RESTRICTIONS: Requires permission of instructor.		
PSYC 837 SUPERVISED PRACTICE IN CLINICAL PSYCHOLOGY IV	1-3	PF
Continuation of PSYC834, PSYC835 and PSYC836. PREREQ: PSYC836. RESTRICTIONS: Requires permission of instructor.		
PSYC 845 CHILDHOOD PSYCHOPATHOLOGY		3
See EDUC813 for course description.		
PSYC 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. RESTRICTIONS: Requires permission of instructor.		
PSYC 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. RESTRICTIONS: Requires permission of instructor.		
PSYC 868 RESEARCH		1-6
PSYC 869 MASTER'S THESIS		1-6
RESTRICTIONS: Requires department permission.		
PSYC 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. RESTRICTIONS: Not open to students who have been admitted to candidacy.		
PSYC 969 DOCTORAL DISSERTATION	1-12	PF

RUSSIAN

RUSS 105 RUSSIAN I - ELEMENTARY	4
Introduction to the Russian language and development of speaking, listening, reading and writing skills through the use of basic texts.	
RUSS 106 RUSSIAN II - ELEMENTARY/INTERMEDIATE	4
Completion of basic Russian. Increasing mastery of the basic skills of speaking, listening, reading and writing. PREREQ: RUSS105. RESTRICTIONS: Two to three years of high school Russian acceptable in lieu of prerequisite.	
RUSS 107 RUSSIAN III - INTERMEDIATE	4
Review of grammar, continued practice in speaking and writing, and reading texts of average difficulty. PREREQ: RUSS106. RESTRICTIONS: Four years of high school Russian acceptable in lieu of prerequisite. Satisfies College of Arts and Science language requirement.	
RUSS 200 RUSSIAN GRAMMAR REVIEW	3
Systematic review of elementary and intermediate Russian grammar, study of complex sentence structure and idioms. Some conversational practice. PREREQ: RUSS107.	
RUSS 205 RUSSIAN CONVERSATION	3
Practical use of the language. Emphasis on topics drawn from contemporary Russian life and literature. PREREQ: RUSS107.	

RUSSIAN

- 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.
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.
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.
PREREQ: RUSS211 or RUSS305.
- RUSS 312 INTRODUCTION TO RUSSIAN LITERATURE II 3**
Masterpieces of poetry, narrative prose and drama from the 20th century.
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**
- RUSS 401 ADVANCED RUSSIAN GRAMMAR AND COMPOSITION 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.
PREREQ: One 300-level Russian course.
- RUSS 440 SPECIAL TOPICS: RUSSIAN DRAMA, PROSE OR POETRY 3**
Explores one of the three major genres by examining a specific theme. Subject matter varies and will be announced in registration booklet.
PREREQ: Any two 300-level Russian courses.
RESTRICTIONS: May be repeated for credit when topics vary.
- RUSS 455 SELECTED AUTHORS, WORKS AND THEMES 3**
Works of one or more outstanding authors or on a special theme.
PREREQ: Two 300-level Russian literature courses.
RESTRICTIONS: May be repeated for credit when topics vary.
- RUSS 465 SEMINAR 3**
Various authors and themes.
PREREQ: One 400-level Russian literature course.
RESTRICTIONS: May be repeated for credit when topics vary.
- RUSS 466 INDEPENDENT STUDY 1-3**
- RUSS 665 SEMINAR 3**
Various authors and themes.
RESTRICTIONS: May be repeated for credit when topics vary.

SCIENCE

- SCEN 101 PHYSICAL SCIENCE 3-4**
The structure, processes and concepts of the physical world.
RESTRICTIONS: Requires high school algebra. For non-science students with no physics or chemistry background. Not for physics or chemistry major credit. Only one course from among SCEN101, PHYS104, PHYS201 or PHYS207 can count toward graduation.
- SCEN 102 PHYSICAL SCIENCE 3-4**
The structure, processes and concepts of the physical world.
RESTRICTIONS: Requires high school algebra. For non-science students with no physics or chemistry background. Not for physics or chemistry major credit. Only one course from among SCEN102, PHYS202 or PHYS208 can count toward graduation.
- SCEN 103 CONCEPTS OF SCIENCE AND TECHNOLOGY 3**
Introduction to some of the fundamental science concepts underpinning high technology, emphasizing everyday devices and practical experience, for the development of scientific and computer literacy of non-science majors.
RESTRICTIONS: Requires high school algebra.
- SCEN 340 ADVANCED SCIENCE FOR TEACHERS 4**
Provides advanced background study for students in the Elementary Teacher Education Milford Program. Topics are drawn from physical, earth and biological sciences and build on science courses previously taken in the program. The areas of science outlined in the State Science Performance Indicators are covered. Along with lecture/discussion, students have hands-on laboratories (including the Smithsonian kits used by the District).
RESTRICTIONS: Offered to students in the Milford ETE program.

- SCEN 344 SCIENCE AND RELIGION 3**
See PHIL344 for course description.

- SCEN 491 TEACHING SCIENCE IN SECONDARY SCHOOLS 4**
Techniques, approaches and preparation for teaching science in high school and middle school. Laboratory meets one full morning per week in local high schools and middle schools for observation and initial teaching.
COREQ: EDUC420 for chemistry education and biology education majors.

- 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.

SOCIOLOGY

- 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 WOMS211 for course description.
- SOCI 213 MEN AND WOMEN IN AMERICAN SOCIETY 3**
Designed to provide students with 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 WOMS213.
- 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**
See IFST270 for course description.
- SOCI 301 INTRODUCTION OF SOCIOLOGICAL RESEARCH 4**
Survey of research methods and data analysis employed in sociology.
PREREQ: SOCI201 and completion of the College of Arts and Science 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: SOCI201 or SOCI209.
- 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: SOCI201 or SOCI202 or SOCI209.

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: SOCI201, SOCI203 or PSYC201

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: SOCI201 or SOCI202 or SOCI203 or SOCI209

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. May be cross-listed with CSCC311

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: SOCI201

SOCI 320 PERSONALITY AND POLITICS 3
 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 PSYC201 or POSC150

SOCI 322 CROWDS, CULTS AND REVOLUTIONS 3
 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 327 SOCIOLOGY OF ORGANIZATIONS 3
 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 3
 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 329 INTERNATIONAL MIGRATION 3
 See POSC329 for course description.

