

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

The course begins with a brief review of the articulatory, acoustic, and perceptual characteristics of speech and computer-based laboratory instrumentation. The remainder of the course is reserved for conduct of 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

PREREQ: LING667.

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 881 SOVIET PSYCHOLINGUISTICS I 3

Study of the theories of Vygotsky, Luria, Leon'ev and others. Basic concepts in Soviet theory: activity, zone of proximal development and regulation.

LING 882 SOVIET PSYCHOLINGUISTICS II 3

Advanced problems in Soviet theory of language learning. Non-Soviet extensions of the theory. Application of theory to second-language acquisition.

PREREQ: LING881

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 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

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 MALS majors only

MALS 603 THE AMERICAN FRONTIER: FACT AND FICTION 3

Uses novels, films and more traditional sources of information to examine the role of the frontier in shaping American attitudes and values.

RESTRICTIONS: Open to MALS majors only.

MALS 605 CHINA AND THE WEST 3

Survey of historical and cultural contacts between China and the West before the 19th century. Presents, among other topics, the old silk road, medieval Christian missions to China, Marco Polo, the Jesuits in Peking, introduction of Western learning into China and the Chinese vogue in the West during the 17th and 18th centuries.

RESTRICTIONS: Open to MALS 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 MALS 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 612 MORAL CHARACTER: VALUES, VIRTUES, RESPONSIBILITIES 3

Tests the hypothesis that lives are more meaningful in direct proportion to developed moral character. Addresses "What is a worthy life?" by exploring such concepts as self-knowledge, integrity, autonomy, courage, justice, work, love and community. Readings from philosophers and developmental psychologists.

RESTRICTIONS: Open to MALS 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 614 THE FRENCH REVOLUTION: IDEAS, INTERPRETATIONS AND DISSENT 3

Examines ways in which the French Revolution of 1789-1815, with all its complex events and movements, has been perceived and conceptualized by contemporaries, commentators and professional scholars. In-depth study of its literature to see how human beings invented concepts and interpretations to make sense of the French Revolution.

RESTRICTIONS: Open to MALS majors only.

MALS 615 REASON, REVOLUTION AND THE RIGHTS OF MAN 3

Examines eighteenth-century French and English movement away from Cartesian rationalism and towards a rejection of reason leading to romanticism and revolution and an application of reason leading to a discussion of civil and human rights.

RESTRICTIONS: Open to majors only.

MALS 616 ON THE NATURE OF GOOD AND EVIL: INQUIRIES IN LITERATURE, PSYCHOLOGY AND RELIGION 3

Focuses on novels and plays that explore the definition of good and evil in Judeo-Christian culture. Students will read these literary works in conjunction with essays by psychologists and theologians who discuss the concept of good and evil from a variety of perspectives

RESTRICTIONS: Open to majors only.

MALS 617 AMERICAN ART IN CONTEXT 3

This course is 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.

MALS 618 STUDIES IN THE HISTORY OF ART 3

Selected topics in the history of art. Focuses on art in the context of cultural and social history for an advanced audience of non-specialists.

RESTRICTIONS: Open to MALS majors only.

MALS 647 PHILOSOPHY OF TECHNOLOGY 3

See PHIL647 for course description

MALS 869 MASTER'S THESIS 1-6

MALS 879 SYNTHESIS PROJECT 3-6

MATERIALS SCIENCE

MASC 302 MATERIALS SCIENCE FOR ENGINEERS 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

MASC 406 CORROSION AND PROTECTION 3

How structural materials degrade by interaction with their environments. High-temperature oxidation and sulfidation of alloys. Electrochemical attack on alloys by electrolytes in relation to metallurgical structure. Stress corrosion cracking. Aggressive environments. Testing and control methods.

PREREQ: Physical chemistry.

MASC 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: MASC302

MASC 602 STRUCTURE OF MATERIALS 3

Fundamentals of crystallography. Crystal structure analysis by X-ray and electron diffraction. Characterization of materials by optical microscopy, scanning and transmission electron microscopy. Simplified approach to image theory and diffraction theory

PREREQ: MASC302.

MASC 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: MASC302 and MASC602.

COREQ: MASC602.

MASC 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: MASC302.

MATERIALS SCIENCE

MASC 606 CORROSION AND PROTECTION 3

Degradation of structural materials through interaction with their environment. High temperature oxidation and sulfidation. Electrochemical attack on alloys and its relation to metallurgical structure. Stress corrosion cracking. Testing and control methods. Localized corrosion. Deterioration of advanced materials.

PREREQ: MASC302

MASC 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.

PREREQ: MASC302

RESTRICTIONS: Graduate standing acceptable in lieu of Prerequisite

MASC 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

MASC 616 CHEMISTRY AND PHYSICS OF SURFACES AND INTERFACES 3

See CHEG616 for course description

MASC 623 ELECTRICAL PROPERTIES OF MATTER I 3

See ELEG623 for course description.

MASC 624 CARRIER TRANSPORT IN SOLIDS 3

Quasi-equilibrium behavior of carriers in homogeneous semiconductors; relaxation, trapping and scattering mechanisms; and regimes of transport. Generation and recombination of excess carriers; equations of continuity and their solutions; and high-field effects. Metal-semiconductor contacts; symmetric and asymmetric semiconductor homojunctions; and heterojunctions.

PREREQ: ELEG623.

MASC 803 EQUILIBRIA IN MATERIAL SYSTEMS 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: MASC302

MASC 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: MASC302

MASC 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.

MASC 811 ADVANCED TOPICS IN MATERIALS 1-3

Discussion of a topic of current interest in the science or engineering of materials

MASC 821 DIFFRACTION OF RADIATION BY MATTER 3

Theory and analysis of diffraction from ideal and imperfect crystals, gases and liquids, and other atomic aggregations.

MASC 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.

MASC 824 ADVANCED CARRIER TRANSPORT IN SOLIDS 3

Selected topics of advanced electronic properties of semiconductors, electronic structure of bands and defects, anisotropy, semiconducting glasses, photon and phonon-induced transitions, quasi-particles, defect spectroscopy, advanced scattering of electrons, phonons, photons, multi-particle theory, nonlinear effects, high-field effects, photoconductivity and luminescence. Recent developments.

MASC 868 RESEARCH 1-9

MASC 869 MASTER'S THESIS 1-6

MASC 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

MASC 969 DOCTORAL DISSERTATION 1-12 PF

MARINE STUDIES

MAST 200 CONCEPTS IN OCEANOGRAPHY 3

Introduction to the scientific study of oceanography. Exploration of the multi-disciplinary nature of applying fundamental physics, chemistry, biology, geology, meteorology and mathematics to understanding the world ocean. Combined lectures with extensive video presentations illustrate field and laboratory research in oceanography.

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 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 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 621 COASTAL FIELD BIOLOGY 1

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 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.

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 halophytic plants. Emphasis on student seminars and group discussions of the current literature.

RESTRICTIONS: May be repeated for credit when topics vary.

MAST 627 MARINE BIOLOGY 3

Ecologically oriented study of elementary oceanography, adaptive physiology, aspects of population and community ecology, reproductive and larval biology and marine production systems. Emphasis on coastal and estuarine habitats including soft and hard-substrate intertidal regions, subtidal regions and coral reefs.

PREREQ: General Biology, Ecology, Genetics, and Physiology.

RESTRICTIONS: Requires permission of instructor

MAST 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

Adds 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 640 OPTO-ELECTRONICS 3

See ELEG640 for course description.

MAST 645 GENERAL OCEANOGRAPHY 3

Introduction to the science of oceanography, emphasizing the physical and natural sciences nature of the subject matter and application to social schemes.

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 INTRODUCTION TO MARINE POLICY 3

Provides an overview of conceptual approaches and analytical tools used in the field as well as an overview of major substantive areas of marine policy. Covers (mainly in a U.S. context) fisheries management, marine minerals exploitation, coastal management, marine transportation and naval power.

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: ECON401

MAST 677 OCEAN LAW AND POLICY 3

Focuses on understanding the strengths and weaknesses of the legal framework which governs ocean resources and ocean space beyond the limits of national jurisdiction. Evaluates international conventions which pertain to the ocean as to impact and effectiveness.

MAST 678 ADMIRALTY AND MARITIME LAW 3

An introduction to admiralty and maritime law, including jurisdiction and decisions on carriage of goods by sea, maritime liens, torts against seamen, collisions, salvage, marine pollution, and marine insurance, with study of public policy issues. May be cross-listed with POSC678 and/or URAF678.

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 680 INTRODUCTION TO APPLIED OCEAN SCIENCE 3

Basic quantitative and empirical description of the behavior of solids, fluids, soils and engineering materials. Corrosion and environmentally induced forces. Development, design, construction and operation of marine structures, transportation energy and aquatic production systems. Role of remote sensing.

RESTRICTIONS: Requires permission of instructor. Not open to applied ocean science or engineering majors.

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 683 STRUCTURAL MATERIALS IN SEAWATER 3

Electrochemical, physical and biological interactions of metals, polymers, concrete, wood and composites with seawater. Emphasis on materials selection and deterioration prevention measures.

PREREQ: CHEM101.

RESTRICTIONS: For students with little or no background in material science. Not for credit for students that passed MASC302.

MAST 684 PARTICLES IN THE AQUEOUS SYSTEM 3

Deals with all aspects of particle flocculation that occur within the bounds of the natural environment. Brings together from a number of fields (physics, engineering, chemistry and biochemistry) the theories, equations and principles that bear on the natural aqueous environment.

RESTRICTIONS: Requires permission of instructor.

MAST 685 UNDERWATER ACOUSTICS 3

Principles of underwater acoustics, including history and basic concepts; the sonar equations; propagation of sound in the sea; reflection and scattering; sonar background noise; detection of signals in noise; sonar systems; system requirements and operations; and signal processing and display.

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 687 COLLOIDAL SCIENCE SEMINAR 1

Basic scientific and applied research topics in colloidal science presented by University students, faculty and guest speakers. Stresses the processes related to fine particles in the marine environment.

RESTRICTIONS: May be repeated for credit when topics vary.

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 804 AIR-SEA INTERACTION I 3

Atmospheric surface layer above and aqueous boundary layer below the air-sea interface; and laboratory.

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 807 GEOPHYSICAL FLUID DYNAMICS II 3

Investigation of fundamental topics in the dynamics of waves and circulation in dynamical physical oceanography and meteorology. Wind-driven ocean circulation, quasi-geostrophic motion of a stratified fluid, and instabilities.

PREREQ: MAST806

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 810 NUMERICAL OCEAN MODELING 3

Application and analysis of numerical techniques for simulating time-dependent fluid flow in two and three dimensions with specific application to large-scale ocean flows. Covers finite-difference, finite-element and spectral techniques. Computer implementation of at least one example problem.

PREREQ: MAST807 and MATH610

RESTRICTIONS: Requires proficiency in FORTRAN, C or Pascal.

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 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 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 technique.

PREREQ: Graduate course in biochemistry

RESTRICTIONS: May be repeated for credit when topics vary.

MAST 831 ESTUARINE AND SHELF GEOLOGICAL OCEANOGRAPHY 3

Origin, distribution and character of sediments deposited in the estuarine and shelf environment. Identifies interaction of sediments and physical, biological and chemical processes.

PREREQ: MAST631 and GEOL631

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 854 MARINE SEDIMENTARY GEOCHEMISTRY 3

Fluxes of major, minor, trace and nutrient elements from ocean waters to marine sedimentary deposits, with emphasis on the deposition of material on the ocean floor, the reaction and transport regimes in sediments that redistribute this material, and return fluxes from sediments to the overlying water.

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 868 RESEARCH 1-9

MAST 869 MASTER'S THESIS 1-6

MAST 870 ADVANCED MARINE POLICY 3

A continuation of MAST670. Explains conceptual approaches and analytical tools in greater detail and applies them to specific marine policy issues in several nations. Compares and contrasts national ocean policies of a selected number of nations. Students evaluate and/or resolve a marine policy issue of their choice at a local, state, national or international level.

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 and 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 881 SATELLITE OCEANOGRAPHY 3

Fundamentals of remote sensing in oceanography, including space platforms, their orbits, instruments, data retrieval and image processing. Oceanographic applications of remote sensing, including visible, infrared and microwave techniques for sensing ocean color, temperature, salinity, currents and waves. Recent developments of remote sensing models for oceanic studies and new developments in data analysis.

RESTRICTIONS: Requires permission of instructor.

MAST 883 CURRENT TOPICS IN APPLIED OCEAN SCIENCE 1-4

Advanced treatment of selected areas of the applied ocean sciences, including acoustic wave propagation; remote sensing of physical biological properties of the oceans; experimental fluid dynamics; coagulation of suspended materials; and marine corrosion/biofouling. Course may be repeated with each change of topic.

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

Establishes, or reestablishes, the background of those who desire to take College Algebra. Experience indicates that many persons who need college mathematics are not able to proceed because of a deficient background.

MATH 012 CONCEPTS OF INTERMEDIATE ALGEBRA 1-3 R

Reviews algebra concepts and skills needed for college level mathematics courses. Topics (when three credits are completed) include a review of sets, operations with polynomial and rational expressions, solving various types of equations and inequalities and an introduction to coordinate plane and functions.

RESTRICTIONS: Requires arithmetic skills.

MATH 114 COLLEGE MATHEMATICS AND STATISTICS 3

Basic algebra skills and concepts with a strong emphasis on graphing and applications in the areas of management, life and social sciences. Topics include exponential functions, logarithms, statistics, linear programming and arithmetic and geometric sequences.

PREREQ: MATH012 or MATH010

RESTRICTIONS: Only three credits from any combination of MATH114, MATH115, MATH170, MATH171 and MATH172 can count toward graduation.

MATH 115 PRE-CALCULUS 3

Develops concepts required for calculus around the unifying notions of a function and the graph of a function (polynomial, algebraic, exponential, logarithmic, and trigonometric functions).

RESTRICTIONS: Familiarity with central concepts of algebra (factoring, solving equations, simplifying algebraic expression and laws of exponents) recommended. Only three credits from any combination of MATH114, MATH115, MATH170, MATH171 and MATH172 can count toward graduation.

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

Stresses algebra concepts and applications, elementary and trigonometric functions and topics in statistics. Variable credit allows the student to proceed at his/her own pace.

RESTRICTIONS: Content same as MATH114 when all three credits completed. Only three credits from any combination of MATH114, MATH115, MATH170, MATH171 and MATH172 can count toward graduation.

MATH 171 SELF-PACED PRE-CALCULUS 1-3

Develops concepts required for calculus around the concept of a function and its graph. Polynomial, rational, exponential, logarithmic and trigonometric functions stressed. Variable credit allows the student to proceed at his/her own pace.

PREREQ: Intermediate Algebra

RESTRICTIONS: Content is same as MATH115 when all three credits completed. Only three credits from any combination of MATH114, MATH115, MATH170, MATH171 and MATH172 can count toward graduation.

MATH 172 ALGEBRA AND PRECALCULUS 2

Mastery-based algebra review followed by concepts required for MATH221 developed around functions and their graphs (polynomial, rational, logarithmic and exponential).

RESTRICTIONS: Does not satisfy general skills math requirement. Only three credits from any combination of MATH114, MATH115, MATH170, MATH171 and MATH172 can count toward graduation.

MATH 210 DISCRETE MATHEMATICS I 3

Sets, logic, induction, number systems, counting, finite probability, introduction to graph theory, sequences and formal power series.

PREREQ: MATH115

RESTRICTIONS: Credit cannot be received for both MATH210 and MATH230.

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. Credit cannot be received for both MATH230 and MATH210.

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, log and trig functions; integration techniques; polar coordinates; and vectors.

PREREQ: MATH241

RESTRICTIONS: Credit cannot be received for both MATH242 and MATH222.

MATH 243 ANALYTIC GEOMETRY AND CALCULUS C 4

Partial derivatives, multiple integrals, line integrals and series.

PREREQ: MATH242

MATH 251 MATHEMATICS FOR THE ELEMENTARY SCHOOL I 3

Basic number concepts: numeration, whole numbers, integers, rational numbers, real numbers and arithmetic procedures.

MATH 252 MATHEMATICS FOR THE ELEMENTARY SCHOOL II 3

Continuation of MATH251

PREREQ: MATH251

MATH 260 BASIC CONCEPTS OF ANALYSIS 3

The notion of limit, continuity, convergence, uniform continuity, least upper bound, greatest lower bound, compactness and connectedness.

PREREQ: MATH243

MATH 280 INSIGHTS INTO MATHEMATICS 3

A basic course. Mathematics presented as a human endeavor. Topics include problem solving, reasoning and modeling.

PREREQ: MATH114 or MATH115

RESTRICTIONS: For liberal arts students not necessarily planning further study in mathematics.

MATH 302 ORDINARY DIFFERENTIAL EQUATIONS 3

Solutions of ordinary differential equations of first and second order; and applications, Laplace transforms, Fourier series and power series solutions.

PREREQ: MATH243

RESTRICTIONS: Credit not given for both MATH302 and either MATH341 or MATH342.

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.

PREREQ: MATH302

RESTRICTIONS: For chemical engineering majors (Juniors and Seniors) 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 MATH302 and MATH341, or both MATH349 and MATH341.

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 MATH349 and MATH342, or both MATH302 and MATH342.

MATH 349 ELEMENTARY LINEAR ALGEBRA 3

Systems of linear equations, determinants, vector spaces, linear transformations, eigenvalues and eigenvectors.

PREREQ: MATH230 OR MATH242.

RESTRICTIONS: Credit not given for both MATH349 and either MATH341 or MATH342.

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 381 PRACTICUM IN SECONDARY MATHEMATICS 1 PF

Teaching experience in a clinical setting, the Math Center. Helps develop an enquiring attitude: to be a perceptive observer of the learning behaviors of those taught, one must develop hypotheses about the causes of misconceptions, means of diagnosing them and methods of treatment (including uses of technology).

COREQ: MATH243.

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 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 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 ABSTRACT ALGEBRA 3

Integers, modular arithmetic, euclidean algorithm and chinese remainder theorem, polynomial rings, including the fundamental theorem of algebra and lagrange interpolation. Introduction to field theory, primitive elements and simple extensions.

PREREQ: MATH349.

MATH 466 INDEPENDENT STUDY 1-6

MATH 503 ADVANCED CALCULUS FOR APPLICATIONS 3

Multivariable calculus, vector calculus, infinite series, uniform convergence and Fourier analysis.

PREREQ: MATH302.

MATH 508 INTRODUCTION TO COMPLEX VARIABLES AND APPLICATIONS 3

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

PREREQ: MATH243.

MATH 514 TOPICS IN ADVANCED MATHEMATICS FOR ENGINEERS 3

Basic methods of analysis: introduction to complex variables; special functions including Bessel functions and Legendre polynomials; Fourier series and integrals; partial differential equations; and emphasis on engineering applications.

PREREQ: MATH302.

RESTRICTIONS: For engineering students.

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 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 540 GEOMETRY 3

Axiomatic systems; transformations; Euclidean, projective and hyperbolic geometry.

PREREQ: MATH349.

RESTRICTIONS: Graduate credit only for teachers.

MATH 555 APPLIED CALCULUS FOR BUSINESS AND ECONOMICS 3

Accelerated version of the usual two-semester undergraduate preparation in calculus.

RESTRICTIONS: Requires high school algebra. Designed for students enrolling in M.B.A. program.

MATH 600 FUNDAMENTALS OF REAL ANALYSIS 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.

RESTRICTIONS: Credit not given for both MATH600 and MATH601.

MATH 601 ADVANCED CALCULUS - INTRODUCTION TO ANALYSIS I 3

Limits, continuity, sequences and series, theory of differentiation and integration, and several variable calculus.

PREREQ: MATH260.

RESTRICTIONS: Credit not given for both MATH600 and MATH601.

MATH 602 ADVANCED CALCULUS - INTRODUCTION TO ANALYSIS II 3

Continuation of MATH600 OR MATH601.

PREREQ: MATH600 or MATH601.

MATH 605 APPLIED FUNCTIONAL ANALYSIS 3

Introduction to formulation and solution of problems of engineering and science by means of functional analytic methods in Hilbert and Banach spaces. Includes boundary and initial value problems in ordinary and partial differential equations as well as integral equations. Emphasis on constructive techniques: variational methods, approximate solutions, bounds for eigenvalues, etc.

PREREQ: MATH514, PHYS608, MEEG864 or advanced calculus.

MATH 609 INTERMEDIATE ORDINARY DIFFERENTIAL EQUATIONS WITH APPLICATIONS 3

Theory and applications of ordinary differential equations; existence theorems of linear and nonlinear systems, oscillation theorems, stability theory, and Sturm-Liouville theory.

PREREQ: MATH302, MATH349 and one semester of advanced calculus.

MATH 610 INTRODUCTION TO PARTIAL DIFFERENTIAL EQUATIONS WITH APPLICATIONS 3

Introduction to partial differential equations: equations of mathematical physics and their classical theories emphasizing boundary and initial value problems and their interpretations.

PREREQ: Two semesters of advanced calculus.

MATH 611 INTRODUCTION TO NUMERICAL ANALYSIS AND SCIENTIFIC COMPUTING I 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 ANALYSIS AND SCIENTIFIC COMPUTING II 3

Approximation, interpolation, data fitting and smoothing, numerical methods for ordinary differential equations. Additional topic selected at discretion of instructor. Experience with standard computer packages, code development and simulations of applied problems.

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 formulation of mathematical problems for systems of interest outside mathematics, particularly those from engineering and physics; systems studied vary; emphasis on interplay between system and mathematical model.

PREREQ: Two semesters of advanced calculus and PHYS208.

MATH 617 INTRODUCTION TO APPLIED MATHEMATICS II 3

Methods of attack on mathematical problems for systems of interest outside mathematics; calculus of variations techniques; and interpretation of solutions to problems in terms of systems.

PREREQ: MATH616.

RESTRICTIONS: Familiarity with systems treated acceptable in lieu of Prereq.

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, classical discrete and continuous random variables; mathematical expectation and moments of a distribution; Chebyshev's inequality; and law of large numbers and central limit theorem. May be cross-listed with STAT601.

MATH 631 INTRODUCTION TO STOCHASTIC PROCESSES 3

Classical stochastic processes with emphasis on their properties, which do not involve measure theory. Course contents: 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 632 TOPICS IN APPLIED PROBABILITY 3

The application of probability theory or stochastic processes in a specific area of science. May include treatment of probabilistic methods not ordinarily covered in other courses. Possible topics are the theory of queues, dams and inventories, replacement and reliability, probability models in population growth and biomathematics, Monte Carlo simulation, algorithmic methods in probability and operational methods.

MATH 650 ABSTRACT ALGEBRA 3

Modular arithmetic, Chinese remainder theorem, rings (including polynomial rings), ideals and quotient rings, groups and homomorphism theorems, unique factorization and principal ideal domains, field extensions.

PREREQ: MATH349.

MATH 672 VECTOR SPACES 3

Vector spaces, linear transformations, decomposition theorems and bilinear forms.

PREREQ: MATH349.

MATH 688 COMBINATORICS AND GRAPH THEORY WITH APPLICATIONS I 3

Permutations and combinations, generating functions and other enumeration techniques, recurrence relations, basic graph theory, partially ordered sets, combinatorial optimization and time complexity.

PREREQ: An undergraduate course in linear algebra.

MATH 689 COMBINATORICS AND GRAPH THEORY WITH APPLICATIONS II 3

Selected topics from graph theory, combinatorial designs, finite geometries, extremal and probabilistic combinatorics. Applications to combinatorial optimization, experimental design and analysis of algorithms.

PREREQ: MATH688.

COREQ: MATH650

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 698 THEMATIC SEMINAR 2 PF

Problems oriented class, topics vary from year to year. Aim is to give students research experience in mathematics and to show how mathematics is used to solve problems.

MATH 801 CALCULUS OF VARIATIONS 3

Comprehensive introduction to variational principles and methods in science and engineering; classical calculus of variations with applications to mechanics; problems of optimal control; direct methods including the method of Faedo-Gelerkin. Emphasis on applications.

RESTRICTIONS: Requires familiarity with concepts of advanced calculus.

MATH 804 TOPICS IN OPTIMIZATION 3

Selected topics from the following: variational inequalities theory of optimal control, complex analysis and nonsmooth optimization, game theory, and optimization algorithms.

MATH 805 ANALYSIS I 3

Topics include Lebesgue measure and integration, absolute continuity and functions of bounded variations, L_p spaces and Fubini's theorem.

PREREQ: MATH602

MATH 806 ANALYSIS II 3

Fundamental structures of modern analysis with special emphasis on the theory of Hilbert space, spectral theorems and application to integral and differential equations.

PREREQ: MATH805

MATH 807 COMPLEX ANALYSIS 3

Complex numbers; analytic functions; geometry of elementary functions; integrals; power series; residues and poles.

PREREQ: MATH602

MATH 808 COMPLEX ANALYSIS 3

Conformal mapping with applications; analytic continuation; Riemann surfaces; elliptic functions; and infinite products.

PREREQ: MATH807.

MATH 811 TOPICS IN CLASSICAL ANALYSIS 3

Investigation of topics chosen from function theory such as geometric function theory, Riemann surfaces, meromorphic and entire functions, etc.

RESTRICTIONS: Requires permission of instructor.

MATH 815 FUNCTIONAL ANALYSIS 3

Topological vector spaces with short introductory review of Banach spaces.

PREREQ: MATH806.

MATH 818 THEORY OF ORDINARY DIFFERENTIAL EQUATIONS 3

Linear systems with isolated singularities and systems with periodic coefficients; boundary value problems; Poincare-Bendixson theory.

PREREQ: MATH609 and MATH805

MATH 819 THEORY OF ORDINARY DIFFERENTIAL EQUATIONS 3

Singular Sturm-Liouville theory; asymptotic behavior of linear and nonlinear systems; and topics of current research.

PREREQ: MATH818.

MATH 822 INTEGRAL EQUATIONS 3

Fredholm and Hilbert-Schmidt theories of Fredholm integral equations of the second kind. Equations of the first kind. Volterra equations. Nonlinear eigenvalue problems. Applications to physics and engineering.

RESTRICTIONS: Requires permission of instructor.

MATH 823 INTEGRAL EQUATIONS 3

Singular integral equations (Carleman and Wiener-Hopf equations). Nonlinear integral equations (Volterra and Hammerstein equations). Nonlinear singular integral equations. Applications to physics and engineering (the nonlinear oscillator, the airfoil equation, the Tricomi Problem in partial differential equations, etc.).

PREREQ: MATH822.

MATH 824 TOPICS IN APPLIED MATHEMATICS 3

Topics chosen from asymptotic analysis, elasticity, electromagnetic theory, fluid dynamics, optimal control theory and other areas.

RESTRICTIONS: Requires permission of instructor.

MATH 825 TOPICS IN APPLIED MATHEMATICS 3

Topics chosen from asymptotic analysis, elasticity, electromagnetic theory, fluid dynamics, optimal control theory and other areas.

RESTRICTIONS: Requires permission of instructor.

MATH 827 GENERAL TOPOLOGY I 3

Generation and properties of topological spaces. Continuity, separation and countability properties; and convergence of nets and filters.

MATH 828 GENERAL TOPOLOGY II 3

Compactness and connectedness, metrization, uniform spaces and basic homotopy theory.

PREREQ: MATH827.

MATH 835 PARTIAL DIFFERENTIAL EQUATIONS I 3

First order differential equations and systems. 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: MATH610

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. Equations of mixed type. Emphasis on modern approaches.

PREREQ: MATH835 and MATH805

MATH 838 NUMERICAL METHODS FOR PARTIAL DIFFERENTIAL EQUATIONS 3

Introduces concepts of consistency, stability and convergence of numerical schemes. Emphasis on various finite difference schemes and their applications to fundamental partial differential equations.

PREREQ: MATH610

MATH 839 NUMERICAL METHODS FOR PARTIAL DIFFERENTIAL EQUATIONS 3

Emphasis on finite element method and its applications to physical problems.

PREREQ: MATH838.

MATH 845 GROUP THEORY WITH APPLICATIONS 3

Groups acting on sets, the class equation, Sylow's theorems, free groups, classical groups, Polya enumeration theory, groups and graphs, Frieze groups and crystallographic groups, and the group Knapsack problem.

PREREQ: MATH650

MATH 846 FIELD THEORY WITH APPLICATIONS 3

Field extensions, structure of finite fields, and basics of Galois theory. Applications of finite fields to block designs and finite geometries. Additional applications may include impulse response sequences, pseudorandom sequences, algebraic coding theory (BCH and Goppa codes) and cryptosystems.

PREREQ: MATH650, MATH672, and MATH845

MATHEMATICS

MATH 850 FOUNDATION OF PROBABILITY THEORY 3

Mathematically rigorous treatment of the foundations of probability theory. Families of sets, semi-ring and sigma algebras, axioms of probability, and extension theorem. Random variables, probability distributions, and modes of convergence for sequences of random variables. Product measure and independence and conditional expectation. The weak and strong laws of large numbers, the central limit theorem and the law of the iterated logarithm.

PREREQ: MATH630 and MATH805.

MATH 851 STOCHASTIC PROCESSES 3

Mathematically rigorous treatment of stochastic processes. Course content: general definitions, separability, Kolmogorov consistency condition. Markov processes and Brownian motion. In-depth discussion of topics such as weak convergence of processes, martingale theory, diffusion processes or second order processes, as announced by instructor.

PREREQ: MATH850.

MATH 868 RESEARCH 1-6

MATH 869 MASTER'S THESIS 1-6

MATH 870 READING IN MATHEMATICS 1-6

MATH 887 MATHEMATICAL METHODS OF PHYSICS AND ENGINEERING 3

Green's function and eigenfunction expansions for boundary value problems, theory of distributions, weak solution, metric spaces, contractions, integral equations and Hilbert spaces.

PREREQ: MATH503, MATH508 or MEEG863, MEEG864 or PHYS607, and PHYS608.

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

MECHANICS

MECH 305 FLUID MECHANICS 3

Incompressible fluid mechanics: fluid statics, control volume analysis of fluid flows, differential analysis of inviscid and viscous fluid flows and dimensional analysis.

PREREQ: CIEG212 or MEEG213 and MATH302

COREQ: MECH306.

MECH 306 FLUID MECHANICS LABORATORY 1

Experiments in fluid mechanics.

COREQ: MECH305.

MEDICAL TECHNOLOGY

MEDT 100 INTRODUCTION TO MEDICAL TECHNOLOGY 1 PF

Orientation to profession of Medical Technology

MEDT 366 INDEPENDENT STUDY 1-6

MEDT 370 PHLEBOTOMY PRACTICUM 1 PF

Supervised clinical experience in the application of laboratory theory and techniques in phlebotomy.

COREQ: MEDT400

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 376 CLINICAL VIROLOGY AND IMMUNOLOGY 2

Fundamentals of diagnostic virology, chlamydiology and serology, including theory, disease correlation, laboratory techniques and safety.

RESTRICTIONS: Open to Medical Technology majors only.

MEDT 378 CLINICAL LABORATORY COMPUTER APPLICATIONS 2

Introduction to the use and application of computers in the clinical laboratory.

RESTRICTIONS: Open to Medical Technology majors only

MEDT 400 URINALYSIS AND BODY FLUIDS 3

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 4

Introduction to basic laboratory principles, mathematics, quality control and spectrophotometry. Application and theory of manual and automated techniques used in diagnostic and therapeutic medicine. Emphasis on clinical procedures for carbohydrates, proteins, lipids, inorganic ions, blood gases and pH, and electrolytes.

RESTRICTIONS: Open to Medical Technology majors only

MEDT 402 MEDICAL MYCOLOGY 1

Epidemiology, pathology and diagnosis of human mycoses. Identification of pathogenic and saprobic fungi found in clinical specimens.

COREQ: MEDT412.

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 407 DIAGNOSTIC MICROBIOLOGY 2

Diagnostic microbiology, emphasizing the correlation of in vitro and in vivo findings in the diagnosis and treatment of infectious disease.

PREREQ: MEDT406 and MEDT416.

COREQ: MEDT417.

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 410 PRINCIPLES OF MEDICAL TECHNOLOGY EDUCATION 1 PF

Educational principles and procedures applicable to teaching clinical laboratory sciences. Topics include preparation of educational objectives, testing and measurement, and use of audiovisual materials.

MEDT 411 CLINICAL PHYSIOLOGICAL CHEMISTRY LABORATORY I 2

Laboratory exercises that complement the topics covered in MEDT401.

COREQ: MEDT401.

MEDT 412 MEDICAL MYCOLOGY LABORATORY 1

Laboratory procedures consistent with MEDT402.

COREQ: MEDT402.

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 417 DIAGNOSTIC MICROBIOLOGY LABORATORY 2

Laboratory procedures consistent with MEDT407.

COREQ: MEDT407.

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 466 INDEPENDENT STUDY 1-6

MEDT 471 CLINICAL LABORATORY MANAGEMENT SEMINAR 1 PF

Discussion of laboratory management areas as they relate to the employer and employee. Emphasis on communication, motivation, interviewing, staffing, job descriptions, government regulations and capital budgeting as they relate to the medical technologist and laboratory.

MEDT 472 CLINICAL URINALYSIS AND SEROLOGY PRACTICUM 2 PF

Clinical experience in the application of laboratory theory and techniques in urinalysis and serology. Emphasis on team concept of health care provided through medical seminars and conferences with clinical laboratory personnel.

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 3 PF

Supervised experience in the application of laboratory procedures in hematology.
PREREQ: MEDT405 and MEDT415.

MEDT 477 CLINICAL MICROBIOLOGY 3 PF

Supervised experience in the application of laboratory procedures in diagnostic microbiology.
PREREQ: MEDT402 and MEDT412, and MEDT407 and MEDT417.

MEDT 479 CLINICAL IMMUNOHEMATOLOGY 3 PF

Supervised experience in the application of laboratory procedures in immunohematology.
PREREQ: MEDT420 and MEDT421.

MECHANICAL ENGINEERING

MEEG 125 INTRODUCTION TO MECHANICAL ENGINEERING 0 PF

Introduces students to Mechanical Engineering as a discipline and career. One lecture each week will be given by faculty or invited speakers. Areas covered will be Professionalism, sub-disciplines of Mechanical Engineering and Industrial applications including site visits.

MEEG 213 PRINCIPLES OF MECHANICS I 3

Vector and scalar methods applied to the statics of rigid and elastic bodies. Introduction to theories of stress, strain and mechanics of materials. Emphasis on solution of two- and three-dimensional engineering problems.

PREREQ: PHYS207.
COREQ: MATH243.