SOCI 330 POPULATION, LAW AND SOCIETY 3
 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 3
 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 3
 See CRJU336 for course description

SOCI 341 WELFARE AND SOCIETY 3
 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 3
 See POSC343 for course description.

SOCI 345 SOCIOLOGY OF LAW 3
 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 3
 Empirical and theoretical investigation of the aging process
 PREREQ: SOCI201 or SOCI202 or SOCI203 or PSYC201

SOCI 348 THEORIES OF SOCIAL WORK PRACTICE 3
 Methods of social work practice; casework, group work, community organization; sociological and psychological foundations underlying social services
 PREREQ: SOCI201

SOCI 356 RACE, CLASS AND CRIME 3
 See CRJU355 for course description

SOCI 360 SOCIOLOGY OF RELIGION 3
 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
 PREREQ: SOCI201

SOCI 361 RACIAL INEQUALITY 3
 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

SOCI 368 INDEPENDENT RESEARCH 1-6
 Independent research under the supervision of a faculty member. Requirements include preparation of a research report consistent with the professional literature in the field. Student and faculty member will file a learning contract describing the research and a report with the department chair.
 RESTRICTIONS: Requires permission of instructor.

SOCI 399 PRACTICUM: TEACHING SOCIOLOGY 3 PF
 Practical 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 401 ADVANCED SOCIOLOGICAL METHODS 3
 Conceptualization, design, data collection and data analysis in sociological research.

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 3
 Seminar on sex and gender relations from a sociological perspective. Surveys current research on gender stratification in the paid 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: SOCI301

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: SOCI301.
 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: SOCI201.

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 fashions 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

Exposes 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 SOCIOLOGY 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 sub-group. May be cross-listed with JWST435
PREREQ: SOCI201.

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: SOCI201

SOCI 454 LAWYER'S ETHICS 3

An exploration of the ethical, moral and legal dilemmas that confront attorneys in the practice of law and how they attempt to resolve them. May be cross-listed with CRJU454
PREREQ: SOCI201 and three additional sociology courses

RESTRICTIONS: Open to Junior and Senior sociology majors only.

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: SOCI201 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 students 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

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: SOCI201 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

Practical exposure to undergraduate education gained by assisting a member of the faculty in carefully supervised experiences such as discussion leader, crafting questions, consulting with students. Students may not be involved in the grading of student work or the assignment of grades. May be repeated for up to three credit hours

RESTRICTIONS: Requires permission of instructor. Not for major credit

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 HIST637.

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
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 835 SEMINAR IN CRIMINAL AND DELINQUENT BEHAVIOR	3
A review of the basic issues in the sociological study of criminal behavior, including definition and measurement, and the relationship between age, gender, race, peers, family, class and economy and crime	
SOCI 836 SEMINAR IN CRIMINAL AND DELINQUENT BEHAVIOR	3
An analysis of the major forms of criminal behavior such as violent crime, property crime, public order crime, organized crime, white collar crime and juvenile delinquency	
SOCI 866 SPECIAL PROBLEM	1-12
SOCI 868 RESEARCH	1-6
SOCI 869 MASTER'S THESIS	1-6
SOCI 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	
SOCI 969 DOCTORAL DISSERTATION	1-12 PF

SPANISH

SPAN 101 ELEMENTARY SPANISH I	3
Introduction to the Spanish language and a development of speaking, listening, reading and writing skills through the use of basic texts.	
SPAN 102 ELEMENTARY SPANISH II	3
Completion of basic Spanish. PREREQ: SPAN101 or SPAN105.	
SPAN 105 SPANISH I - ELEMENTARY	4
Introduction to the Spanish language and a development of speaking, listening, reading and writing skills through the use of basic texts	
SPAN 106 SPANISH II - ELEMENTARY/INTERMEDIATE	4
Completion of basic Spanish. Increasing mastery of the basic skills of speaking, listening, reading and writing. PREREQ: SPAN105. RESTRICTIONS: Two to three years of high school Spanish acceptable in lieu of prerequisite.	
SPAN 107 SPANISH III - INTERMEDIATE	4
Review of grammar, continued practice in speaking and writing, and reading texts of average difficulty. PREREQ: SPAN106 RESTRICTIONS: Four years of high school Spanish acceptable in lieu of prerequisite. Satisfies College of Arts and Science language requirement.	
SPAN 111 INTERMEDIATE SPANISH I	3
Review of grammar. Increasing mastery of the basic skills of speaking, listening, reading and writing. PREREQ: SPAN102 or SPAN106 RESTRICTIONS: Three years of high school Spanish acceptable in lieu of prerequisite.	