MEEG 214 PRINCIPLES OF MECHANICS II 3

Intermediate-level development of the kinematics and dynamics of particle systems and rigid bodies with an introduction to the variational principles of mechanics. Emphasis on engineering methods and applications to machines, structures and vehicles.

PREREQ: PHYS207 and MEEG213.
COREQ: MATH302.

MEEG 302 HEAT TRANSFER 3

Laws and applications of heat transfer by conduction, convection and radiation.
PREREQ: MEEG307

MEEG 307 THERMODYNAMICS I 3

Introduction to thermodynamics from phenomenological and classical viewpoints. Zeroth, First and Second Laws, and thermodynamic properties. Applications. Introduction to power and refrigeration cycles.

PREREQ: MATH302.

MEEG 308 THERMODYNAMICS II 3

Properties of mixtures; phase equilibrium, chemical reactions, combustion processes, application of fundamental principles to work-producing and work-absorbing systems, and elements of heat transfer processes in thermodynamic systems.

PREREQ: MEEG307.

MEEG 313 STRENGTH OF MATERIALS 4

Concepts of stress, strain and material response. Load-deflection for axial and torsional members. Bending, shear and deflection in beams. Elastic stability and energy methods.
PREREQ: MEEG213.

MEEG 316 MATERIALS ENGINEERING 3

Selection and utilization of materials. Practical examples and scientific background. Defects arising from casting, heat treatment, fabrication, machining, welding and sintering; and relationship to component failure. Strengthening methods. Behavior of materials under creep fatigue and bearing conditions; the influence of corrosion and irradiation. Embrittlement.

PREREQ: MASC302

MEEG 336 FLUID MECHANICS II 3

Compressible flows. Isentropic flow. Shock waves. Turbo machinery. Inviscid flows. Potential and stream functions, elementary wing theory, and potentials via analytic solution and approximate methods.

PREREQ: MECH305.

MEEG 347 MECHANICAL DESIGN I 3

Kinematic analysis of machines and mechanisms, kinematic synthesis, cam design, gear train analysis, balancing and machine dynamics.

PREREQ: MEEG125 and MEEG214.

MEEG 348 MECHANICAL DESIGN II 3

Statistical methods in design; theories of failure and design for strength; and design of machine elements.

PREREQ: MEEG347 and MEEG313.

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 391 ENGINEERING SCIENCE LABORATORY 4

An introduction to engineering experimentation with experiments drawn from subjects without scheduled laboratories such as heat transfer, thermodynamics, vibrations, gas dynamics, etc. Lectures cover topics in treatment of experimental data, error analysis and analytic techniques useful to the experimentalist.

PREREQ: MECH305, MEEG214, MEEG307 and MEEG361.

MEEG 408 POWER GENERATION SYSTEM DESIGN 3

Design details and performance characteristics of electricity generating power plants. Total heat systems and peaking systems. Power generation economics. Aspects of environmental impact.

PREREQ: MEEG307.

MEEG 410 EXPERIMENTAL MECHANICS FOR COMPOSITE MATERIALS 3

Study of the micromechanical and thermomechanical response of composite materials. Execution and assessment of experiments conducted to investigate the strength and stiffness characteristics of composite material and structural elements.

PREREQ: MEEG313.

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: MEEG214 and MEEG313.

MEEG 413 ADVANCED MECHANICS OF MATERIALS 3

Intermediate topics in structural analysis and mechanics of materials. Introduction to energy methods and failure analysis.

PREREQ: MEEG313 and MATH302.

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: MEEG313.

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: MEEG213 and MEEG214.

MEEG 427 SYSTEM DYNAMICS 3

Introduction to the modelling, analysis and synthesis of dynamic systems. Emphasis on the elements of vibrations, automatic control, and on mechanical and aerospace system applications.

PREREQ: MEEG214, MATH302.

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: MECH305.

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 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 447 DESIGN AND SYSTEMS SYNTHESIS I 3

Lectures on engineering case studies, project planning and engineering ethics; project work emphasizing project definition and evolution of design concepts.

MEEG 448 DESIGN AND SYSTEMS SYNTHESIS II 3

Lectures on engineering case studies and patents, engineering economics; project work emphasizing implementation of a design concept through detailed design, analysis and prototype testing.
PREREQ: MEEG447.

MEEG 466 INDEPENDENT STUDY 1-6

MEEG 600 SEMINAR 1 PF

MEEG 606 FLUID MECHANICS MEASUREMENTS 3

Theory and practice of point-wise measurement techniques such as differential pressure measurement, hot-wire anemometry, and laser-Doppler anemometry. Global measurement techniques based on particle imaging and image processing. Course is a combination of classroom and laboratory sessions. Topics in signal processing, statistics and uncertainty analysis will also be covered.

MEEG 614 FRACTURE OF MATERIALS 3

See MASC614 for course description.

MEEG 615 MECHANICAL PROPERTIES OF MATERIALS 3

See MASC615 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

Elements of elasticity theory; tensorial transformation equations; elastic symmetries and engineering constants; two-dimensional composites; laminated composites; analysis of composite structures; micromechanics theories of composites; and material aspects of composite materials.

MEEG 625 VEHICLE DYNAMICS 3

Mechanics of road and off-road vehicles. Mechanics of pneumatic tires, performance of road vehicles, vehicle handling, introduction to random vibrations, ride and passenger comfort, and performance of off-road vehicles.

MEEG 626 RANDOM VIBRATION 3

See CIEG616 for course description.

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 652 FLOW OF VISCOUS MATERIALS 3

Review of Newtonian fluid mechanics creeping and squeezing flows. Flow phenomena in polymeric, ceramics and composite materials. Introduction to constitutive models to describe the flow of viscous materials. Viscous heating during flow. Modeling of flow processes. Applications to processing and manufacturing with such materials.

PREREQ: MEEG302

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: MEEG361.

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 802 CONDUCTION HEAT TRANSFER 3

The solution of problems in conduction in rectangular, cylindrical and spherical coordinates involving heat sources, constant and varying boundary conditions. Use of Fourier series, Fourier integral, Laplace equations, method of images. Nonlinear problems.

PREREQ: MEEG361 or MATH514.

MEEG 803 CONVECTION HEAT TRANSFER 3

Forced convection heat transfer in laminar and turbulent boundary layers including viscous dissipation effects. Forced convection to fluids flowing through channels. Free convection, condensation and evaporation in boundary layers.

PREREQ: MEEG361 or MATH514.

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 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: MEEG813

MEEG 815 FINITE ELEMENT ANALYSIS 3

Develops the theory of the finite element method and illustrates its application to problems in solid mechanics, fluid mechanics and heat transfer.

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.

PREREQ: MEEG813

MEEG 817 COMPOSITE MATERIALS 3

Heterogeneous material systems; continuous and discontinuous filament reinforcement; interface and surface consideration; modes of failure; macroscopic elastic properties from properties of constituents; mechanics of structures composed of composite materials; and thermal and dynamic effects.

PREREQ: MEEG813.

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.

PREREQ: MEEG813.

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.

PREREQ: MEEG813

MEEG 821 ADVANCED DYNAMICS 3

General principles of spatial dynamics. Lagrangian and Hamiltonian methods. Application to engineering problems.

MEEG 822 SERVOMECHANISMS AND CONTROLS 3

Linear and nonlinear analysis and synthesis of mechanical, electrical, hydraulic and pneumatic systems. Use of Laplace transform and other techniques. Stability and performance criteria.

MEEG 823 VIBRATION ANALYSIS 3

Engineering analysis of the vibrations of machines and structures. Free, forced and random vibrations with emphasis on linear, multi-degree-of-freedom systems by matrix and energy methods. Introduction to the Lagrangian method and normal coordinate analysis of complex systems.

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 I 3

Physical properties of fluids, description of motion, vector and tensor algebra, Navier-Stokes equations, kinetic theory of gases, incompressible viscous flows, boundary-layer theory and turbulence.

PREREQ: MEEG361 or MATH514.

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 853 POLYMER FLUID MECHANICS 3

Development and application of constitutive equation to describe flow of polymeric liquids.

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 863 ENGINEERING ANALYSIS I 3

N-space, eigenvalue problem, diagonalization and quadratic forms; field theory; Sturm-Liouville theory; integral transforms; Bessel and Legendre functions; and partial differential equations. Engineering applications.

MEEG 864 ENGINEERING ANALYSIS II 3

Continuation of partial differential equations; complex variables; variational calculus. Engineering applications.

PREREQ: MEEG863

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 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 BASIC LEADERSHIP I 1**

Introduction to leadership using leadership case studies, historical perspectives and the dimensions of leadership. Skills training on rappelling, basic rifle marksmanship, first aid and effective writing and speaking styles.

MLSC 106 BASIC LEADERSHIP II 1

Organizational skills using inspections, small unit tactics, officers entry level positions, and development of subordinates. Skills training on maps and compass, M-16 firing, drill and physical fitness training.

MLSC 205 PROBLEM SOLVING 1

Principles of military organization; exercises in management planning and organizing; continued development of decision-making and problem-solving capabilities; physical training instruction; and introduction to individual military training and military drill.

MLSC 206 MILITARY ORGANIZATIONS 1

Methods of presenting instruction; practical exercise in patrolling; advanced physical training instruction; and evaluation of problem-solving skills.

MLSC 305 APPLIED LEADERSHIP I 2

Leadership and management case studies; the military manager's role in today's Army; military drill; basic weapons familiarization; land navigation instruction; and advanced physical training instruction.

RESTRICTIONS: Requires permission of instructor.

MLSC 306 APPLIED LEADERSHIP II 2

Continued analysis of leadership and management case studies; military tactics applied to squads and platoons; and practical exercise under field conditions.

PREREQ: MLSC305

MLSC 366 INDEPENDENT STUDY 1-3**MLSC 405 MILITARY MANAGEMENT I 2**

Management by objectives; individual leadership assignments; administrative management; logistics management; Army readiness program; ethics; and the role of the Army in the contemporary world.

PREREQ: MLSC306

MLSC 406 MILITARY MANAGEMENT II 2

Military law; operational techniques of the military team; role of the second lieutenant in today's Army; and individual leadership assignments.

PREREQ: MLSC306

MLSC 466 INDEPENDENT STUDY 1-3**MUSEUM STUDIES****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 604 HISTORY OF NINETEENTH-CENTURY AMERICAN INTERIORS 3

See EAMC604 for course description.

MSST 605 HISTORY OF THEORIES IN MATERIAL CULTURE 3

See EAMC605 for course description.

MSST 606 ISSUES IN AMERICAN MATERIAL CULTURE 3

See EAMC606 for course description.

RESTRICTIONS: Requires permission of instructor.

MSST 629 SEMINAR IN HISTORIC PRESERVATION 3

See URAF629 for course description.

MSST 630 HISTORIC PRESERVATION STUDIO 3

See URAF630 for course description.

MSST 655 ARCHIVAL MANAGEMENT I 3

See HIST655 for course description.

MSST 656 ARCHIVAL MANAGEMENT II 3

See HIST656 for course description.

MSST 657 HISTORICAL ARCHAEOLOGY AND MUSEUM INTERPRETATION 3

See HIST657 for course description.

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. Taught jointly by museum studies and art conservation faculty, 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, and professional standards and ethics.

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

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

Seminar sessions at Delaware Nature Society headquarters with staff and guest lecturers, including attorneys, investment counselors and museum administrators. Experiences at area environmental institutions. Covers goal definition, long-range planning, building/grounds management, programming, fund raising, financial management, personnel policies, volunteers, publicity and publications, legal considerations and conservation/preservation roles.

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

MUSIC EDUCATION

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

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.

RESTRICTIONS: For music majors.

MUED 381 MUSIC IN EARLY CHILDHOOD 3

Methods and materials for developing musical skills and understanding of children ages three to eight. Includes clinical experience.

RESTRICTIONS: For majors in Colleges of Education and Human Resources

MUED 385 MUSIC FOR THE SPECIAL LEARNER 3

Analysis of types of exceptional learners and analysis of music materials and methods appropriate for special learners.

RESTRICTIONS: For College of Education elementary majors and College of Human Resources young exceptional children 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.

RESTRICTIONS: Requires permission of instructor.

MUED 559 FIELD WORKSHOP 1-4

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.

MUED 575 MUSIC IN EARLY CHILDHOOD 3

Advanced study of musical content and techniques of teaching

RESTRICTIONS: For experienced teachers

MUED 576 GENERAL MUSIC: MIDDLE SCHOOL AND HIGH SCHOOL 3

Methods and materials for involving students in musical experiences

RESTRICTIONS: For experienced teachers.

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 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 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: Requires permission of instructor. 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 "member choruses" rehearse on weekday afternoons. The Union performs large-scale choral works. Smaller sections perform independently as well.

RESTRICTIONS: Requires permission of instructor. 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: Requires permission of instructor. May be repeated for credit.

MUSC 111 INTRODUCTION TO MUSIC HISTORY 3

A survey of selected works in music history with emphasis on selected basic terminology, forms and style changes, through score reading and listening

RESTRICTIONS: Open to music majors and minors only

MUSC 115 BAND 1

Marching band and Concert band during football season. At close of the football season, Wind Ensemble and Symphonic Band. Representative original and transcribed works performed

RESTRICTIONS: Audition required for entrance to Wind Ensemble and Symphonic Band. 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 119 GAMELAN TRADITIONS OF INDONESIA 3

A performance-oriented introductory course in the "knobbed gong" musical traditions of Java and Bali. Includes traditional as well as contemporary literature study, theoretical analysis and historical overview, with performance experience.

MUSC 121 GAMELAN ENSEMBLE 1

Gameelan 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. Includes a one-contact-hour studio class.

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. Includes a one-contact-hour studio class.

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 Co-requisite of MUSC195. Preference for enrollment will be 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 a 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 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 189 PIANO FOR THE CLASSROOM 1

Functional piano skills.

RESTRICTIONS: For teachers of elementary school children.

MUSC 190 JAZZ IMPROVISATION 3

Techniques of harmonic, rhythmic and melodic embellishment and improvisation in jazz.

RESTRICTIONS: Requires intermediate level of performance.

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.

RESTRICTIONS: Requires permission of instructor.

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: MUSC175, 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 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 214 STRINGED INSTRUMENTS CLASS: VIOLIN, VIOLA, CELLO, BASS 1

Development of performing and teaching skills.

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.

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.

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.

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.

MUSC 219 PERCUSSION INSTRUMENTS 1

Development of performing and teaching skills.

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.

MUSC 242 ACCOMPANYING CHAMBER MUSIC: PIANO 1

Accompanying vocalists and instrumentalists in the performance of chamber music with keyboard.

PREREQ: MUSC241.

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 273 CLASS VOICE: INTERMEDIATE 1

Basic voice study. Repertoire technique and vocal problems isolated through performance, research and discussion.

PREREQ: MUSC173 and MUSC174.

RESTRICTIONS: One year of university-level vocal experience acceptable in lieu of Prerequisites. For music majors and students with exceptional vocal ability.

MUSC 274 CLASS VOICE: ADVANCED 1

Basic voice

PREREQ: MUSC273.

RESTRICTIONS: For music majors and students with exceptional vocal ability

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

RESTRICTIONS: For vocal or instrumental music majors with some background in piano playing.

MUSC 276 CLASS PIANO: INTERMEDIATE II 1

A continuation of MUSC275.

PREREQ: MUSC275

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 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 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 301 JUNIOR RECITAL 0 PF

A 30-minute public recital.

RESTRICTIONS: Requires Junior status and permission of instructor.

MUSC 303 CHAMBER MUSIC LITERATURE 3

Chamber music written for various combinations from the Baroque period to the present.

PREREQ: MUSC111, or MUSC101 and MUSC102.

MUSC 305 THE SYMPHONY 3

The development of the symphony from the early 18th century to the present.

PREREQ: MUSC111 or MUSC101.

MUSC 307 MUSIC IN AMERICAN CULTURE 3

Music in the United States from 1620 to 1875. Folk music in an expanding nation. The evolution of jazz.

MUSC 308 MUSIC IN AMERICAN CULTURE 3

The development of the United States as an international leader in musical composition, performance and technology 1865 to the present. Also, the history of the Broadway musical.

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: MUSC111 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: MUSC111 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: MUSC111 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 3

Study of style, structure and interpretations of representative choral works, including large and small forms composed since 1500.

PREREQ: MUSC111.

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 of the course will be on Viennese music. A combination of Music History and Music Appreciation. This course is offered in the Semester in Vienna Program only.

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

See THEA345 for course description.

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 repertory. Content varies from year to year.

PREREQ: MUSC363

MUSC 366 INDEPENDENT STUDY 1-3**MUSC 390 HONORS COLLOQUIUM 3**

See ARSC390 for course description

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 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 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 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

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 495 ANALYSIS FOR PERFORMANCE 3

Examination of structural, melodic, rhythmic, harmonic and textural aspects of selected music literature and their significance in artistic performance.

PREREQ: MUSC296

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

MUSIC

MUSC 636 ADVANCED CHORAL CONDUCTING 3

A study of the conducting of vocal ensemble literature of the historical periods from the Renaissance through the 20th century.

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 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 663 ADVANCED KEYBOARD LITERATURE 3

Style, structure and technical performance of keyboard music from the 17th century to the present.

RESTRICTIONS: Requires permission of instructor.

MUSC 675 GENERAL MUSIC K-12 3

Learning strategies to develop listening, performing, creating and literacy skills in a general music curriculum. Recommended for directors of performing ensembles.

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 majors with Freshman or Sophomore status.

NTDT 200 NUTRITION CONCEPTS 3

Functions and sources of nutrients, dietary adequacy and dietary guidelines. Energy balance, weight control and evaluation of popular diets and ideas. Includes nutrition concerns such as world food problems, food safety, alcohol and malnutrition.

RESTRICTIONS: Credit for graduation limited to one of the following: NTDT200 or NTDT303

NTDT 205 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 222 NUTRITION CONTROVERSIES 1

Explores topical issues in nutrition via discussion format.

COREQ: NTDT200.

NTDT 240 INTRODUCTION TO CLINICAL DIETETICS 2

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 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. Applied computer-assisted management.

PREREQ: NTDT200 and FOSC201.

NTDT 322 FOOD SERVICE SYSTEMS MANAGEMENT 4

Organization and administration of food service systems. Function and responsibilities specific to this management. Personnel, food cost accounting, production and service facility planning, and environmental design.

PREREQ: NTDT321, NTDT325 or NTDT331.

NTDT 325 LABORATORY IN QUANTITY FOOD PRODUCTION AND SERVICE 1

Laboratory experience in quantity food production and delivery systems. Application of principles of sanitary practice, technical reporting and management.

COREQ: NTDT321.

NTDT 326 COMPUTER-ASSISTED FOODSERVICE SYSTEMS MANAGEMENT 2

Investigation of microcomputers and computer software programs that could be used in the management of foodservice systems. Understanding of basic computer concepts, appropriate applications, maintenance of data bases and data integrity and use of management information reports.

PREREQ: NTDT200 and NTDT321.

NTDT 330 NUTRITION COUNSELING 3

Theories, skills and techniques of nutrition interviewing and counseling.

PREREQ: None.

NTDT 331 QUANTITY FOODS PRACTICE 6

Supervised practice in quantity food production and delivery systems with emphasis on sanitation, employee training, quality standards and controls, and menu planning.

COREQ: NTDT321.

RESTRICTIONS: Open to CUD majors only.

NTDT 332 FOODSERVICE MANAGEMENT PRACTICE 6

Supervised practice in foodservice systems management, emphasizes organization and administration, marketing, management of personnel and financial resources and facility design.

PREREQ: NTDT331.

COREQ: NTDT322.

RESTRICTIONS: Open to CUD majors only.

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: NTDT200, CHEM214 and CHEM216

NTDT 403 DIETETICS SEMINAR 1

Explores registration, specialty certification and licensure for dietitians. Discusses the roles and activities of the national professional organization, The American Dietetic Association. Clarifies professional values and ethical behavior
RESTRICTIONS: Open only to Senior dietetics majors.

NTDT 404 NUTRITION SEMINAR 1

Clarifies professional and ethical behavior of nutrition professionals. Roles and activities of relevant professional organizations. Career development, position application and interview.
RESTRICTIONS: Open to majors in Applied Nutrition and Nutritional Science.

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 BISC406.

NTDT 421 NUTRITION RESEARCH METHODS 2

Discussion of and experience with selected methods and techniques 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 440 NUTRITION AND DISEASE 4

Study of the metabolic deviations caused by various diseases and implications for the role of nutrition in therapy.
PREREQ: BISC106 or BISC406 and NTDT400

NTDT 445 NUTRITION EDUCATION 3

Identification of objectives for nutrition education; selection and use of methods, materials and resources for different age levels; integration of nutrition into the total health and consumer aspects of school, non-school and adult programs.
PREREQ: NTDT200.

NTDT 450 CLINICAL DIETETICS PRACTICE8

Supervised practice in clinical nutrition, nutritional assessment and case management of patients undergoing various medical treatments, nutritional counseling and education of hospitalized patients
PREREQ: NTDT332.
COREQ: NTDT440
RESTRICTIONS: Open to CUD majors only.

NTDT 452 TOPICS IN HUMAN NUTRITION 2

Current perspectives on the physiological functions of nutrients and other food constituents.
PREREQ: NTDT400 and BISC106, BISC116 or BISC406, and BISC416.

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 470 COMMUNITY DIETETICS PRACTICE 6

Supervised practice in nutritional components of community programs in health promotion, health maintenance and community health care delivery settings.
PREREQ: NTDT450.
COREQ: NTDT460
RESTRICTIONS: Open to CUD majors only.

NTDT 475 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.

NTDT 611 ADVANCED NUTRITION 3

Metabolism and its relation to human nutrition; current literature; methods and techniques of nutrition research
PREREQ: NTDT400.

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 652 TOPICS IN HUMAN NUTRITION 2

Current perspectives on the physiological functions of nutrients and other food constituents
PREREQ: NTDT400, BISC106/BISC116 or BISC406/BISC416

NTDT 654 RUMINANT NUTRITION AND METABOLISM 3

See ANSC654 for course description

NTDT 665 SEMINAR 1-3 PF

NTDT 668 RESEARCH 1-6

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 or NTDT303
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 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 health care system. Discusses importance of professionalism, including ethical and legal responsibilities.
PREREQ: BISC207, BISC208, CHEM105, ENGL110, MATH114 and SOC1200-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: BISC207, BISC208, CHEM105 and CHEM106.
COREQ: BISC371.
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: BISC207, BISC208, CHEM105 and ENGL110

COREQ: NURS205

RESTRICTIONS: Open to nursing majors only

NURS 305 DETERMINANTS OF WELLNESS 10

Utilization of the nursing process to assist well clients of all ages in the maintenance and promotion of health. Biopsychosocial assessment of the well client within a family context and in relation to other systems of health care. Includes clinical experience.

PREREQ: NURS205, NURS215, MATH114, ENGL301, CHEM106, IFST201, BISC371, BISC406/BISC416, PHYS104, NTD200, ANTH100-level and SOCI200-level.

RESTRICTIONS: Requires 2.0 G.P.A.

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 health care system.

PREREQ: BISC371, BISC406, BISC416, CHEM106, IFST201, NURS205, NURS215, NTD200 and PSYC201

COREQ: NURS312, NURS314 and NURS315

RESTRICTIONS: Open to nursing majors only. Offered in Fall

NURS 307 RESTORATIVE NURSING PRACTICE I 10

Biopsychosocial stressors in health and illness with emphasis on the nursing process, the client's state disequilibrium, role of the nurse and therapeutic intervention. Includes clinical experience with individuals and groups

PREREQ: NURS305, NURS312 and NURS314

RESTRICTIONS: Requires 2.0 G.P.A.

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. Offered in Spring.

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: Nursing major - BISC371, BISC406, BISC416, CHEM106, IFST201, NURS205, NURS215, NTD200 and PSYC201.

COREQ: Nursing major - NURS306, NURS314 and NURS315

RESTRICTIONS: Open to nursing majors only. Nursing major must take 3 credits. BRN majors must take 4 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: Nursing majors - BISC371, BISC406, BISC416, CHEM106, IFST201, NURS205, NURS215, NTD200 and PSYC201

COREQ: Nursing majors - NURS306, NURS312 and NURS315.

RESTRICTIONS: BRN major - Admission to BRN Program. Open to nursing majors only. Nursing major must take 2 credit hours. BRN major must take 3 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 health care systems. Comprises 112 clinical hours.

PREREQ: BISC371, BISC406, BISC416, CHEM106, IFST201, NURS205, NURS215, NTD200, and PSYC201.

COREQ: NURS312, NURS314, NURS315 and NURS306.

RESTRICTIONS: Open to nursing majors only. Offered in Fall.

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. Offered in Spring.

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. Offered in Spring.

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. Offered in Spring.

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, NURS315 and MATH114

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 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 major must take 3 credit hours. BRN major must take 2 credit hours. Open to nursing majors only.

NURS 407 RESTORATIVE NURSING PRACTICE II 10

Individuals and families in biopsychosocial disequilibrium. Emphasis on proficiency in the nursing process. Expands on previously learned theories. Introduces management and patterns of care. Includes clinical experience.

PREREQ: NURS307, NURS314 and NURS332.

RESTRICTIONS: Requires 2.0 G.P.A.

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, NURS332, ANTH100-level or above, PHYS104 and ENGL301

COREQ: NURS417; NURS418 or NURS419; and NURS405.

RESTRICTIONS: Open to nursing majors only. Offered in Fall.

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. Offered in Spring.

NURS 410 PROFESSIONALISM IN NURSING PRACTICE 8

Research, current issues in nursing, management, including strategies of administration and complex organizational theory, and the concept of interdisciplinary collaboration of health care personnel as they relate to clients in varying stages of health and illness. Includes clinical experience.

PREREQ: NURS322 and NURS407

RESTRICTIONS: Requires 2.0 G.P.A.

NURS 411 TOPICS IN HEALTH CARE DELIVERY 1-6

A consideration of selected issues and problems of nursing practice within the health care delivery system. Exploration of some topics may include a laboratory or clinical component. Variable topics.

PREREQ: NURS308; NURS317; NURS318 or NURS319; and NURS332. No prerequisites for BRN major.

COREQ: NURS405; NURS417; NURS418 or NURS419.

RESTRICTIONS: Open to nursing majors only. May be repeated for up to six credit hours.

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. Offered in Fall.

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. Offered in Fall.

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. Offered in Fall.

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. Offered in Spring.

NURS 431 HONORS: DYING AND THE HOSPICE ALTERNATIVE 1

Exploration of personal attitudes and philosophy of death and dying and predominant views of society - discussion of needs of persons involved in the dying experience with special attention to how hospice care meets those needs, as well as hospice development in modern British and U.S. health systems.

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.

NURS 443 BRN ROLE PRACTICUM 3

A preceptored clinical experience focused upon the integration of concepts learned in baccalaureate nursing education.

PREREQ: NURS441 and NURS442.

COREQ: NURS445.

RESTRICTIONS: NURS446 is either a prerequisite or corequisite.

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: NURS441, NURS405 and NURS442.

COREQ: NURS443.

RESTRICTIONS: NURS446 is either a prerequisite or a corequisite.

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 462 PHYSICAL ASSESSMENT OF ADULTS 3

Introductory course in the physical assessment of adults for registered nurses to expand their skills in health assessment. All aspects of the physical examination of adults covered with limited clinical application.

RESTRICTIONS: Requires permission of instructor.

NURS 466 INDEPENDENT STUDY 1-6**NURS 470 WELLNESS: SURVIVAL IN MODERN SOCIETY 3**

Exploration of major issues in wellness care: holistic movements, stress, habit control, nutritional controversies, touch and massage, physical fitness and health maintenance organizations. Nursing roles emphasized in context of facilitation of wellness.

NURS 800 HEALTH ASSESSMENT OF THE AGED 4

Knowledge and theory of biophysical aging and psychosocial development. Methods of logical clinical protocol in a systems approach to collect and arrange data as a baseline for nursing diagnoses.

PREREQ: NURS812.

RESTRICTIONS: Open to nursing majors only. Requires permission of instructor.

NURS 801 HEALTH PROMOTION AND RESTORATION FOR THE AGED 4

Knowledge, theory and nursing skills for health promotion, maintenance and restoration of abilities of aged individuals with functional losses complicated by psychosocial problems. Clinical experience with individuals and their families within a multidisciplinary health team approach.

PREREQ: NURS800.

RESTRICTIONS: Open to nursing majors only. Requires permission of instructor.

NURS 802 ACUTE CARE NURSING OF THE AGED 4

Synthesis of gerontological nursing theory with acute care nursing knowledge. Clinical practice includes comprehensive nursing of acutely ill, aged persons.

PREREQ: NURS801.

RESTRICTIONS: Open to nursing majors only. Requires permission of instructor.

NURS 806 TRANSCULTURAL HEALTH CARE 3

Understanding and respect of the differences in cultural backgrounds between health-care providers and consumers provide the framework for the study of the impact of culture on this relationship. Emphasis on examining the variety of meanings of health and illness among selected cultures and ethnic groups.

RESTRICTIONS: Requires RN and permission of instructor.

NURS 807 ETHICS AND HEALTH CARE 3

Provides an opportunity to analyze philosophic positions, ethics theories and moral principles encountered by health care professionals in their role as providers. Discusses issues common to clinical practice settings and ethical dimensions.

RESTRICTIONS: Requires permission of instructor.

NURS 809 HEALTH BEHAVIOR 3

Nursing and behavioral science theory and research provide a framework for the analysis of health-related behaviors across the life span. Emphasis on the psychological and social determinants of health-related behaviors of individuals. Examines the roles of the clinical nurse specialist and other health professionals in this context.

RESTRICTIONS: Requires RN and permission of instructor.

NURS 810 RESEARCH METHODS IN NURSING 3

Focuses on the relationship between nursing theories and research, the scientific method, research design and methodology and ways to implement research findings in nursing practice.

PREREQ: NURS812 and first clinical course.

RESTRICTIONS: Open to nursing majors only. Requires permission of instructor.

NURS 811 CONCEPTS IN ADVANCED NURSING PRACTICE 2

Focuses on concepts relevant to advanced nursing practice across the life span. Includes the impact of changing demographics, environmental influences and cultural determinants on delivery of health care. Emphasis on the responsibility of advanced practitioners for review of current health policies and legislation.

RESTRICTIONS: Requires BSN and permission of instructor.

NURS 812 NURSING THEORIES AND MODELS 2

Examines the theoretical base of nursing as a discipline. The development of selected models and theories are analyzed with emphasis in relevance to nursing practice, education and research.

COREQ: Clinical nursing course.

RESTRICTIONS: Requires BSN and permission of instructor.

NURS 813 ADVANCED NURSING ROLES IN HEALTH CARE DELIVERY 2

Exploration of roles and responsibilities of nurses in advanced practice in clinical specialty and nursing management. Reviews issues related to change, education, consultation, power and evaluation of nursing systems and collaboration with multidisciplinary professions.

RESTRICTIONS: Requires BSN and permission of instructor.

NURSING

NURS 814 NURSING MANAGEMENT IN CONTEMPORARY HEALTH CARE SETTINGS 3

Analysis of organizational behavior of individuals and groups in health care systems related to nursing management. Emphasis on the application of management theory and concepts to issues encountered in the work setting.

RESTRICTIONS: Requires BSN and permission of instructor.

NURS 815 ORGANIZATIONAL THEORIES AND NURSING ADMINISTRATION 4

Introduces theories of organization, administration and management, their interaction with nursing theories and influence on management of health care organizations.

COREQ: NURS812.

RESTRICTIONS: Requires BSN and permission of instructor.

NURS 817 ORGANIZATIONAL GOALS AND PLANNING STRATEGIES 4

Introduces the basic principles and concepts of effective management of organizational systems. Includes identifying organizational needs, formulating goals and objectives and selecting appropriate strategies for goal attainment within ethical constraints of health care.

PREREQ: NURS815.

RESTRICTIONS: Open to nursing majors only

NURS 818 NURSING MANAGEMENT AND EVALUATION 4

Emphasizes the role of nurse managers in personnel development promoting research in clinical settings, and developing and implementing quality assurance programs and their implications for nursing care and, where appropriate, on health care.

PREREQ: NURS815 and NURS817.

RESTRICTIONS: Open to nursing majors only

NURS 819 NURSING ADMINISTRATION: ACCOUNTING, FINANCE AND ORGANIZATIONAL BUDGETS 3

Provides the basic principles and concepts of effective management of budgets for nursing units. Includes analysis of the environment, nursing organization and impact on nursing care.

RESTRICTIONS: Requires BSN and permission of instructor.

NURS 820 ADVANCED HEALTH ASSESSMENT 3

Assists the graduate student to acquire advanced knowledge and proficiency in performing health assessments. Such assessment includes eliciting a complete health history and performing a comprehensive physical examination.

RESTRICTIONS: BSN and a Basic Physical Assessment Course

NURS 821 ADVANCED PATHOPHYSIOLOGY 3

Involves advanced study of the etiology and pathogenesis of the physiologic and biologic manifestations of disease in individuals throughout the life span. In addition to the common clinical disorders and diseases of children and adults, complex pathological sequelae will be studied.

RESTRICTIONS: BSN.

NURS 822 ADVANCED PHARMACOLOGY 3

Principles of pharmacology are applied to the therapeutic management of the client. Emphasis is placed on prescribing, monitoring drug regimens, identifying adverse reactions, and anticipating changes inherent in self medication.

RESTRICTIONS: BSN

NURS 823 MANAGEMENT OF WOMEN'S HEALTH CARE 3

Focuses on gynecological and reproductive primary health care. Emphasis is on management of gynecologic health needs and the normal reproductive cycle.

PREREQ: NURS812, NURS820, NURS821 and IFST621.

COREQ: NURS822

NURS 824 MANAGEMENT OF CHILDREN'S HEALTH 3

Focuses on delivery of primary health care to children and adolescents. Emphasis is placed on physical and developmental variations and management of acute and episodic illness.

PREREQ: NURS812, NURS820, NURS821 and IFST621.

COREQ: NURS822.

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. Emphasis is placed on the clinical decision making that is necessary to plan and provide primary health care services to this population.

PREREQ: NURS812, NURS820, NURS821 and IFST621.

COREQ: NURS822

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. Emphasis is placed on management of ongoing needs.

PREREQ: NURS812, NURS820, NURS821 and IFST621.

COREQ: NURS822

NURS 827 FNP PRECEPTORSHIP 4

Comprehensive course builds on all previous clinical courses. Emphasis is placed on clinical decision making in an interdisciplinary environment with the nurse practitioner as the principal provider of primary care.

PREREQ: All required clinical courses.

NURS 828 NURSE PRACTITIONER SEMINAR 1

Culminating experience in role development. Emphasis is placed on the role of the nurse practitioner in the current health care system. Issues such as marketing, practice acts, reimbursement, and prescriptive privileges will be discussed.