SPAN 112 INTERMEDIATE SPANISH II	3
Continued practice in speaking and writing, reading texts of average difficulty, grammar review as needed. PREREQ: SPAN111. RESTRICTIONS: Four years of high school Spanish acceptable in lieu of prerequisite. Satisfies College of Arts and Science language requirement	
SPAN 200 SPANISH COMPOSITION AND GRAMMAR	3
Intensive study of selected grammatical topics (subjunctive, ser-estar, preterite and imperfect). Vocabulary exercises and short compositions PREREQ: SPAN107 or SPAN112.	
SPAN 201 SPANISH READING AND COMPOSITION	3
Major emphasis on reading development, composition and literary analysis. PREREQ: SPAN200	
SPAN 205 SPANISH CONVERSATION	3
Practical use of Spanish by means of oral reports and discussions. Emphasis on improvement of basic conversational skills. Grammar review where appropriate, and/or some written work PREREQ: SPAN107 or SPAN112, or one 200-level course RESTRICTIONS: Prerequisites require a minimum grade of B. Not intended for native speakers	
SPAN 206 CULTURE THROUGH CONVERSATION	3
Discussion of topics drawn from contemporary Spanish or Latin American life. For students who wish to broaden their knowledge of Hispanic culture while improving their oral and aural language skills. PREREQ: SPAN107 or SPAN112. RESTRICTIONS: Taught abroad only	
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 Science 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 Science language requirement.	
SPAN 250 INTRODUCTION TO BUSINESS SPANISH	3
Familiarizes students with characteristics of business Spanish (terminology, letter writing, etc.) and policies and practices of the Hispanic business community PREREQ: SPAN107 or SPAN112.	
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: Any 200-level course taught in the Spanish language.	
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: Any 200-level course taught in the Spanish language.	
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 exposes, discussion of articles and videos, textual analysis and compositions.
 PREREQ: Any two 200-level Spanish courses conducted in Spanish.
 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 PHONETICS AND PHONOLOGY 3**
 Study and practice of Spanish pronunciation and intonation. Contrastive analysis of Spanish and American English phonological systems. Introduction to Spanish dialectology.
 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 350 ADVANCED BUSINESS SPANISH 3**
 Development of strategies to initiate and maintain oral and written communication in the world of business. Practice in speaking Spanish in business situations, letter writing and article reading. Functional and cultural approach.
 PREREQ: Any two 200-level Spanish courses, one preferably being SPAN250.
- 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: SPAN200
 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 3**
 A systematic study of standard written and oral Spanish syntax. Translation and syntactic exercises.
 PREREQ: Any 300-level Spanish course
- 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 415 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 SPAN300-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 SPAN300-level survey of literature.
- SPAN 417 HISPANIC NOBEL PRIZE AUTHORS 3**
 Covers the works of Spanish and Latin American Nobel Prize authors - Echegaray, Benavente and Martinez, Mistral, Jimenez, Asturias, Aleixandre, Neruda, Garcia Marquez - in relation to their cultural milieu on the regional, national and international levels and in relation to their authors' biographies.
 PREREQ: One SPAN300-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, Aleman, Juan de la Cueva, Cervantes, Luis de Leon, Gracian and Quevedo.
 PREREQ: One SPAN300-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 SPAN 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 SPAN 300-level survey of literature course.
- SPAN 430 LATIN AMERICAN NOVEL AND CINEMA 3**
 Study of a selection of novels of the 20th century that have brought international recognition to the 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 SPAN300-level survey of literature.
- SPAN 436 TOPICS: LITERATURE OF THE SPANISH GOLDEN AGE 3**
 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 3**
 The Spanish novel from 1962 to the present. Focuses on novels by leading authors such as Luis Martin-Santos, Juan Goytisolo, Juan Benet, Carmen Martin Gaité, Ana Maria Moix and Esther Tusquets. 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 3**
 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 3**
 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 3**
 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 3**
 Analysis of Spanish poetry from Becquer to the present day.
 PREREQ: One SPAN300-level survey of literature.
- SPAN 455 SELECTED AUTHORS, WORKS AND THEMES 3**
 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 3**
 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 3
 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 3
 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 3
 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 3
 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 3
 Systematic study of standard written and oral Spanish syntax. Translation and syntactic exercises.

SPAN 603 HISTORY OF THE SPANISH LANGUAGE 3
 History of the language from Latin to the present. Historical phonology and morphology.

SPAN 615 LATIN AMERICAN LITERATURE AND ITS POLITICAL CONTEXT 3
 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 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.

SPAN 617 HISPANIC NOBEL PRIZE AUTHORS 3
 Studies the works of Spanish and Latin American Nobel Prize authors - Echegaray, Benavente and Martinez, Mistral, Jimenez, Asturias, Aleixandre, Neruda and Garcia Marquez - 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 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, Aleman, Juan de la Cueva, Cervantes, Luis de Leon, Gracian and Quevedo

SPAN 620 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: Open to graduate students only.

SPAN 621 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.

SPAN 630 LATIN AMERICAN NOVEL AND CINEMA 3
 Study of a selection of novels of the 20th century that have brought international recognition to the 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 3
 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 3
 Covers the Spanish novel from 1962 to the present. Focuses on novels by leading authors such as Luis Martin-Santos, Juan Goytisolo, Juan Benet, Carmen Martin Gaité, Ana Maria Moix and Esther Tusquets. Analysis of these works is grounded in international literary theory and criticism.

SPAN 640 TOPICS: EIGHTEENTH AND NINETEENTH CENTURY HISPANIC LITERATURE 3
 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 3
 Explores current fiction by women in Spain and Spanish America. Analyzes selected works as individual literary creations, and also to situate them in their cultural, historical and aesthetic contexts, using appropriate critical methodologies.

SPAN 650 TOPICS: MODERN HISPANIC LITERATURE 1898-1936 3
 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 3
 Analysis of Spanish poetry from Becquer to the present day. Special emphasis on stylistics.

SPAN 655 SELECTED AUTHORS, WORKS AND THEMES 3
 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 3
 Works of one or more authors or of a special theme, genre, or topic within Hispanic literature from 1936 to the present

SPAN 662 TOPICS: HISPANIC SHORT FICTION 3
 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

SPAN 664 CONTEMPORARY SPANISH-AMERICAN LITERATURE BY WOMEN 3
 Explores 20th century fiction by major women authors from diverse regions of Spanish America. Analyzes works as individual literary creations, and situates each author in her specific socio-cultural, historical and literary contexts. Examines the international criticism elicited by each work.

SPAN 675 TOPICS: HISPANIC CULTURE AND CIVILIZATION 3
 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 684 CONTEMPORARY SPANISH THEATRE 3
 Twentieth-century Spanish theater as a reflection of and commentary on society. Principal authors: Garcia Lorca, Buero Vallejo and Sastre

SPAN 869 MASTER'S THESIS 1-6

SPAN 875 SEMINAR: TOPICS IN SPANISH LITERATURE 3
 Study of selected topics, authors and works in the various fields of Spanish literature. Variable content. Emphasizes preparation of seminar presentations and term papers
 RESTRICTIONS: May be repeated for credit when topics vary.

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, discrete and 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 418 SAMPLING METHODS 3
 Types of sampling, census vs. survey, methods of sample selection, sampling and non-sampling errors. Planning and execution of surveys, and data collection in selected fields of application
 PREREQ: STAT371

STATISTICS

- STAT 420 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 466 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, especially data distributed over space and/or time. 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 GEOG475.
PREREQ: MATH243 and GEOG250
RESTRICTIONS: If STAT475 is taken, degree credit cannot be given for any of the following courses: MATH300, STAT370, STAT371 or MATH450
- STAT 601 PROBABILITY THEORY FOR OPERATIONS RESEARCH AND STATISTICS 3**
Provides the basic background in probability theory for further work in statistics and operations research. Basic topics: sample spaces and axioms of probability; conditional probability and independence; Bayes theorem; random variables; moments and moment generating functions; transformations of random variables; common families of distributions; multivariate distributions, covariance and correlation; probability inequalities and limit theorems.
PREREQ: MATH243
- STAT 602 MATHEMATICAL STATISTICS 3**
Derived sampling distributions; decision theory; estimation theory; multivariate normal; hypotheses testing; special topics.
PREREQ: STAT601
- STAT 603 VECTOR SPACES AND OPTIMIZATION 3**
Bases, linear transformations, subspaces, projection theorem, least squares, eigenvalues, eigenvectors, matrix factorizations. Quadratic programming, convexity, duality, Karash-Kuhn-Tucker conditions, constraints, sequential quadratic programming. Linear programming, simplex method, interior point methods. Examples taken from maximum likelihood estimation, robust and ridge regression, resource allocation, transportation problems
PREREQ: MATH243 and MATH349
- STAT 611 REGRESSION ANALYSIS 3**
Simple linear and nonlinear regression. Subset regression; principal component and ridge regression. Introduction to experimental design and design models.
PREREQ: MATH202 or STAT371
- STAT 615 DESIGN AND ANALYSIS OF EXPERIMENTS 3**
Fundamental principles of design, randomized designs, Latin squares, sources of error, components of error. Factorial designs, response surfaces, models for design.
PREREQ: STAT371
- STAT 616 DESIGN AND ANALYSIS OF EXPERIMENTS 3**
Planning of experiments, designs for specific problems, fractional factorials, quasifactorial experiments, balanced and unbalanced designs, confounding, introduction to linear estimation.
PREREQ: STAT615
- STAT 617 MULTIVARIATE METHODS 3**
Multivariate analysis of variance and covariance; classification and discrimination; canonical correlation; principal components; factor analysis.
PREREQ: STAT371
- STAT 618 SAMPLING TECHNIQUES 3**
Simple random sampling; stratified random sampling; ratio estimates; regression estimates; systematic sampling; cluster sampling; double sampling.
PREREQ: STAT371
- STAT 620 NONPARAMETRIC STATISTICS 3**
Statistical procedures valid under unrestrictive assumptions; scales of measurement; efficiency comparisons; signed rank procedures; two-sample rank tests; zeros, ties, and other problems of discrete data; order statistics; k-sample procedures; nonparametric measures of correlation.
PREREQ: STAT371, STAT601
- STAT 635 STATISTICAL QUALITY CONTROL 3**
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
- STAT 640 STATISTICAL CONSULTING 3**
Topics include the client/consultant relationship; effective communication; identifying the question, developing a plan and presenting the results; following up; actual consulting experience
- STAT 641 STATISTICAL LABORATORY 1**
Requires attendance at the weekly statistical laboratory meetings.
- STAT 656 BIostatISTICS 3**
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
- STAT 657 STATISTICS FOR EARTH SCIENCES 3**
Spatial distributions; directional data; statistical graphics; regression and time series analysis; model validation; sampling; principal components; cluster analysis; discriminant analysis; and statistical software routines. May be cross-listed with GEOL657.
PREREQ: MATH201
- STAT 664 STATISTICS INTERNSHIP 1-6 PF**
Supervised on the job experience, performing statistical analysis of problems for clients
RESTRICTIONS: Requires permission of instructor
- STAT 674 APPLIED DATA BASE MANAGEMENT 3**
See FREC674 for course description
- STAT 675 LOGISTIC REGRESSION 3**
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.
- STAT 800 ESTIMATION AND STATISTICAL INFERENCE I 3**
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
- STAT 801 ESTIMATION AND STATISTICAL INFERENCE II 3**
Further topics in estimation and inference will be covered.
PREREQ: STAT800
- STAT 815 LINEAR STATISTICAL INFERENCE I 3**
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
- STAT 816 LINEAR STATISTICAL INFERENCE II 3**
Topics from general linear hypotheses of full rank and not full rank.
PREREQ: STAT815
- STAT 818 MULTIVARIATE ANALYSIS 3**
Likelihood estimation, vector random variables, Hotelling's T-squared distribution of correlation coefficients, classification and discrimination, distribution of sample covariance matrix and generalized variance, and testing multiple hypotheses.
PREREQ: STAT800
- STAT 824 ADVANCED TOPICS IN STATISTICS I 3**
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
- STAT 831 TIME SERIES ANALYSIS 3**
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
- STAT 832 TOPICS IN DATA ANALYSIS 3**
Topics: graphical analysis; model evaluation, robust procedures; influence functions; multidimensional data plots, residual analysis; Bayesian concepts in data analysis.
- STAT 836 RESPONSE SURFACE METHODOLOGY 3**
Derivation of nonlinear relationships between variables. Techniques for characterization and interpreting multidimensional systems through canonical and ridge analysis. Correlation analysis through eigenvalues and eigenvectors for linear systems
PREREQ: STAT602 and either STAT611 or STAT617.

STAT 840 STATISTICAL COMPUTING 3

Computer organization. Error in floating point computation. Approximating probabilities. Random numbers: generating and testing. Simulation. Computational linear algebra. Optimization methods appropriate for maximum likelihood computation. Fast Fourier transforms.

PREREQ: STAT602 and knowledge of Fortran or equivalent.

STAT 852 ADVANCED TOPICS IN MATHEMATICAL STATISTICS 3

Selected topics: Sequential methods, reliability theory, multivariate contingency tables, large sample theory, density estimation, robust and nonparametric estimation.

RESTRICTIONS: Requires permission of Department

STAT 969 DOCTORAL DISSERTATION 1-12 PF**THEATRE****THEA 102 INTRODUCTION TO PERFORMANCE 3**

A survey of performance training techniques for the non-minor, including the elements of voice, improvisation, movement, dance, character analysis and portrayal.

THEA 104 INTRODUCTION TO THEATRE AND DRAMA 3

Survey of the elements of theatre and drama. Includes attendance at theatrical productions, readings of representative plays, discussion of a method of dramatic analysis, explanation of staging in periods of major importance and discussion of the actor, the designer and the director.

THEA 106 THE THEATRICAL EXPERIENCE ABROAD 3

Survey of the elements of performance, theatre and drama in relationship to observed field performances. Attendance at rigorous program of theatrical performances. Studies elements of voice, improvisation, movement, dance, character analysis and portrayal specifically based on observed performances.

RESTRICTIONS: Taught abroad

THEA 200 INTRODUCTION TO THEATRE PRODUCTION 3

Processes involved in the production of scenery, properties, lighting, sound and costumes for live performance events. Plays read and analyzed for production requirements.

RESTRICTIONS: Mandatory attendance at performance events.