PREREQ: All required clinical courses except NURS827.

NURS 868 RESEARCH 1-3

Investigation of a research problem in clinical nursing, finance, administration, personnel management, public policy or education and completion of a scholarly research project.

RESTRICTIONS: Open to nursing majors only.

NURS 869 MASTER'S THESIS 1-6

NURS 870 MEDICAL-SURGICAL NURSING I 4

Explores the scientific basis for therapy in adult patients with cardiopulmonary or oncological nursing problems. Theory and clinical practice emphasize health assessment skills and therapeutic intervention.

PREREQ: NURS812.

RESTRICTIONS: Also requires BISC671 for oncology nursing students and BISC675 for cardiopulmonary nursing students

NURS 871 MEDICAL-SURGICAL NURSING II 4

Theoretical and clinical investigations of cardiopulmonary or oncological nursing problems that require long-term therapy involving adult patients, families and groups. Emphasis on assessment, prevention, maintenance and rehabilitation.

PREREQ: NURS870.

RESTRICTIONS: Requires permission of instructor.

NURS 872 MEDICAL-SURGICAL NURSING III 4

Exploration of nursing theory as applied to patients with cardiopulmonary or with oncological nursing problems, and with complex physiological and psychosocial problems. Experiential learning focuses on the practice of the specialty with patients, families and groups in a variety of settings.

PREREQ: NURS871.

RESTRICTIONS: Requires permission of instructor.

NURS 880 NURSING ASSESSMENT OF WOMEN, CHILDREN AND FAMILIES 4

Integration of theories and concepts related to assessment of health and developmental status of women, children and their families.

PREREQ: NURS812.

RESTRICTIONS: Open to nursing majors only. Requires permission of instructor.

NURS 881 NURSING OF WOMEN AND DEVELOPING FAMILIES I 4

Biopsychosocial needs of women and developing families. Emphasis on nursing intervention to maintain or restore steady state in clients with health care needs of varying degrees of complexity.

PREREQ: NURS880.

RESTRICTIONS: Requires permission of instructor.

NURS 882 NURSING OF WOMEN AND DEVELOPING FAMILIES II 4

Biopsychosocial needs of women and developing families. Emphasis on nursing intervention to maintain or restore steady state in clients with health care needs of increased complexity.

PREREQ: NURS881.

RESTRICTIONS: Requires permission of instructor.

OPERATIONS RESEARCH

ORES 601 SURVEY OPERATIONS RESEARCH I 3

Covers various deterministic mathematical programming methods (LP, integer dynamic nonlinear and goal) network models and Markov chain analysis.

PREREQ: Linear algebra

ORES 602 SURVEY OPERATIONS RESEARCH II 3

Oriented towards developing analysis of dynamic production decision processes primarily within stochastic settings. Estimation of linear and nonlinear systems of equations along with transportation models.

PREREQ: Linear algebra.

ORES 603 OPERATIONS RESEARCH PRACTICE 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.

COREQ: ORES602.

ORES 650 URBAN TRANSPORTATION SYSTEMS 3

See CIEG650 for course description.

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 queuing theories, maintenance and replacement or 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 queuing 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 moral philosophies that people strive to live by, typically including individualistic, group-oriented, religious and nonreligious positions. May be cross-listed with WOMS100.

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 CLEAR 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.

PHIL 202 CONTEMPORARY MORAL PROBLEMS 3

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

PHIL 203 ETHICS 3

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

PHIL 204 WORLD RELIGIONS 3

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

PHIL 205 LOGIC 3

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

PHIL 206 INTRODUCTION TO SCIENCE, TECHNOLOGY AND SOCIETY 3

See CSCC206 for course description.

PHIL 207 INDUCTIVE LOGIC AND SCIENTIFIC METHOD 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 225 SCIENCE OR PSEUDOSCIENCE 3

Examination of claims and theories like astrology, biorhythms, parapsychology, ancient astronauts and the Bermuda triangle. Emphasis on methodology, patterns of reasoning and assumptions used to support such claims and theories and how they compare with those used in natural and social sciences. Topics include confirmation, explanation, causation, testing, scientific method, rationality and scope of science.

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 HEALTH CARE 3

See CSCC241 for course description.

PHIL 242 TOPICS: PHILOSOPHY OF EDUCATION 3

Themes and individuals in philosophy of education such as moral and character education. Variable topics. May be repeated for degree credit. May be cross-listed with EDST242.

PREREQ: One philosophy course or permission of instructor.

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.

PHILOSOPHY

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, post-Socratic ethics, Plato, Aristotle, the Epicureans, Stoics, Skeptics and Neoplatonists.

PHIL 302 MEDIEVAL PHILOSOPHY 3

Christian European philosophy from the 4th to the 14th century. Augustine and early medieval thought; Aquinas and the 13th century; Ockham and the rise of nominalism. Problems such as the relation between faith and reason, the possibility of demonstrating God's existence and the status of universals.

PHIL 303 MODERN PHILOSOPHY 3

Main trends: Francis Bacon and scientific empiricism; Thomas Hobbes and materialism, Descartes, Spinoza and Leibniz; Locke, Berkeley, Hume and Kant; and the Age of Enlightenment and its impact on theories of art and history.

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 307 BLACK THOUGHT AND PHILOSOPHY 3

See BAMS307 for course description.

PHIL 308 JUSTICE AND EQUALITY 3

Theories of justice and rights. Constraints on liberty, the enforcement of morals, legal vs moral responsibility, authority, disobedience and loyalty.

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 313 MAJOR THEOLOGICAL TRADITIONS 3

Selected major theologians of decisive importance for the historical development of Christian thought and the relation of theology to philosophy and culture.

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 EXPERIENCE, KNOWLEDGE AND REALITY 3

An examination of some central issues in epistemology and metaphysics. The nature of minds and the world, and the nature and possible extent of our knowledge of both.

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 324 THE PHILOSOPHY OF LOVE 3

Eros, agape, caritas, "passion-love," romantic love, fraternal love, friendship, Tristanism, Don Juanism, the forms serving to identify discrete life-styles, ages and cultures. Readings include Ortega y Gasset, Sartre, Santayana, Kierkegaard, Schopenhauer, Stendhal, Augustine, Plotinus and Plato.

PHIL 325 DIMENSIONS OF PERSONAL GROWTH 3

Using eudaimonist ("self-actualization") presuppositions, seeks to uncover the intrinsic values, virtues and obligations of four stages of personal development: childhood, adolescence, maturation and old age.

PHIL 338 TOPICS IN PHILOSOPHY AND GENDER 3

Critical examination of philosophical issues raised by feminism. May be cross-listed with WOMS338.

RESTRICTIONS: May be repeated twice for degree credit when topics vary.

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 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 351 MATHEMATICAL LOGIC 3

Axiomatic quantified predicate calculus with identity; axiomatic set theory and number theory; and demonstration of metatheorems.

PREREQ: PHIL205.

PHIL 360 HUMANITIES COLLOQUIUM 3

See ARSC360 for course description. May be cross-listed with ENGL360.

PHIL 366 INDEPENDENT STUDY 1-3

PHIL 390 HONORS COLLOQUIUM 3

See ARSC390 for course description. May be cross-listed with WOMS390.

PHIL 392 HONORS COLLOQUIUM 3

See ARSC392 for course description. 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 446 PHILOSOPHY OF LAW 3

The nature and function of law; relations among law, morality and society; the logic of legal reasoning; and analysis of fundamental concepts and institutions.

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 SEMINAR: PHILOSOPHICAL TOPICS 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 URAF647.

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 101 INTRODUCTION TO PHYSICS 4

Survey of the fundamentals of physics, both classical and modern. No previous background in physics required.

RESTRICTIONS: Only one course among PHYS101, PHYS104, PHYS201, PHYS207 and SCEN101 can count toward graduation.

PHYS 102 INTRODUCTION TO PHYSICS 4

Survey of the fundamentals of physics, both classical and modern. No previous background in physics required.

RESTRICTIONS: Only one course among PHYS102, PHYS202 and PHYS208 can count toward graduation.

PHYS 104 ELEMENTARY PHYSICS 3

Topics of current and general interest. Stresses applications of basic principles. Uses elementary algebra and scientific notation.

RESTRICTIONS: Only one course among PHYS101, 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. Use of binoculars and small telescopes to find fainter "deep-sky" objects. Estimating directions and time from knowledge of the sky. Use of sky maps and coordinates.

PHYS 143 ENERGY, TECHNOLOGY AND SOCIETY 3

Definition and units; orders of magnitude of energy-related quantities. Forms of energy: mechanical, thermal, chemical, electrical and nuclear. Sources of utilizable energy: petroleum, coal, nuclear fission and fusion, solar and geothermal. Methods of conversion to useful forms.

PREREQ: College algebra.

PHYS 144 CONCEPTS OF THE UNIVERSE 3

Early and modern concepts of the universe, the appearance of the sky, the planets and their motions; information in starlight, distances in the universe and intelligent life in the universe.

RESTRICTIONS: Not for credit to students who have taken PHYS133 or PHYS134.

PHYS 145 QUASARS, BLACK HOLES AND THE UNIVERSE 3

A non-mathematical course focusing on the role of explosions and other violent events in the universe. The major topics are Einstein's theory of special relativity, black holes, galaxies, exploding galaxies, quasars, the expanding universe, pulsars, supernovae and x-ray stars.

PHYS 201 GENERAL PHYSICS 4

Fundamentals of physics, classical and modern. Includes more mathematics and problem work than PHYS101 and PHYS102.

PREREQ: MATH115.

RESTRICTIONS: Recommended for pre-dentistry students. Only one course among PHYS104, PHYS201 and PHYS207 and SCEN101 can count toward graduation.

PHYS 202 GENERAL PHYSICS 4

Fundamentals of physics, classical and modern. Includes more mathematics and problem work than PHYS101 and PHYS102.

PREREQ: MATH115 and PHYS201.

RESTRICTIONS: Recommended for pre-dentistry students. Only one course from among PHYS102, PHYS202 and PHYS208 can count toward graduation.

PHYS 207 GENERAL PHYSICS 4

Mechanics. A more mathematical treatment than PHYS201-202 and more problem solving. COREQ: MATH242.

RESTRICTIONS: Only one course from among PHYS101, PHYS104, PHYS207 and SCEN101 can count toward graduation.

PHYS 208 GENERAL PHYSICS 4

Electricity and magnetism. A more mathematical treatment than PHYS201-202 and more problem solving.

PREREQ: PHYS207.

COREQ: MATH243.

PHYS 209 GENERAL PHYSICS 3

Optics and modern physics including relativity and quantum mechanics. A more mathematical treatment than PHYS201-202 and more problem solving.

PREREQ: PHYS208.

PHYS 313 PHYSICAL OPTICS 4

Principles of optics; review of geometrical optics; interference, diffraction, polarization and the theory and use of optical instruments.

PREREQ: MATH302.

PHYS 366 INDEPENDENT STUDY 1-3

PHYS 419 ANALYTICAL MECHANICS 3

Particle mechanics, conservation laws: motion under central forces, rigid body dynamics, small vibrations, continuum mechanics and Lagrange's equations.

COREQ: MATH302.

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 faculty describing their current research to aid graduate students in selection of an area of thesis research.

PHYS 603 ELECTRICITY AND MAGNETISM 3

Electrostatics and magnetostatics, uniqueness theorems, dielectric and magnetic materials; Maxwell's equations; generation and propagation of electromagnetic waves.

PREREQ: PHYS208 or PHYS202.

COREQ: MATH503 or MATH601.

PHYS 604 ELECTRICITY AND MAGNETISM 3

Electrostatics and magnetostatics, uniqueness theorems, dielectric and magnetic materials; Maxwell's equations; generation and propagation of electromagnetic waves.

PREREQ: PHYS208 or PHYS202, and 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, MATH302 and MATH602.

PHYS 608 METHODS OF MATHEMATICAL PHYSICS 3

Mathematical subjects commonly employed in physics with examples taken from physics. Complex variables and asymptotic analysis.

PREREQ: PHYS620, MATH302 and MATH602.

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: PHYS622.

PHYS 616 KINETIC THEORY AND THERMODYNAMICS 3

Elements of the kinetic theory of gases, a treatment of thermodynamic principles and introduction to statistics.

PREREQ: MATH243 and PHYS209.

PHYS 620 ANALYTICAL MECHANICS 3

Particle mechanics, conservation laws, motion under central forces, rigid body dynamics, small vibrations, continuum mechanics and Lagrange's equations.

PREREQ: MATH302 and PHYS419.

PHYS 621 INTRODUCTION TO MODERN PHYSICS 3

A comprehensive description and mathematical treatment of the fundamentals of modern electronic, atomic, molecular and nuclear physics.

PREREQ: PHYS209 and MATH302.

PHYS 622 INTRODUCTION TO MODERN PHYSICS 3

A comprehensive description and mathematical treatment of the fundamentals of modern electronic, atomic, molecular and nuclear physics.

PREREQ: PHYS209 and 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 hours of physics.

PHYS 633 STELLAR ASTROPHYSICS 3

Basic principles governing the construction of theoretical models of the atmospheres and interiors of stars. Stellar evolution. Computer calculation of stellar spectra and modeling of stellar interiors.

PREREQ: PHYS632.

PHYS 638 SELECTED TOPICS IN PHYSICS 3

Treatment of a specialized subject, taken from the following list: low-temperature physics, advanced experimental physics in research areas active in the department, cosmology, elementary particles, lasers and Fourier optics and plasma physics.

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.

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.

PHYS 647 MODERN PHYSICS LABORATORY 3

Introduction to modern experimental methods and techniques. Consists of a variety of experiments for the study of the structural, transport, magnetic, optical and nuclear properties of matter. Covers basic experimental techniques involved in materials preparation, vacuum design and measurement, and temperature control and measurement.

PREREQ: PHYS209 and PHYS621.

PHYSICS AND ASTRONOMY

PHYS 803 SOLID STATE PHYSICS 3

Crystal structure; mechanical, thermodynamic, electrical, optical and magnetic properties of solids; and imperfections in crystals

PREREQ: PHYS624

PHYS 804 SOLID STATE PHYSICS 3

Crystal structure; mechanical, thermodynamic, electrical, optical and magnetic properties of solids; and imperfections in crystals

PREREQ: PHYS803

PHYS 809 ELECTROMAGNETIC THEORY 3

Review of statics; Maxwell's equations, physical optics and wave guides; relativistic particle and field dynamics; and radiation damping

PREREQ: PHYS604

PHYS 810 ELECTROMAGNETIC THEORY 3

Review of statics; Maxwell's equations, physical optics and wave guides; relativistic particle and field dynamics; and radiation damping

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 and an introduction to fluid mechanics, Gibbsian ensemble theory in classical and quantum statistical mechanics, the ideal Bose and Fermi gases with elementary applications, the statistical aspects of light, electrical noise and irreversible thermodynamics

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

PHYS 834 GALACTIC AND EXTRAGALACTIC ASTROPHYSICS 3

A theoretical and analytic treatment [contrasted with the largely phenomenological approach of PHYS632] of non-stellar astrophysics, including cosmic rays, inter-stellar medium, atomic astrophysics, plasma astrophysics, galactic structure, active galaxies and quasars, and cosmology

PREREQ: PHYS632

PHYS 838 ADVANCED TREATMENT OF SELECTED TOPICS 3

Selected topics taken from the following list: molecular biophysics, theory of relativity, nuclear theory, elementary particles, magnetic resonance, quantum mechanics, applications of group theory in physics, and quantum electronics

RESTRICTIONS: May be repeated for up to six credit hours when topics vary

PHYS 839 ADVANCED SOLID STATE PHYSICS 3

Selected topics in solid state physics, taken from the following list: electronic conductivity, optical properties, crystal imperfections, magnetism, irreversible thermodynamics, mathematical methods, and band theory

RESTRICTIONS: May be repeated for up to nine 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 863 THEORETICAL PHYSICS SEMINAR 1 PF

Lectures and discussions on specialized topics in theoretical 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

An introduction to the ethics, licensure laws and practice of physical therapy

RESTRICTIONS: Open to MPT Program students only. Requires permission of instructor

PHYT 601 EXERCISE PHYSIOLOGY: TREATMENT AND RESEARCH 3

Discusses research on the effects of exercise on various patient populations. Emphasis on muscle, bone and connective tissue remodeling. Examines cardiopulmonary rehabilitation, isokinetic and isotonic theories and research

RESTRICTIONS: Open to MPT Program students only

PHYT 602 PATIENT MANAGEMENT I 3

An introduction to the theory and skills necessary for the physical therapy management of patients commonly seen in primary care facilities

RESTRICTIONS: Open to MPT Program students only

PHYT 603 PHYSICAL AGENTS 2

Introduces the physics, physiology and clinical applications of various physical agents. Students incorporate this new knowledge into patient care problems

RESTRICTIONS: Open to MPT Program students only

PHYT 604 FUNCTIONAL ANATOMY AND BIOMECHANICS 3

Gives a description of normal and abnormal human movement. Emphasis on surface anatomy and evaluation procedures such as EMG and cinematography

PREREQ: BISC401 and PHYT622

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 METHODS 3

The research process will be studied. Among the topics covered are: scientific method, experimental design, statistical procedures and technical writing

RESTRICTIONS: Open to MPT Program students only

PHYT 607 ELECTROPHYSIOLOGICAL TREATMENTS AND EVALUATION 3

Emphasis on the physiological basis for the electrotherapeutic and electrophysiological evaluative procedures practiced in the physical therapy clinic

RESTRICTIONS: Open to MPT Program students only

PHYT 608 MUSCULOSKELETAL EVALUATION AND TREATMENT 3

In-depth analysis of evaluation and treatment strategies of spinal and extremity joints, muscles and connective tissue. Emphasizes research on the physiological basis of traction, mobilization and exercise

PREREQ: PHYT604, PHYT622 and PHYT604

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

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

PHYT 612 CLINICAL MANAGEMENT PRACTICUM 3

Full- or part-time practicum in a management setting. Advances skills in management

PREREQ: All previous MPT courses

PHYT 613 ADVANCED ORTHOPEDICS 3

Discusses various schools of orthopedic intervention

PREREQ: All previous MPT courses

PHYT 614 SPORTS PHYSICAL THERAPY 3

Analyzes the various competencies required in the practice of sports physical therapy. Clinical skill acquired

PREREQ: All previous MPT courses

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

PHYT 616 PEDIATRICS SEMINAR 3 PF

Discusses selected problems encountered by the pediatric population. Studies the evaluation, treatment and research basis of these problems

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

PHYT 620 EDUCATIONAL PROCESS IN COMMUNITY HEALTH 1

Focuses on the learning/teaching process for application to the teaching roles of the health professional.