THEA 202 INTRODUCTION TO THEATRE DESIGN 3

Survey of the evolution of design theory and aesthetics for live production. Elements include the design of scenery, properties, costumes, lighting and sound. Plays read and analyzed for design requirements.

RESTRICTIONS: Mandatory attendance at performance events

THEA 203 INTRODUCTION TO COSTUMING 3

Explores the evolution of costume design and technology. Discusses and analyzes all aspects of costuming through reading of plays.

THEA 204 INTRODUCTION TO VOICE AND SPEECH 3

The use of voice and speech in performance. Includes exercises to develop relaxation, breath support, resonance, vocal strength, optimum pitch and articulatory precision, as well as studies in basic vocal anatomy. Studio format.

RESTRICTIONS: Involves some strenuous physical activity.

THEA 206 INTRODUCTION TO DANCE 3

Examines the function and impact of dance in the lives of individuals, societies, and cultures. Lecture and participatory format.

THEA 207 TECHNICAL PRODUCTION PRACTICUM 1-4

Laboratory course for the production of scenery, properties, lighting and sound for public performances of the Professional Theatre Training Program Productions.

THEA 209 COSTUME PRODUCTION PRACTICUM 1-4

Laboratory course for the production of costumes and costume crafts for public performances of the Professional Theatre Training Program Productions.

THEA 226 FUNDAMENTALS OF ACTING 3

Exploration of basic elements of the actor's art and craft so as to deepen and broaden the experience of viewing the theatre. May utilize theatre games, basic text work, improvisation and lecture/demonstrations.

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. Emphasis on 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

Class will include casting, sculpting human and animal features, and will explore various methods and materials for constructing theatrical masks. Students will construct three to four masks.

PREREQ: THEA203.

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 CMLT341.

THEA 342 THEATRE/DRAMA: RENAISSANCE TO 1700 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 CMLT342.

THEA 343 THEATRE/DRAMA: 1700 TO 1900 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 CMLT343.

THEATRE

- THEA 344 THEATRE/DRAMA: 1900 TO PRESENT 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 CMLT344.
- THEA 345 HISTORY OF THEATRE: AMERICAN MUSICAL THEATRE 3**
See MUSC345 for course description
- THEA 347 SPECIAL TOPICS IN THEATRE HISTORY 3**
A series of changing topics in history and theory. Topics range from studies of significant movements in theatre to the study of theoretical issues and individual playwrights and genres.
- THEA 360 FUNDAMENTALS OF ORAL INTERPRETATION 3**
Basic course in interpretation of text for the stage. Concentrates on texts from plays; explores prose and poetry. Emphasis on diction, meaning and presentation. Studio format.
- THEA 366 INDEPENDENT STUDY 1-6**
- THEA 407 THEATRE PRACTICUM FOR MAJORS 1-4**
Students assigned production responsibilities on departmental productions in the areas of lighting, sound, scenery, properties, costuming, stage management, painting and theatre management.
RESTRICTIONS: Open to majors only. Requires permission of instructor.
- THEA 410 FUNDAMENTALS OF DRAMATURGY 3**
Topics covered include various methods of dramatic and entertainment analysis, scene analysis, development of dramaturgical plot, fable and practice. Survey of function and role of the dramaturg in contemporary theatre. Readings in primary and secondary material.
- THEA 420 FUNDAMENTALS OF STAGE DIRECTING 3**
Exploration of the director's part in the creative process of theatre. Philosophy, techniques and problems of directing plays
PREREQ: THEA104
- THEA 466 INDEPENDENT STUDY 1-6**
- THEA 490 SEMINAR IN THEATRE AND DRAMA 3**
Seminar in theatre and drama. Topics will be announced.
RESTRICTIONS: Requires permission of instructor.
- THEA 600 DISTINCTIONS OF PROFESSIONAL THEATRE PRACTICE 1-3**
Inquiry into the nature of the theatre as an art form; techniques and issues of communication, organization, management, leadership team participation and creativity necessary to the pursuit and accomplishment of fulfilling careers in institutional and commercial theatres. Explores how the nature and purpose of the theatre as an art informs the day-to-day practices, values and behavior of the individual artist.
RESTRICTIONS: Requires enrollment in Professional Theatre Training Program. May be repeated up to 12 credit hours.
- THEA 601 DYNAMICS 1**
A vocal/physical warmup. Exercises designed to prepare student for the day's work
RESTRICTIONS: Requires enrollment in the Professional Theatre Training Program. May be repeated for up to six credit hours.
- THEA 602 VOICE DEVELOPMENT IA 1**
Basic breath control and tone production to develop strength, control, flexibility and awareness.
RESTRICTIONS: Requires enrollment in the Professional Theatre Program/Acting or Directing
- THEA 603 VOICE DEVELOPMENT IB 1**
Continuation of THEA602.
PREREQ: THEA602
- 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 IB 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 IIB 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 IB 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 IIIB 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 IIB** 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 course exploring 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.
RESTRICTIONS: 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 upholstery 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.
RESTRICTIONS: 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.
RESTRICTIONS: 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.
RESTRICTIONS: 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.
RESTRICTIONS: 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.
RESTRICTIONS: 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.
RESTRICTIONS: 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.
RESTRICTIONS: Requires enrollment in the Professional Theatre Training Program/Technical Production. May be repeated for 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.
RESTRICTIONS: 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 PTTP production faculty.
RESTRICTIONS: Requires enrollment in the Professional Theater Training Program. May be repeated up to nine credits.

URBAN AFFAIRS AND PUBLIC POLICY

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.
 RESTRICTIONS: 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 3
 Examines the complex ways in which the concepts of community analysis and development are used and understood. Students connect the concepts to issues, problems or policy alternatives affecting local communities by participating in applied projects. 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. Intent is to give basic understanding of financial statement analysis. Will cover 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.

UAPP 612 URBAN HOUSING POLICY AND ADMINISTRATION 3
 Problems associated with providing adequate and affordable housing in the U.S. The structure and dynamics of the housing market; demand and supply factors; market failure; financing methods; and 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 street-car 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 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 1
 Brings recognized scholars and leaders in urban affairs together with students. Provides an opportunity for wide-ranging discussion of current policy and research issues concerning communities and their citizens related to development, planning, democratic practice, social equity and governance in multiple contexts

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 622 RESOURCES, DEVELOPMENT AND THE ENVIRONMENT 3
 See GEOG622 for course description.

UAPP 623 INDEPENDENT STUDY IN GEOGRAPHICAL INFORMATION SYSTEMS (GIS) 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, and the course will go into substantial depth. Topics will include environmental impacts, utility programs, and international comparisons. May be cross-listed with MAST622 and/or POSC626.
 PREREQ: UAPP625 and 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 MAST628 and/or POSC628.

UAPP 628 ISSUES IN LAND USE AND ENVIRONMENTAL PLANNING 3
 See GEOG628 for course description.

UAPP 629 SEMINAR IN HISTORIC PRESERVATION 3
 Survey of historic preservation and management of cultural resources examining cultural contexts and public policy. Covers techniques of preservation, legal and legislative basis of preservation programs, with particular attention to National Register of Historic Places. May be cross-listed with ARTH628, HIST652 and/or MSST629.

UAPP 630 METHODS IN HISTORIC PRESERVATION 3
 Upper-level field research seminar concentrating on developing graphic, photographic and narrative skills for architectural documentation. Involves classroom and field sessions. May be cross-listed with ARTH634 and/or HIST634

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 634 HOUSING FINANCE AND DEVELOPMENT 3
 Fundamentals of real estate and housing finance. Various 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 function, operation and regulation of financial and related institutions, including FHA, FNMA, GNMA, FHLBB 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 data-base techniques. May be cross-listed with ARTH622, GEOG636 and/or HIST636.

UAPP 638 WORLD CITIES IN COMPARATIVE PERSPECTIVE 3
 See GEOG638 for course description.

UAPP 640 INTERNATIONAL AND DEVELOPMENT ADMINISTRATION 3
 See POSC640 for course description.

UAPP 642 STRATEGIC PLANNING FOR PUBLIC AND NONPROFIT ORGANIZATIONS 3
 Provides students with the skills and knowledge required for carrying out strategic planning in private nonprofit and public agencies. Focuses on the organizational environments in which planning takes place, examines the theories which underlie planning in general and strategic planning in particular and presents a usable model for strategic planning.

UAPP 645 PUBLIC SECTOR LABOR RELATIONS 3
 An overview of employer-employee relations in state and local governments. Emphasis on the economic and political environment, institutional responses to collective bargaining, and economic and political outcomes of the bargaining process. Some emphasis on development of skills in grievance handling and arbitration.

UAPP 647 PHILOSOPHY OF TECHNOLOGY 3
 See PHIL647 for course description.

UAPP 648 ENVIRONMENTAL ETHICS 3
 See PHIL648 for course description.

UAPP 653 POLITICS AND HEALTHCARE 3
 See POSC653 for course description.

UAPP 654 VERNACULAR ARCHITECTURE 3
 See HIST654 for course description.

UAPP 655 SOCIAL ENVIRONMENT AND HEALTH 3
 Examines the relation between socioeconomic structure and health as a descriptive and conceptual framework for health policy analyses at national and local levels. Views relations between health levels and socioeconomic structure, and changes in socioeconomic structure from spatial and historical perspectives. Dimensions of socioeconomic structure include income, education, occupation, industry, employment and ethnicity.

UAPP 656 POLITICS AND DISASTER 3
 See POSC656 for course description.

UAPP 657 HEALTH POLICY 3
 Provides students with a basic understanding of the U.S. health system and gives them practical experience in analyzing how healthcare reform and health policy more generally affect various sectors of the economy.

UAPP 658 CONTEMPORARY ISSUES IN PUBLIC ADMINISTRATION 1
 Focus on "cutting edge" issues in the field of public administration and public affairs, including the response of those in public administration as they seek to establish more clearly the role of administrators in the governance process.

UAPP 659 TOPICS IN PUBLIC ADMINISTRATION 1
 Focuses on micro and macro public administration issues, i.e., privatization, health care cost containment, flexible benefits packages, ethics, organizational productivity, concession and productivity bargaining. May be cross-listed with POSC659.

UAPP 660 SEMINAR IN URBAN MANAGEMENT 3
 Provides a theoretical and conceptual orientation to urban management, perspectives on the development of urban management as a profession, a description of the intergovernmental, sociopolitical and economic environment of urban management, and analyses of current issues in the area.

UAPP 661 COMPARATIVE PUBLIC ADMINISTRATION AND POLICY 1
 Examines contemporary experience in public administration and policy in other cultures and systems.

UAPP 662 MUNICIPAL MANAGEMENT 3
 Surveys the major operational functions of local government with emphasis on the practical elements and problems in the management of these functions. Functions include solid waste disposal; economic development; planning and land use control; water supply; police and emergency services; and cultural, social and recreational services. Emphasis on innovative approaches to the provision of services.

UAPP 664 CASE STUDIES IN STATE AND LOCAL MANAGEMENT 3
 Uses analyses of cases in state and local decision making to enable students to improve their communication, decision making and management skills. Cases deal with a broad range of subject areas (e.g., health and recreation) and problems (e.g., facility location and personnel).

UAPP 670 INTRODUCTION TO FUND DEVELOPMENT 1
 Introduction to the principles of fund development, a guide to organizing for fund development, and an overview of the fundamentals of annual, major and planned giving fundraising.

UAPP 678 COASTAL AND MARITIME LAW 3
 See MAST678 for course description.

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. This course treats infrastructure decision making using approaches from public economics. May be cross-listed with POSC681.
 PREREQ: UAPP834 or microeconomics.

UAPP 683 REGIONAL POLICY ANALYSIS 3
 Why do some regions-cities grow and change? Course 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 POSC683.
 PREREQ: UAPP834 or microeconomics.

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, may be waived with instructor approval.

UAPP 686 STATE AND LOCAL GOVERNMENT: CONCEPT 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 to include legislative policy making and operations, executive branch organization and functions, structure and role of state courts, role of the governor and the states in intergovernmental policy making. State government in the Middle 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 800 RESEARCH DESIGN AND METHODOLOGIES 3
 Provides skills and examines issues in research design, data acquisition and data analysis in urban affairs.