RESTRICTIONS: Open to MPT Program students only

PHYT 621 PRACTICE CLINIC 1 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, lectures and demonstrations. Stresses clinical significance of anatomical structure.

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 INTRODUCTION TO EVALUATION 1

Provides the student with 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: MPT Program students only

PHYT 801 MEDICAL SCIENCE I 2

Lectures in pathology, clinical medicine, cardiology and pharmacology.

RESTRICTIONS: Open to MPT Program students only.

PHYT 802 MEDICAL SCIENCE II 2

Lectures in orthopedics, radiology and rheumatology.

PREREQ: All previous MPT courses

PHYT 803 MEDICAL SCIENCE III 2

Lectures in neurology, pediatrics, geriatrics and other medical specialties as required

PREREQ: All previous MPT courses

PHYT 868 RESEARCH 1-9

PREREQ: All previous MPT courses

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 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 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 213 TURF ESTABLISHMENT AND MAINTENANCE 3

Factors affecting the establishment and maintenance of fine and utility turf; emphasis on the management of golf courses, athletic fields and sod farms.

PLSC 270 BIOTECH: SCIENCE AND SOCIOECONOMIC ISSUES 3

See ANSC270 for course description.

PLSC 300 PRINCIPLES OF ANIMAL AND PLANT GENETICS 3

Introduction to the theory and application of genetics as related to the improvement of plants and animals. May be cross-listed with ANSC300 and/or ENTO300

PREREQ: PLSC101, or ANSC101 and ANSC140

PLSC 302 VEGETABLE SCIENCE 3

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 BISC201

PLSC 304 SOIL AND PLANT MICROBIOLOGY 4

Introduction to microorganisms in the plant and soil sciences: characterization of major microbial taxa; microorganisms in relation to soil productivity, environmental quality, and plant growth and disease; and basic laboratory techniques for studying microorganisms.

PREREQ: PLSC201 and PLSC204

PLSC 305 SOIL FERTILITY AND PLANT NUTRITION 4

Basic principles of nutrient availability in the soil and physiological functions of nutrients in the plant. Application of principles to fertility management of agricultural crops.

PREREQ: CHEM102 and PLSC204

PLSC 310 ANIMAL AND PLANT GENETICS LABORATORY 1

Laboratory exercises concerning genetic concepts, methods and applications using various plant and animal systems. May be cross-listed with ANSC310 and/or ENTO310

COREQ: PLSC300

PLSC 331 LANDSCAPE CONSTRUCTION I 4

Introduction to principles involved in contour grading, site drainage, design of landscape features and methods of construction related to landscaping.

PREREQ: PLSC332

PLANT AND SOIL SCIENCES

PLSC 332 BASIC LANDSCAPE DESIGN I 4

Application of design principles to actual field problems, drafting and presenting techniques.
PREREQ: PLSC212.

PLSC 364 ORNAMENTAL HORTICULTURE INTERNSHIP 1-6

Supervised, faculty-monitored, career-related experience in one or more aspects of the ornamental horticulture industry.
PREREQ: PLSC133.

PLSC 366 INDEPENDENT STUDY 1-6

PLSC 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 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 403 NURSERY AND GARDEN CENTER MANAGEMENT 3

Production, maintenance and marketing of plants relative to the establishment and management of a nursery or garden center.
PREREQ: PLSC101 or PLSC151.

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 PLSC208, and CHEM213.

PLSC 411 DIAGNOSTIC PLANT PATHOLOGY 2

Consideration of major pathogenic causes of economic losses of plants. Emphasis on principles of etiology, epiphytology, symptoms and control.
PREREQ: PLSC303.

PLSC 412 DIAGNOSTIC PLANT PATHOLOGY LABORATORY 1-6

Diagnosis, epidemiology and control of diseases of specific crops.
PREREQ: PLSC411.
COREQ: PLSC411.

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 414 PLANT CELL AND TISSUE CULTURE 4

Principles of culturing plants in vitro. Topics for both lecture and laboratory include cell suspensions, another culture, embryo rescue, micropropagation and regeneration via organogenesis and embryogenesis.
PREREQ: PLSC101.

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 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 422 PLANT PROPAGATION 3

Practical and physiological aspects of the propagation of economic plants including both sexual and asexual methods.
PREREQ: PLSC201.

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 431 LANDSCAPE CONSTRUCTION II 3

The application of the principles covered in PLSC331 to the solution of landscape construction, site drainage and grading problems, and construction documentation.
PREREQ: PLSC331.

PLSC 450 LANDSCAPE DESIGN II 3

Comprehensive solution of landscape problems. Field application of principles of construction and design.
PREREQ: PLSC332.

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 465 SEMINAR 1

Oral and written reports in one of the fields of plant science.

PLSC 466 INDEPENDENT STUDY 1-6

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 AGE603 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 SOIL CHEMISTRY 3

Aspects of soil acidity and of soil colloids. Reactions of soil nitrogen, phosphorus, potassium and micronutrients. Electrochemistry of soil colloids including double layer theory, zero point of charge theory and ion exchange reactions. Kinetics and thermodynamics of exchange in pure and mixed soil systems.
PREREQ: CHEM102 or CHEM104 and PLSC204.

PLSC 609 PLANT MICROTCHNIQUE 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 2

Consideration of major pathogenic causes of economic losses of plants. Emphasis on principles of etiology, epiphytology, symptoms and control.
PREREQ: PLSC303.

PLSC 612 DIAGNOSTIC PLANT PATHOLOGY LABORATORY 1-6

Diagnosis, epidemiology and control of diseases of specific crops.
PREREQ: PLSC611.

PLSC 613 PRINCIPLES OF PLANT DISEASE CONTROL 3

Exclusion, eradication, resistance and protection with emphasis on fungicides, bactericides and nematocides and their use.
PREREQ: PLSC303.

PLSC 615 VASCULAR PLANT ANATOMY 3

A developmental and comparative study of the cells, tissues and organs of vascular plants. Readings in the current anatomical literature.

PLSC 616 PLANT VIROLOGY 4

The epidemiology, detection, identification and control of plant viruses and virus-like agents.
PREREQ: PLSC303.

PLSC 619 SOIL MICROBIOLOGY 4

Characterization of microorganisms and microbial habitats in soil environments. Processes and interactions involving soil microorganisms with respect to agricultural productivity and environmental quality. Introduction to laboratory techniques for the observation, enumeration and isolation of soil microorganisms, and measurement of associated activities.

PLSC 620 PLANT PHYSIOLOGY LABORATORY 2

The extraction from higher plants of enzymes and other macromolecules, and assay by chemical tests. Pigment extraction, organelle separation, ion uptake, protein manipulation using centrifuge, spectrophotometer, chromatography and electrophoresis.

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 650 CLAY MINERALOGY 3

See MAST650 for course description.

PLSC 800 CURRENT TOPICS IN PLANT SCIENCE 1-3

Discussion of selected topics and recent literature in plant science.

PLSC 801 PLANT SCIENCE TECHNIQUES 3

Theories, principles and applications of laboratory techniques used in planning and conducting plant science research.

RESTRICTIONS: Requires permission of instructor.

PLSC 802 PROFESSIONAL DEVELOPMENT 1

Professional development including grantsmanship, manuscript writing and reviewing, resume preparation, job interviewing and presentation of research at professional meetings.

PLSC 803 ADVANCED SOIL FERTILITY AND PLANT NUTRITION 3

Analysis of chemical and biochemical factors involved in nutrient availability and transport in the soil. Evaluation of current theories of ion uptake, translocation and 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 810 SOIL PHYSICAL CHEMISTRY 3

Basic physical chemistry principles applied to heterogeneous soil systems, including ionic distribution of the diffuse double layer, thermodynamics of cation exchange, theories of cation adsorption by soil constituents, anion exclusion, miscible displacement theory and aspects of equilibrium and kinetics.

PREREQ: PLSC608.

PLSC 814 ADVANCES IN PLANT TISSUE CULTURE 3

A review of current tissue culture literature supplemented with a historical perspective.

RESTRICTIONS: Requires consent of instructor.

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.

RESTRICTIONS: None

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. Language laboratory as needed.

PORT 106 BRAZILIAN PORTUGUESE II - ELEMENTARY/INTERMEDIATE 4

Completion of basic Brazilian Portuguese. Increasing mastery of the basic skills of speaking, listening, reading and writing.

PREREQ: PORT105.

RESTRICTIONS: Two or three years of high school Brazilian Portuguese acceptable in lieu of Prerequisite.

PORT 107 BRAZILIAN PORTUGUESE III - INTERMEDIATE 4

Review of grammar, continued practice in speaking and writing, and reading texts of average difficulty.

PREREQ: PORT106.

RESTRICTIONS: Four years of high school Brazilian Portuguese acceptable in lieu of Prerequisite. Course satisfies the Arts and Science foreign language requirement.

POLITICAL SCIENCE

POSC 105 THE AMERICAN POLITICAL SYSTEM 3

Constitutional principles, structure and functions of the political process in the United States.

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 POSC105.

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 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 301 STATE AND LOCAL GOVERNMENT 3

American federalism with emphasis on government and politics, with special attention to Delaware.

POSC 302 RESEARCH METHODS 3

Design, measurement of political phenomena, collection and analysis of data and use of computer in political research.

POSC 303 THE ADMINISTRATIVE PROCESS 3

Public administration treated as process of organization, methods of management and decision making common to all levels of bureaucracy.

POSC 306 PUBLIC CHOICE 3

See ECON306 for course description.

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

POSC 312 EAST ASIAN POLITICAL SYSTEMS 3

An introductory survey to study the structure and process of political power in major countries in Asia. Special emphasis on China and Japan

POSC 313 AMERICAN FOREIGN POLICY 3

The theory, policies and administration of U.S. foreign policy

POSC 314 MAKING UNITED STATES FOREIGN POLICY 3

Discusses the roles of the executive, foreign, defense and intelligence establishments in making American foreign policy. Also treats the impact of public opinion, interest groups and Congress.

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 MINORITY GROUP POLITICS 3

Examines the history, strategic positions and political tactics of Blacks, Chicanos (Hispanic Americans), Native Americans and women in the American political system. Where appropriate, the politics of ethnic and racial minorities will be compared/contrasted to the politics of women.

POSC 322 BLACK POLITICS 3

Provides insight and understanding about the Black experience in the American political system. Basic questions addressed are: Is Black politics unique and, therefore, different from American politics? What are the goals and aspirations of Black America and are they universally shared?

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 POLITICAL BEHAVIOR 3

Public opinion, voting and elections, the mass media, ideology, political socialization and violence. The relationship between public opinion and public policy

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 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

POSC 341 ENVIRONMENT OF MULTINATIONAL CORPORATIONS 3

See BUAD341 for course description.

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 3

Decision-making processes and the exercise of political power in urban communities

POSC 360 HUMANITIES COLLOQUIUM 3

See ASRC360 for course description

POSC 365 MODEL UNITED NATIONS 2

Intensive preparation for effective participation in the National Model United Nations held in New York City each April

RESTRICTIONS: May be repeated once for credit. Open only to selected delegates to the National Model United Nations

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

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

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

POSC 414 PROBLEMS IN AMERICAN FOREIGN POLICY 3

Contemporary problems in American foreign policy and policy making.

POSC 415 FORCE AND WORLD POLITICS 3

Interrelationship of military and foreign policy; military strategies, arms control and disarmament; and the American experience.

POSC 416 TRANSNATIONAL RELATIONS AND WORLD POLITICS 3

Transnational political and economic phenomena; emphasis on political behavior of multinational corporations, international financial system; implications for world order.

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 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 426 LATIN AMERICAN POLITICAL SYSTEMS 3

Impact of social and economic change on the political processes

POSC 427 POLITICS IN CHINA 3

An in-depth study of who governs China and the relations among the major forces: the party, the military and the bureaucracy

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 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 POLITICAL SYSTEMS 3

Structure, process and policies of the governments, south and north of the Sahara

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 WOMS436.

POSC 437 DEMOCRATIC THEORY 3

Definition and operation of democracy in contemporary society; elite-mass public interaction, representation, bureaucratic power, mass media and economic power as constraints on democratic theory. Emphasis on the American experience.

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.

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 objective examination of China's relations with the major countries in the world. Special attention paid to China's policy towards the superpowers and its role in the "Third World."

POSC 444 SEMINAR IN WORLD POLITICS 3

Survey of current world problems including seminar sessions with visiting scholars. Content varies from year to year.

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 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.

POSC 453 PUBLIC PERSONNEL ADMINISTRATION 3

Public personnel systems, including political appointees, the general civil service, professional career systems and the collective bargaining system. Emphasis on recruitment, promotion, evaluation, management, patronage, affirmative action and collective bargaining

POSC 454 PUBLIC ADMINISTRATIVE AND ORGANIZATIONAL THEORY 3

Major administrative and organizational theories as applied to public organizations. Special attention to classical, political and pragmatic theories. Topics include administrative change and decision making.

POSC 455 PUBLIC BUDGETING AND FINANCIAL MANAGEMENT 3

Examines the role of budgeting in government policy formation, resource allocation, communication and control. Reviews the relative strength of various public budget systems. Topics also include a survey of techniques employed in the management of government financial operations

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 460 HUMANITIES COLLOQUIUM 3

See ASRC460 for course description.

POSC 463 INTERNATIONAL INSTITUTIONS 3

A consideration of the growth, development and functions of various major international organizations. Provides preparation for effective participation in Model United Nations or similar international organization simulations which may run in conjunction with course RESTRICTIONS: Model UN Program may be repeated once for credit.

POSC 464 FIELDWORK IN POLITICAL SCIENCE 1-6

Internship or fieldwork program under the direction of a faculty member, including preparation of a substantial bibliography and/or major research paper

PREREQ: POSC105

RESTRICTIONS: Requires permission of instructor.

POSC 465 MODEL OAS 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. May be cross-listed with EDST465.

POSC 466 INDEPENDENT STUDY 1-6**POSC 470 SENIOR HONORS SEMINAR 3****POSC 477 POLITICS OF THE ARAB WORLD 3**

Arab politics surveyed from Morocco to Iraq.

POSC 604 INTERNATIONAL LAW 3

See MAST673 for course description.

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 615 FORCE AND WORLD POLITICS 3

Interrelationship of military and foreign policy; military strategies, arms control and disarmament; and the American experience.

POSC 616 TRANSNATIONAL RELATIONS AND WORLD POLITICS 3

Transnational political and economic phenomena; emphasis on political behavior of multinational corporations, international financial system; and implications for world order.

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 URAF625

POSC 627 LATIN AMERICAN POLITICAL SYSTEMS 3

Impact of social and economic change on the political processes

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 POLITICAL SYSTEMS 3

Structure, process and policies of the governments of Africa, south and north of the Sahara

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 640 INTERNATIONAL AND DEVELOPMENT ADMINISTRATION 3

The administration of development, especially in third world countries. Considers development a multi-dimensional process involving major changes in social structures, popular attitudes and local, national and international institutions, as well as in economic growth, the reduction of inequality and the eradication of absolute poverty. May be cross-listed with URAF640.

POLITICAL SCIENCE

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 643 FOREIGN POLICY OF COMMUNIST CHINA 3

Theory, policies and administration of Communist Chinese foreign policy.

POSC 650 PROBLEMS OF LATIN AMERICAN POLITICS 3

Current political issues in selected Latin American countries.

POSC 651 COMMUNIST POLITICAL THOUGHT 3

Major theoretical ideas of Marxism-Leninism. Marx, Engels, Lenin, Stalin, Mao Tse-Tung and Castro examined for their contributions to Communist thought.

POSC 652 TOPICS IN POLITICAL THEORY 3

Focuses on selected topics in political theory, including Marxism, Liberalism and Contemporary Political Theory.

POSC 677 POLITICS OF THE ARAB WORLD 3

Arab politics surveyed from Morocco to Iraq.

POSC 678 ADMIRALTY AND MARITIME LAW 3

See MAST678 for course description.

POSC 679 SHIPPING AND PORT MANAGEMENT 3

See MAST679 for course description.