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 803 SEMINAR: PUBLIC ADMINISTRATION 3**
See POSC803 for course description.
- UAPP 804 PROGRAM EVALUATION 3**
Survey of theory and methods for the evaluation of human service programs. When possible, students participate in actual evaluative research.
- UAPP 806 SURVEY RESEARCH 3**
Methods and procedures for the design, administration and analysis of sample surveys.
- 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 815 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. May be cross-listed with POSC815.
- UAPP 816 ADVANCED SOCIAL STATISTICS 3**
See POSC816 for course description.
- 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 and time series. May be cross-listed with POSC819.
PREREQ: Lotus 123 or 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 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 how public sector decision makers evaluate feasibility of government programs and projects. Governmental and societal costs incurred and benefits that would result if public programs or capital projects were undertaken in urban areas. Considers how issues of time, program design, urban activities and structures, and potential effectiveness should be handled. Considers the equity of government programs and their potential impact in the future.
- UAPP 828 URBAN ANALYSIS AND POLICY ALTERNATIVES 3**
Explores a variety of theories of the city and their ability to explain the contemporary conditions and problems of cities. Critically examines the role of analysis in the formation of urban policy.
- 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 resources 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 LAW FOR ADMINISTRATORS 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

Assists student in making decisions about specialization and internship objectives related to the Masters in Public Administration program and identifies related skills. Develops short- and long-term career skills.

UAPP 863 DOCTORAL RESEARCH PAPER 3

Requirement of the doctoral program, the doctoral research paper is prepared prior to the dissertation proposal.

RESTRICTIONS: Ph.D. students only

UAPP 864 INTERNSHIP FIELDWORK 2

Three-month (or equivalent) fieldwork completed along with seminars, performance evaluation and career reflection paper.

UAPP 868 RESEARCH 1-6

UAPP 869 MASTER'S THESIS 1-6

UAPP 870 READINGS 1-6

UAPP 872 ANALYTICAL PAPER 3-6

A requirement of the M.A., M.P.A. and M.E.E.P. programs. The paper demonstrates the student's ability to analyze a particular policy or administrative problem and develop an appropriate response.

UAPP 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.

UAPP 969 DOCTORAL DISSERTATION 1-12 PF

UNIVERSITY COURSE

UNIV 101 FIRST YEAR EXPERIENCE I 1 PF

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.

UNIV 102 FIRST YEAR EXPERIENCE II 1 PF

Continuation of UNIV101.

PREREQ: UNIV101.

UNIV 301 PEER MENTOR PRACTICUM I 1 PF

Seminar for peer mentors working in the LIFE program. Covers issues in peer mentor activities and LIFE clusters.

UNIV 302 PEER MENTOR PRACTICUM II 1 PF

Continuation of UNIV301.

PREREQ: UNIV301.

UNIV 303 PEER MENTOR PRACTICUM III 1 PF

Continuation of UNIV302.

PREREQ: UNIV302.

UNIV 320 CONTEMPORARY ISSUES FOR RESIDENT ASSISTANTS 1

Introduces new resident assistants to issues affecting college students. All topics covered in the course focus on the needs of the new resident assistant in the Office of Housing and Residence Life.

RESTRICTIONS: Must be a resident assistant.

UNIV 330 DEL CENTRAL YEAR ABROAD 0

UNIV 350 NATIONAL STUDENT EXCHANGE PROGRAM 0

UNIV 351 SEMESTER IN COPENHAGEN 0

UNIV 352 SEMESTER IN VIENNA 0

UNIV 354 SEMESTER IN LONDON 0

UNIV 359 SEMESTER AT BIOSPHERE 2 CENTER 0

UNIV 369 HONORS: UNDERGRADUATE RESEARCH SUSTAINING 0

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, University Honors Program.

UNIV 401 SENIOR THESIS 2-4

Senior thesis for students working toward a degree with distinction.

RESTRICTIONS: Total credit for UNIV401 and UNIV402 not to exceed six.

UNIV 402 SENIOR THESIS 2-4

Continuation of UNIV401.

RESTRICTIONS: Total credit for UNIV401 and UNIV402 not to exceed six.

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 3.0 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 899 MASTER'S SUSTAINING 0

UNIV 999 PH.D. SUSTAINING 0

WOMEN'S STUDIES

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 PHIL202 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 SOC1206.

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 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 PHIL210.

WOMEN'S STUDIES

- 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 216 INTRODUCTION TO FEMINIST THEORY 3**
See PHIL216 for course description.
- WOMS 222 LANGUAGE AND GENDER 3**
See LING222 for course description.
- WOMS 233 WOMEN, BIOLOGY AND MEDICINE 3**
Considers societal theories and medical practices concerning women and discusses their biological basis, their biological effects, sources of information with which to evaluate them, etc. Emphasis on preparing the student to make own medical and obstetrical decisions and to critically evaluate claims concerning male/female differences. May be cross-listed with CSCC233.
- WOMS 240 WOMEN AND VIOLENCE 3**
Analyzes a variety of issues and topics relating to women and violence, including rape, domestic violence, images of women in popular culture, incest and child abuse, pornography, sexual harassment and women who use violence. Presents descriptive materials, sociological analysis and strategies for change.
- WOMS 242 WOMAN AS IMAGE AND IMAGEMAKER 3**
See ARTH242 for course description.
- WOMS 250 TOPICS IN INTERNATIONAL WOMEN'S STUDIES 3**
Explores topics related to women's lives in various parts of the world and may include women's history, women's creativity, and social movements in Africa, Asia, Europe, Australia or Latin America.
- WOMS 291 WOMEN'S HISTORY THROUGH FILM 1**
Explores women's historical experiences through the medium of film. Students will view and discuss a variety of documentary films on women and read materials related to topics covered in the films. Films will deal with historical and contemporary issues in the United States and internationally. May be cross-listed with HIST291.
RESTRICTIONS: May be repeated for credit when topics vary.
- WOMS 298 RESEARCH ON RACE, ETHNICITY AND CULTURE 1 PF**
Lecture series in which faculty and guest speakers discuss their research on contemporary and historical perspectives on race, ethnicity and culture. Research presented from several disciplines, including sociology, history, literature, anthropology and psychology, among others. May be cross-listed with BAMS298.
RESTRICTIONS: May be repeated for credit when topics vary.
- WOMS 299 RESEARCH ON WOMEN 1 PF**
Interdisciplinary lectures in which faculty, staff and advanced students share results of their research on women. Lectures cover issues in anthropology, sociology, political theory, psychology, philosophy, literature, history, theology, ethnic studies, music, art, math education, health, etc.
RESTRICTIONS: May be repeated for credit when topics vary.
- WOMS 300 WOMEN IN AMERICAN HISTORY 3**
See HIST300 for course description.
- WOMS 302 WOMEN IN MUSIC: AN ALTERNATE SURVEY 3**
See MUSC302 for course description.
- WOMS 305 THE EVOLUTION OF HUMAN SEX ROLES AND REPRODUCTION 3**
See ANTH305 for course description.
- WOMS 311 RENAISSANCE WOMEN, SOCIETY AND ART 3**
See ARTH311 for course description.
- WOMS 315 THIRD WORLD WOMEN IN POLITICS 3**
See POSC315 for course description.
- WOMS 318 STUDIES IN FILM 3**
See ENGL318 for course description.
PREREQ: ENGL110
RESTRICTIONS: May be repeated for credit when topics vary.
- WOMS 320 VARYING AUTHORS AND GENRES 3**
See FLLT320 for course description.
- WOMS 322 TOPICS: CLASSICAL LITERATURE IN TRANSLATION 3**
See Fllt322 for course description.
- WOMS 323 INTRODUCTION TO WOMEN AND POLITICS 3**
See POSC323 for course description.
- WOMS 325 TOPICS: GERMAN LITERATURE IN TRANSLATION 3**
See FLLT325 for course description.
- WOMS 326 TOPICS: HISPANIC LITERATURE IN TRANSLATION 3**
See FLLT326 for course description.
- WOMS 327 RACE, GENDER, SCIENCE 3**
See PHIL327 for course description.
- WOMS 328 TOPICS: JAPANESE LITERATURE IN TRANSLATION 3**
See FLLT328 for course description.
- WOMS 329 TOPICS: ITALIAN LITERATURE IN TRANSLATION 3**
See FLLT329 for course description.
- WOMS 330 VARYING AUTHORS, THEMES AND MOVEMENTS 3**
See FLLT330 for course description.
- WOMS 333 PSYCHOLOGY OF WOMEN 3**
See PSYC333 for course description.
- WOMS 350 GENDER AND CRIMINAL JUSTICE 3**
See CRJU350 for course description.
- WOMS 352 STUDIES IN NINETEENTH-CENTURY LITERATURE 3**
See ENGL352 for course description.
PREREQ: ENGL110
RESTRICTIONS: May be repeated once for credit when topics vary.
- WOMS 353 TWENTIETH CENTURY BRITISH LITERATURE 3**
See ENGL353 for course description.
- WOMS 363 WOMEN IN CROSS-CULTURAL PERSPECTIVE 3**
Social realities of women within the cultures of Asia, Africa and Latin American societies. How institutions such as motherhood, the family, sexuality and work structure women's lives within the dominant social ideologies. May be cross-listed with ANTH363.
- WOMS 366 INDEPENDENT STUDY 1-6**
- WOMS 372 POPULAR CULTURE IN URBAN JAPAN 3**
See HIST372 for course description.
- WOMS 375 TOPICS: RUSSIAN AND SOVIET CULTURE IN TRANSLATION 3**
See FLLT375 for course description.
- WOMS 380 WOMEN WRITERS 3**
See ENGL380 for course description.
- WOMS 381 WOMEN IN LITERATURE 3**
See ENGL381 for course description.
- WOMS 382 STUDIES IN MULTICULTURAL LITERATURE IN ENGLISH 3**
See ENGL382 for course description.
- WOMS 385 WOMEN AND THE ECONOMY 3**
See ECON385 for course description.
PREREQ: ECON151.
- WOMS 389 TOPICS: WOMEN AND HEALTH ISSUES 3**
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 CSCC389 and/or PHIL389.
RESTRICTIONS: May be repeated for credit when topics vary.
- WOMS 390 HONORS COLLOQUIUM 3**
See ARSC390 for description. May be cross-listed with ANTH390, IFST390 and/or PHIL390.
- WOMS 392 HONORS COLLOQUIUM 3**
See PHIL392 for course description.

WOMS 401 FOUNDATIONS OF HUMAN SEXUALITY	3	WOMS 475 SEMINAR IN MODERN EUROPEAN HISTORY	3
See IFST401 for course description.		See HIST475 for course description.	
WOMS 407 SOCIOLOGY OF SEX AND GENDER	3	WOMS 480 SEMINAR	3
See SOCI407 for course description and restrictions		See ENGL480 for course description.	
WOMS 410 CRITICAL ISSUES IN FEMINIST SCHOLARSHIP	1	WOMS 484 WOMEN IN SPORTS	3
Capstone course for majors. Culminates in a senior conference. Students must complete one of the following options: 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.		See HESC484 for course description.	
RESTRICTIONS: Senior majors and minors. Requires approval of women's studies advisor and course instructor. Students who select cross-listed seminar option, study abroad option, thesis option or equivalent, or internship option must register for the appropriate courses.		WOMS 498 INTERNSHIP IN WOMEN'S STUDIES	3
WOMS 411 SEMINAR IN AMERICAN HISTORY	3	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.	
See HIST411 for course description.		RESTRICTIONS: Requires permission of instructor.	
WOMS 413 PROBLEMS IN AMERICAN GOVERNMENT	3	WOMS 610 CRITICAL ISSUES IN FEMINIST SCHOLARSHIP	3
See POSC413 for course description.		Provides a survey introduction to women's studies for graduate students.	
WOMS 415 RACE, CLASS AND GENDER	3		
See SOCI415 for course description.			
WOMS 418 RACE, GENDER AND POVERTY	3		
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 TEACHING FAMILY LIFE	3		
See IFST430 for course description			
WOMS 436 POLITICS AND LITERATURE	3		
See POSC436 for course description			
WOMS 439 WOMEN AND REVOLUTION IN AFRICA	3		
See HIST439 for course description.			
WOMS 440 TOPICS IN INTERPERSONAL AND ORGANIZATIONAL COMMUNICATION	3		
See COMM440 for course description.			
WOMS 442 TOPICS IN ORGANIZATIONAL COMMUNICATION	3		
See COMM442 for course description.			
WOMS 444 SEMINAR: WOMEN IN THE ISLAMIC MIDDLE EAST	3		
See HIST444 for course description.			
WOMS 460 WOMEN IN INTERNATIONAL DEVELOPMENT	3		
See SOCI460 for course description.			
WOMS 465 STUDIES IN LITERATURE GENRES, TYPES AND MOVEMENTS	3		
See ENGL465 for course description.			
WOMS 466 INDEPENDENT STUDY	1-6		
WOMS 471 ADVANCED PHILOSOPHICAL TOPICS	3		
See PHIL470 for course description			
WOMS 472 SEMINAR IN MEDIEVAL HISTORY	3		
See HIST471 for course description.			