POSC 800 SEMINAR: SCOPE AND METHODS 3

Introduces basic topics of political inquiry. Surveys philosophies of science, epistemologies, and seeks to address questions such as: What is theory? How are scientific theories of politics constructed and evaluated? What constitutes a valid description or explanation? Conceptual and normative issues are also explored.

POSC 801 RESEARCH DESIGN FOR POLITICAL AND POLICY SCIENCES 3

Seminar helps students understand and evaluate alternative research strategies. Each participant has an opportunity to write a research proposal that is then critiqued by members of the class and the instructor. A wide variety of research designs is covered.

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 URAF803.

POSC 805 SEMINAR: PUBLIC LAW 3

Seminar on the role of courts and constitutional law within the political system. Research paper will be expected.

RESTRICTIONS: Graduate students only.

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 812 SEMINAR: TOPICS IN AMERICAN POLITICS 3

Focuses on selected topics in American politics, including urban politics, judicial politics and political parties.

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 815 PUBLIC MANAGEMENT STATISTICS 3

See URAF815 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 URAF816.

POSC 817 FINANCING ALTERNATIVES IN THE PUBLIC SECTOR 3

See URAF817 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 URAF818.

POSC 819 MANAGEMENT DECISION MAKING 3

See URAF819 for course description.

POSC 821 TECHNOLOGY AND SOCIETY SEMINAR 3

See URAF821 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 URAF825.

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 831 READING SEMINAR: INTERNATIONAL RELATIONS 3

Topics and problems in international relations. Content varies and ranges across the field of international relations including historical, theoretical, global, regional, legal, organizational, normative and contemporary policy questions.

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 ORGANIZATIONAL THEORY AND ADMINISTRATION 3

Examines the major theories of organization and considers their implications for strategies of administration. Focuses on selected aspects of organizational psychology and administrative behavior related to motivation and incentives, group dynamics and leadership and control. May be cross-listed with URAF835.

POSC 837 PUBLIC PERSONNEL ADMINISTRATION 3

See URAF837 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 URAF838.

POSC 839 PUBLIC FINANCE AND FISCAL MANAGEMENT 3

See URAF 833 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 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 202 HUMAN DEVELOPMENT AND EDUCATIONAL PRACTICE 3

See EDST202 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 304 EDUCATIONAL PSYCHOLOGY - SOCIAL ASPECTS 3

See EDST304 for course description.

PSYC 305 EDUCATIONAL PSYCHOLOGY - COGNITIVE ASPECTS 3

See EDST305 for course description.

PSYC 306 COMPUTER APPLICATIONS IN PSYCHOLOGY 3

Introduction to computer programming, statistic packages, spreadsheet and data base systems and computer graphics.

PREREQ: PSYC309

RESTRICTIONS: Open to PSYC majors only.

PSYC 309 MEASUREMENT AND STATISTICS 3

Theory and the application of statistical techniques to psychology 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: PSYC309

PSYC 312 LEARNING AND MOTIVATION 3

Experimental study of contemporary theories of learning and motivation

PREREQ: PSYC309

PSYC 314 BRAIN AND BEHAVIOR 3

Study of the brain mechanisms underlying hunger, sex, aggression, learning, memory, perception, sleep and waking

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 322 PSYCHOLOGY OF ADJUSTMENT 3

Problems of human adjustment with emphasis on causation and prevention of common maladjustments.

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

PREREQ: PSYC201 and PSYC309

PSYC 346 PSYCHOLOGY AND THE LAW 3

See CRJU346 for course description.

PSYC 347 THE JURY: GUILTY OR NOT GUILTY 3

Observations of actual criminal and civil trials, mock jury deliberations of trials observed, and lectures on jury research, films, meetings with judges, prosecutors and defense attorneys

PREREQ: PSYC201

COREQ: CRJU347

RESTRICTIONS: Requires permission of instructor

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

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

PSYC 380 PSYCHOPATHOLOGY 3

Exploration of research on diagnosis, etiology and treatment of major pathological disorders. Emphasis on original research articles, class discussion, assessment instruments in addition to analysis of video taped interviews with patients used to illustrate the disorders.

PREREQ: PSYC201 and PSYC309; and either PSYC301, PSYC303, or PSYC325

RESTRICTIONS: If both PSYC334 and PSYC380 are taken, only PSYC334 will count for major credit. Open to majors only.

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.

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 405 ADVANCED SOCIAL PSYCHOLOGY 3

Contemporary theories of interpersonal behavior, dynamics of social groups and experimental methods for the study of social (communication and interaction) processes.

PREREQ: PSYC309, and PSYC390 or PSYC303

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 411 BRAIN AND COMPUTER 3

The computing machinery of the brain: a hands-on introduction to neural models and networks.

PREREQ: PSYC310 or PSYC312 or PSYC314 or PSYC340

PSYC 412 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 and PSYC314

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 419 PSYCHOLOGY OF HUMOR 3

Systematic survey of psychological theories of humor and the empirical basis for them. Undertakes the analysis of cognitive, motivational and social developmental bases of smiling and laughter

PREREQ: PSYC201, PSYC303 or PSYC325 or PSYC301; and PSYC309

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 TOPICS IN CHILD PSYCHOLOGY 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 PSYC 350

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

PREREQ: PSYC340

PSYC 444 THE PSYCHOLOGY OF AESTHETICS 3

Psychological and psychobiological theories and empirical investigations of aesthetic experience

PREREQ: PSYC309, 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 452 LANGUAGE AND THOUGHT 3

A survey of research dealing with the nature of linguistic and cognitive structures, their development and their interaction.

PREREQ: PSYC340

PSYC 460 ASSESSMENT OF YOUNG CHILDREN 3

See IFST452 for course description.

PSYC 462 LANGUAGE ACQUISITION 4

See EDST462 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: Psychology Majors only

PSYC 605 ADVANCED SOCIAL PSYCHOLOGY 3

Contemporary theories of interpersonal behavior, dynamics of social groups and experimental methods for the study of social (communication and interaction) processes

PREREQ: PSYC303 and PSYC309

PSYC 606 ANIMAL BEHAVIOR 3

Seminar on naturalistic and experimental investigations of species-typical behavior

PSYC 608 ADVANCED LEARNING AND MOTIVATION 3

Experimental origins of the principles of learning with emphasis on the role of motivation in the learning process.

PREREQ: PSYC310 and PSYC312

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 615 HISTORY OF COGNITIVE PSYCHOLOGY 3

Review of major concepts in psychology and its philosophical roots that have determined the current theories and models of cognition.

PSYC 616 COMPUTER MODELS OF COGNITION 3

Survey of computer models for perception, language and problem-solving. Covers representation schemes and control structures used in artificial intelligence models. Emphasis placed on their psychological relevance

RESTRICTIONS: Requires permission of instructor.

PSYC 624 INDUSTRIAL SOCIAL PSYCHOLOGY 3

Social psychology applied to problems of productivity, satisfaction, communication and organization

PREREQ: PSYC303

PSYC 626 NEUROSCIENCE I 4

See BISC626 for course description.

PSYC 627 NEUROSCIENCE II 4

See BISC627 for course description.

PSYC 640 TEXT COMPREHENSION 3

Survey of recent theoretical and experimental work being done in the area of text comprehension. Based on primary sources, addresses such topics as the effects of prior knowledge on processing, semantic priming, question answering and hypertext

RESTRICTIONS: Requires permission of instructor.

PSYC 641 VISUAL COGNITION 3

Reviews current research findings on how biological systems process visual information. Topics include basic visual processes, object recognition, spatial attention, visual search, visual memory (including imagery) and reading. Considers models derived from cognitive psychology, machine vision and neuroscience.

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

RESTRICTIONS: Requires permission of instructor.

PSYC 650 COGNITIVE NEUROSCIENCE 3

Examines neurophysiological basis for a variety of cognitive processes such as object recognition, selective attention, visual imagery, memory and language. Topics include neural networks, effects of brain damage and neural imaging techniques, such as Pet Scan and event-related brain potentials

RESTRICTIONS: Requires permission of instructor.

PSYC 651 CONTROVERSIES IN COGNITIVE PSYCHOLOGY 3

Based on empirical research, students critically evaluate selected models of visual perception, attention and human memory. Opposing theoretical perspectives chosen to highlight the controversial areas of cognitive theory.

RESTRICTIONS: Requires permission of instructor

PSYC 665 USING TESTS IN COUNSELING 3

See EDDV675 for course description.

PSYC 668 RESEARCH 1-6

PSYC 675 LANGUAGE ACQUISITION 4

See EDST675 for course description.

PSYC 681 CLINICAL PSYCHOLOGY 3

Introduction to clinical theories, research and practices. Diagnosis, classification and treatment of behavior disorders.

PREREQ: PSYC310 or PSYC312

PSYC 692 SOCIAL SKILLS TRAINING FOR CHILDREN 3

See EDST692 for course description.

PSYC 803 EMOTIONS IN HUMAN DEVELOPMENT 3

The nature of emotions, their relation to cognition and action and their role in mother-infant interaction, attachment, temperament, personality development, psychopathology and psychotherapy.

PSYC 804 SEMINAR IN HUMAN DEVELOPMENT 3

Selected research literature in developmental psychology. May be cross-listed with EDST837

RESTRICTIONS: Requires permission of instructor

PSYC 805 THEORIES IN SOCIAL PSYCHOLOGY 3

A comprehensive examination of the dominant theories and associated research in social psychology

RESTRICTIONS: Requires permission of instructor

PSYC 806 PSYCHOBIOLOGY 3

The structure and function of the nervous system and the neural mechanisms underlying sensory and motor processes and arousal, sleep, emotions, motivation, learning and memory

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 808 CLINICAL NEUROPSYCHOLOGY 3

Presents an overview of the neuroanatomical and biochemical bases of normal and abnormal behavior, the essentials of the neurological examination, a survey of neuropsychological assessment and an examination of several current topics.

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.

PSYC 810 INFORMATION PROCESSING 3

Theories of information processing and psychophysics.

PSYC 811 SENSORY PROCESSES 3

Structure and function of the sense organs, with emphasis on research techniques and methodology.

PREREQ: PSYC627

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 perceptions.

RESTRICTIONS: Requires permission of instructor.

PSYC 814 RESEARCH METHODS IN SOCIAL PSYCHOLOGY 3

Strategies and techniques; and critical analysis of design

PSYC 815 THEORY AND RESEARCH IN GROUP BEHAVIOR 3

Empirical findings and major theories of group behavior. Emphasis on research methodology.

PSYC 817 INDIVIDUAL INTELLIGENCE TESTING 3

See EDST817 for course description.

PSYC 819 PSYCHOTHERAPY I 3

Survey of theories, schools and techniques of psychotherapy and critical review of relevant research.

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.

PSYC 821 FAMILY THERAPY 3

Survey of different models for assessing and treating family dysfunction. Particular emphasis will be placed on marital and parent-child problems. The course objective is to help students develop conceptual and observational skills required for conducting therapy.

RESTRICTIONS: Requires permission of instructor.

PSYC 823 APPLIED HUMAN DEVELOPMENT 3

See EDST823 for course description.

PSYC 824 COMMUNITY MENTAL HEALTH 3

The community's role in contributing to mental illness and the mode and feasibility of organizing community mental health agencies into a concerted preventive mental hygiene effort. Focuses on the Greater Wilmington community.

PSYC 825 GROUP PSYCHOTHERAPY 3

Theories and applications of group psychotherapeutic practices including role playing and psychodrama. Review of relevant research and evaluative studies.

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

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.

PSYC 833 SEMINAR IN EMOTIONS 3

The theories and methods of measuring emotions, as states or traits of humans. Describes and demonstrates a range of methods, including rating, checklist, questionnaire and physiological ones.

PSYC 834 SUPERVISED PRACTICE IN CLINICAL PSYCHOLOGY I 1-3 PF

Limited diagnostic and therapeutic practice in clinical setting under professional supervision.

PSYC 835 SUPERVISED PRACTICE IN CLINICAL PSYCHOLOGY II 1-3 PF
Continuation of PSYC834.

PSYC 836 SUPERVISED PRACTICE IN CLINICAL PSYCHOLOGY III 1-3 PF
Continuation of PSYC834 and PSYC835.

PREREQ: PSYC834 and PSYC835.

PSYC 837 SUPERVISED PRACTICE IN CLINICAL PSYCHOLOGY IV 1-3 PF

Continuation of PSYC834, PSYC835 and PSYC836.

PREREQ: PSYC836.

PSYC 840 ADVANCED PERSONALITY STUDY 3

Theories of personality and motivation, current research in personality and motivation, relationship to psychopathology, normal adjustment and psychotherapy.

RESTRICTIONS: Requires permission of instructor.

PSYC 845 CHILDHOOD PSYCHOPATHOLOGY 3

See EDST850 for course description.

PSYC 850 SEMINAR IN MEMORY 3

Theories of information storage and retrieval.

RESTRICTIONS: Requires permission of instructor.

PSYC 851 SEMINAR IN PERCEPTION 3

Major experimental problems and theories: core-context, configuration, topological, association and others.

PSYC 852 SEMINAR IN PERSONALITY 3

Description and measurement of personality; comprehensive theories of personality; and methods of experimental investigation.

PSYC 853 SEMINAR IN LEARNING 3

Current theories of learning; and emphasis on contemporary experimental literature.

PSYC 854 SEMINAR IN COMMUNICATIONS 3

Syntactic, semantic, and pragmatic phenomena. Experimental study of communication processes with special attention to nonverbal aspects of interpersonal interaction.

RESTRICTIONS: Requires permission of instructor.

PSYC 855 SEMINAR IN ATTITUDE THEORY AND MEASUREMENT 3

Analysis of structure, development and change in social attitudes. Emphasis on research methodology.

PREREQ: PSYC805.

RESTRICTIONS: Requires consent of instructor.

PSYC 856 SEMINAR IN COGNITIVE PROCESSES 3

Consideration of major theories and empirical research in both individual and group problem solving and decision making.

PSYC 858 SEMINAR IN VISUAL PROCESSES 3

Survey of structure and function in the visual system with particular emphasis on the nature of light and stimulus detection, as well as integration and transfer of the neural code.

RESTRICTIONS: Requires permission of instructor.

PSYC 859 SEMINAR IN COOPERATION AND COMPETITION 3

Study of negotiation, bargaining, risk taking and cooperation, in small and large groups.

RESTRICTIONS: Requires permission of instructor.

PSYC 860 PSYCHOLOGICAL STATISTICS 3

Applications to behavior measurement of probability, regression, analysis of variance and covariance; psychometrics and scaling techniques; and design of experiments.

PREREQ: STAT201 or PSYC309, and four courses in psychology.

PSYC 861 PSYCHOLOGICAL STATISTICS 3

Applications to behavior measurement of probability, regression, analysis of variance and covariance; psychometrics and scaling techniques; and design of experiments.

PREREQ: STAT201 or PSYC309, and four courses in psychology.

PSYC 863 SEMINAR: CHILD PSYCHOLOGY 3

Advanced treatment of the experimental literature in child psychology as it relates to the issue of the "cognitive" vs. "motivational" approach to child development.

PREREQ: PSYC607

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

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. Language laboratory as needed.

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 Prereq. Satisfies the Arts and Science foreign 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

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 the Soviet Union. 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

RUSS 312 INTRODUCTION TO RUSSIAN LITERATURE II 3

Masterpieces of poetry, narrative prose and drama from the 20th century.

PREREQ: RUSS211

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

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, PHYS101, 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.

SCEN 391 SECONDARY SCIENCE CURRICULUM 3

Content, organization, levels and design of curriculum in secondary-school programs in biology, chemistry, earth science, general science, physical science and physics. Design of a science course; planning major units.

RESTRICTIONS: Must precede SCEN491.

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: EDST302.

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: EDDV400.

SOCIOLOGY

SOCI 201 INTRODUCTION TO SOCIOLOGY 3

Principles of sociology.

SOCI 202 SOCIAL DEVIANCE 3

Major forms of deviant behavior and the varied approaches to analysis.

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.

May be cross-listed with BAMS204.

SOCI 206 WOMEN AND WORK 3

See WOMS206 for course description.

SOCI 208 WORK IN AMERICA 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 209 SOCIAL PROBLEMS 3

Topics may include poverty, intergroup conflicts, war, mental illness, aging, adolescence and environmental pollution.

SOCI 210 POPULATION PROBLEMS 3

The interaction between population characteristics and other social and economic factors.

SOCI 211 MEN, CONFLICT AND SOCIAL CHANGE 3

See WOMS211 for course description.

SOCI 242 SOCIETY AND THE HEALTH PROFESSIONS 3

See CSCC242 for course description.

SOCI 243 SOCIETY, POLITICS AND HEALTH CARE 3

See CSCC243 for course description.

SOCI 301 INTRODUCTION OF SOCIOLOGICAL RESEARCH 3

Survey of research methods and data analysis employed in sociology.

PREREQ: SOCI201.

RESTRICTIONS: Strongly recommended - Junior status and 12 social science credits.

SOCI 303 JUVENILE DELINQUENCY 3

Delinquency as a form of socially deviant behavior; definition of the extent of limitations of statistics, theories of causation, and the delinquent subculture; prevention and treatment.

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 307 SOCIOLOGY OF SEX AND GENDER 3

Gender relations in society, including sex-role socialization; gender stratification; gender relations in the family, the workplace and other social institutions; and feminism and social change. May be cross-listed with WOMS307.

PREREQ: SOCI201 or SOCI203.

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 310 SOCIOLOGY OF HEALTH CARE 3

Professionalization of health occupations, hospitals as social systems, medical education and practice organizations, health care organizations and their interrelationships (politics of health), and health service patterns. May be cross-listed with CCCC310.

PREREQ: SOCI201.

SOCI 311 HOSPITALS 3

Hospitals, asylums, nursing homes and other medically organized inpatient facilities viewed as health care settings and as organizations in society. Includes considerations of hospitals as organizations, as research settings, as locations where health professionals work and as sites of patient experience. May be cross-listed with CCCC311.

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 POSC105.

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.

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 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. May be cross-listed with CRJU330.

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 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 SOCIOLOGY OF 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. May be cross-listed with CRJU348.

PREREQ: SOCI201.

SOCI 355 COMPUTERS, ETHICS AND SOCIETY 3

See CCCC355 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.

PREREQ: SOCI201.

SOCI 361 RACE, POWER AND SOCIAL CONFLICT 3

The structure of minority groups; processes of conflict, competition and cooperation; analysis of stratification patterns as they affect and are affected by minority groups. May be cross-listed with BAMS361.

PREREQ: SOCI201.

SOCI 362 SOCIOLOGY OF MASS COMMUNICATION 3

Impact of mass media - television, film, radio and press - upon social attitudes, values and behavior. Problems of audience feedback, the media in social crisis and issues of control.

PREREQ: SOCI201.

SOCI 366 INDEPENDENT STUDY 1-3

SOCI 376 AMERICAN SOCIAL CHARACTER 3

Nature of social character in America, particularly as influenced by recent sociocultural change. Dominant and variant systems of beliefs, ideologies, values, motivations, psychodynamics, personality types and social behavior.

SOCI 380 DEVELOPMENT AND MODERNIZATION 3

Contemporary issues of social, political and economic change in developing societies. Dominant theories of modernization and development. Roles of men and women in developing societies.

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 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. May be cross-listed with CCCC410.

PREREQ: SOCI310 or SOCI311.

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.

SOCI 414 DATA ANALYSIS 3

Methods of analyzing data in sociological research focusing on multivariate approaches.

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 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.

RESTRICTIONS: Requires permission of instructor. Only 3 credits from this course may apply toward departmental requirement of six 400-level credits.

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 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.

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 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.

RESTRICTIONS: Requires upper division status, any major.

SOCI 495 FIELD EXPERIENCE IN CRIMINAL JUSTICE 4 PF

See CRJU495 for course description.

SOCI 604 SOCIAL ORGANIZATION: URBAN COMMUNITY 3

Conditions underlying urban residential patterns and the consequences of these patterns for local community activities.

SOCI 605 DATA COLLECTION 3

A survey of methods and techniques for defining research problems and for gathering and ordering 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 SEX AND GENDER 3

Reviews current research and theory in the sociology of sex roles and 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 and class inequality. Introduces sociological theory and methodology as used and revised by scholars working on gender issues. May be cross-listed with WOMS607.

SOCI 609 SOCIAL STRATIFICATION 3

Reviews major theoretical and empirical work in social stratification.

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 19th century.

SOCI 613 RESEARCH AND SOCIAL THEORY 3

Focuses on the relations between theory and method in social research.

SOCI 614 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 626 SOCIOLOGY OF ORGANIZATIONS 3

Cultural context of organizational behavior: organizational input-output systems, structures and dynamics. Case studies of industrial, educational, medical and voluntary action organizations.

SOCI 627 THEORIES OF COMPLEX ORGANIZATION 3

Development of theories of organizations: systems of authority and power, communication, reward and penalty; dynamics of conflict and accommodation between and within organizations; and problems of induction, placement, coordination and succession within organizations.

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 629 ORGANIZATIONAL CAREERS 3

Relationship between occupational careers and the organizations in which they are pursued. Process of recruitment, socialization, placement, promotion and succession.

SOCI 650 POLITICAL SOCIOLOGY 3

Analysis of political organization and action, including evaluation of major approaches. Case studies of political structures and behavior.

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 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 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

SOCI 836 SEMINAR IN CRIMINAL AND DELINQUENT BEHAVIOR 3

SOCI 869 MASTER'S THESIS 1-6

SOCI 875 PROPOSAL WRITING 3

Focuses on all aspects of grant proposal writing and reviewing. Funded and disapproved grant applications analyzed and critiqued. Mandatory student preparation of a complete grant application to be reviewed on campus by sitting members of NIH review committees.

RESTRICTIONS: Requires 30 hours of graduate study, including 3-6 hours of methods courses. Open only to advanced sociology/criminology graduate students.

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. Language laboratory work as needed.

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. Language laboratory as needed.

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 Prereq. Satisfies the Arts and Science foreign 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 Prereq.

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 Prereq. Satisfies the Arts and Science foreign 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.

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

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 Arts and Science foreign language requirement.

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 Arts and Science foreign language requirement.

SPAN 250 INTRODUCTION TO BUSINESS SPANISH 3

Familiarizes students with characteristics of business Spanish (terminology, syntactical patterns, etc.) and policies and practices of the Spanish business community.

PREREQ: SPAN107 or SPAN112.

SPAN 254 LATIN AMERICAN POLITICS IN THE PRESS 3

Students will explore topics in contemporary Latin American politics as expressed in the news media. The emphasis of the course will be on current events related to the internal and external politics of Latin America. Focus of the study will be the Latin American press: newspapers and magazines printed in the Spanish language.

PREREQ: Any 200-level course taught in the Spanish language

SPAN 255 SPANISH POLITICS IN THE PRESS 3

Explores topics in contemporary Spanish politics as expressed in the news media. Emphasis on current events related to the internal and external politics of Spain. Focus 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 to 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

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 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 and the influence of the pre-Roman strata, Latin, Germanic languages and Arabic. 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 and 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 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 433 MODERN SPANISH LITERATURE 3

Spanish drama and lyric poetry from Romanticism to contemporary period

PREREQ: One SPAN300-level survey of literature

SPAN 434 MODERN SPANISH LITERATURE 3

Prose from costumbrismo to the present

PREREQ: One 300-level survey of literature

SPAN 435 SPANISH MEDIEVAL LITERATURE 3

Study of the literature from the early lyric poetry to the 15th century

PREREQ: One SPAN300-level survey of literature

SPAN 436 STUDIES IN THE LITERATURE OF THE SPANISH GOLDEN AGE 3

The poetry and prose of the 16th and 17th centuries

PREREQ: One SPAN300-level survey of literature

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 441 THE CONTEMPORARY SPANISH AND SPANISH-AMERICAN NOVEL 3

Study of the novel of the 20th century considered as an artistic expression of the thought and life of the Hispanic world

PREREQ: One SPAN300-level survey of literature

SPAN 443 MEXICAN LITERATURE 3

Representative authors from the Colonial period to the present

PREREQ: One SPAN300-level survey of literature

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 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: Two 300-level Spanish literature courses

RESTRICTIONS: May be repeated for credit when topics vary

SPAN 462 SPANISH ESSAY AND CRITICISM OF THE TWENTIETH CENTURY 3

Study of contemporary critical works and essays

PREREQ: One SPAN300-level survey of literature

SPAN 466 INDEPENDENT STUDY 1-3

SPAN 482 THE THEATRE OF THE SPANISH GOLDEN AGE AND ITS LEGACY 3

Compares the masters of the Golden Age Theatre with today's internationally-known Spanish playwrights. Studies the comedies of Tirso de Molina, Lope de Vega and Calderon de la Barca, and finds their legacy in the plays of Saavedra, Zorrilla, Garcia Lorca and Casona. Investigates the sources and interpretation of the contemporary theatre, and how they have been influenced by the earlier dramatists

PREREQ: One SPAN300-level survey of literature

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 and the influence of the pre-Roman strata, Latin, Germanic language and Arabic. 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 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 633 MODERN SPANISH LITERATURE 3

Spanish drama and lyric poetry from Romanticism to contemporary period

SPAN 634 MODERN SPANISH LITERATURE 3

Prose from costumbrismo to the present

SPAN 635 SPANISH MEDIEVAL LITERATURE 3

Study of the literature from the early lyric poetry to the 15th century

SPAN 636 STUDIES IN THE LITERATURE OF THE SPANISH GOLDEN AGE 3

The poetry and prose of the 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 641 THE CONTEMPORARY SPANISH AND SPANISH-AMERICAN NOVEL 3

Study of the novel of the 20th century considered as an artistic expression of the thought and life of the Hispanic world

SPAN 643 MEXICAN LITERATURE 3

Representative authors from the Colonial period to the present

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 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 662 SPANISH ESSAY AND CRITICISM OF THE TWENTIETH CENTURY 3

Study of contemporary critical works and essays.

SPAN 682 THE THEATRE OF THE SPANISH GOLDEN AGE AND ITS LEGACY 3

Compares the masters of the Golden Age Theatre with today's internationally-known Spanish playwrights. Studies the comedies of Tirso de Molina, Lope de Vega, Calderon de la Barca and finds their legacy in the plays of Saavedra, Zorrilla, Garcia Lorca and Casona. Investigates the sources and interpretation of the contemporary theatre, and how they have been influenced by the earlier dramatists.

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 201 INTRODUCTION TO STATISTICS I 3

Probability, estimation, classical statistical inference and data analysis.

STAT 202 INTRODUCTION TO STATISTICS II 3

Correlation and regression, multiple regression, analysis of variance, classical time series, short- and long-term forecasting, smoothing, and index numbers: business indicators.

PREREQ: STAT201.

STAT 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.

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.

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 450 STATISTICS FOR THE ENGINEERING AND PHYSICAL SCIENCES 3

Combinatorial probability; distribution theory, estimation and hypothesis testing. Experimental design, analysis of variance and regression theory.

PREREQ: MATH243.

STAT 466 INDEPENDENT STUDY 1-6**STAT 555 STATISTICS FOR BUSINESS AND ECONOMICS 3**

Statistical inference, modern decision making, measures of association, classical time series analyses, forecasting and non-parametric techniques.

PREREQ: MATH221, MATH241 or MATH555.

STAT 600 FUNDAMENTALS OF STATISTICAL ANALYSIS 3

Basic topics in mathematics of most importance in probability and statistics. Selected topics in analysis. Arithmetic operations on arrays and matrices. Least squares approximation and the projection theorem.

STAT 601 PROBABILITY THEORY AND APPLICATIONS 3

See MATH630 for course description.

STAT 602 MATHEMATICAL STATISTICS 3

Derived sampling distributions, decision theory, estimation theory, multivariate normal, hypotheses testing and special topics.

PREREQ: MATH630.

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: STAT202, STAT371 or STAT555.

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 and factor analysis.

PREREQ: STAT371.

STAT 618 SAMPLING TECHNIQUES 3

Simple random sampling, stratified random sampling, ratio estimates, regression estimates, systematic sampling, cluster sampling and 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; and nonparametric measures of correlation.

PREREQ: STAT601 and STAT371.

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 or STAT450.

STAT 640 STATISTICAL CONSULTING 3

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

Involves attendance at weekly statistical laboratory meetings.

STAT 650 STATISTICS FOR THE ENGINEERING AND PHYSICAL SCIENCES 3

Combinatorial probability, distribution theory, estimation and hypothesis testing. Experimental design; analysis of variance and regression theory.

PREREQ: MATH243.

STAT 656 BIostatISTICS 3

Introductory course in 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: STAT201.

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: STAT201.

STAT 800 ESTIMATION AND STATISTICAL INFERENCE 3

In-depth coverage of 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, maximum likelihood estimation, robust estimation and Pitman efficiency.

PREREQ: STAT602 and MATH602.

STAT 801 ESTIMATION AND STATISTICAL INFERENCE 3

Covers further topics in estimation and inference.

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 and STAT616.

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

Presentation of a current area of statistical application or research. Examples of topics covered include: biometry, bootstrapping, data analysis, response surfaces, survival analysis and time series.
PREREQ: STAT816

STAT 825 ADVANCED TOPICS IN STATISTICS II 3

Presentation of a current area of statistical application or research. Examples of topics covered includes: 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 used in the time domain. Emphasis on model building, evaluation and forecasting. Analysis in the 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 and robust procedures, influence functions, multidimensional data plots, residual analysis, and Bayesian concepts in data analysis.

STAT 836 RESPONSE SURFACE METHODOLOGY 3

Derivation of nonlinear relationships between variables. Techniques for characterizing 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 856 TOPICS IN BIOMETRY 3

Selected topics from Poisson processes; tolerance distribution; assays; nonparametric techniques; estimation; tests of hypothesis; orthogonal, nonorthogonal and arbitrary designs. Missing values and iterative regression methods. Special experimental designs. Multivariate methods, response surfaces and epidemic theory.
RESTRICTIONS: Requires permission of Department.

STAT 868 RESEARCH 1-6

STAT 869 MASTER'S THESIS 1-9

STAT 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.

STAT 969 DOCTORAL DISSERTATION 1-12 PF

TEXTILES, DESIGN AND CONSUMER ECONOMICS

TDCE 114 CLOTHING IN CONTEMPORARY SOCIETY 3

Introduction to the study of clothing including social psychological influences in personal clothing choice, basic concepts of fashion: structure and operation of the apparel industry, elements of apparel quality and retailing of clothing.

TDCE 115 INTRODUCTION TO TEXTILES 3

Introduction to fiber theory, fiber identification methods, yarn structure, textile fabrications (weaves, knits), dyes and printing, and finishing techniques.

TDCE 200 CONSUMER ECONOMICS 3

Consumer decision making, theory of consumer markets, analysis of consumption activities of individuals and families, interaction of consumers, government and the marketplace.
PREREQ: ECON151 or ECON152

TDCE 211 BASIC CLOTHING PROCESSES 3

Basic clothing construction procedures, fitting techniques and methods of evaluation for apparel.

RESTRICTIONS: For students with limited or no construction experience. Credit cannot count for both TDCE211 and TDCE216 except for apparel design majors.

TDCE 213 TWENTIETH-CENTURY DESIGN: ETHNIC INFLUENCE 3

Examines African American and other ethnic groups, their cultures and clothing practices and subsequent influences on fashion. Studies individual minority designers and their contributions.

TDCE 214 COSTUME HISTORY BEFORE 1700 3

Costume as a mirror of civilization in Western Europe and the Near East from antiquity through the 17th century. Influence of societal, economic and aesthetic factors upon the development of costume.

TDCE 215 FUNDAMENTALS OF TEXTILES I 3

Fundamental concepts related to textile materials. Emphasis on structure/property relationships in fibers and yarns. Includes standards and testing.
PREREQ: TDCE114 or TDCE211/216 and CHEM102.

TDCE 216 ADVANCED CLOTHING PROCESSES 3

Advanced clothing construction and fitting principles and processes; comparative analysis of assembly and organizational procedures including industrial concepts.

RESTRICTIONS: Advanced placement required. Credit not given for both TDCE211 and TDCE216 except for apparel design majors.

TDCE 217 ACCOUNTING PRACTICE FOR MERCHANDISE 3

Introduction to basic accounting principles used in the retailing of apparel and other fashion products. Emphasis placed on the retail method of inventory, perpetual and periodic systems, LIFO, FIFO, development of gross margin statement and the effects of cash/trade discounts and cumulative mark-on on profitability.

TDCE 218 FASHION MERCHANDISING 3

An overview of the fashion industry which examines the interrelationship between primary, auxiliary and retail fashion markets; trends in fashion retailing, promotion and manufacturing.

TDCE 220 FUNDAMENTALS OF TEXTILES II 3

Fundamental concepts of textile materials emphasis on structure/property relationships in cloth forms, and finishing processes (including dye and print application); standards, laws and regulations. It is the second course of a textile sequence.

PREREQ: TDCE215.

TDCE 224 CLOTHING DESIGN AND PRODUCTION SINCE 1700 3

Clothing design and production in America and Western Europe since 1700. Study of craft skills, growth of ready-to-wear industry, couture and 20th-century manufacturing and fashion centers.

TDCE 225 ARCHITECTURAL DRAWING 3

Introduction to the handling of the tools, techniques and terms of architectural drawing and the designing of plans, elevations, sections and drawing of isometrics and perspectives.

TDCE 233 FASHION DRAWING AND RENDERING 3

Drawing from the fashion model; emphasis on rendering clothing character, fabrics and fashion details using various media; translation of drawings to finished fashion illustrations.
PREREQ: ART 129 or ART 140

TDCE 235 MANAGEMENT OF RESOURCES 3

Management of individual resources for the purpose of reaching goals. The influence of values, resources and decision making upon individual and societal management practices.

TDCE 242 CONSUMER MOVEMENT IN PERSPECTIVE 3

The history, present status and possible future of the consumer movement in the United States examined within the context of the existing economic, political and social environments.

TDCE 310 HOUSING 3

Selection of housing as related to varying income levels and stages in the life cycle; types of housing, government agencies, and design considerations for special groups.

TDCE 313 MULTICULTURAL FASHION ACCESSORIES 3

Examines design and production of accessory apparel and body adornment objects created by cultures throughout the world. Ornamental and functional accessories from African, Asian, Indian, American and Far Eastern cultures will be emphasized. Students will produce accessories inspired by self-conducted research.
PREREQ: TDCE211.

TDCE 314 APPAREL DESIGN I 3

Comparative study of the foundation principles and processes of apparel design utilizing draping, flat pattern and simple drafting techniques.

PREREQ: TDCE216.

TDCE 315 TEXTILE ANALYSIS 3

Structure of the textile industry; physical and chemical properties of fibers and finishes as they relate to end use and care. Fiber and fabric production
PREREQ: TDCE115 and CHEM213.

TDCE 317 TAILORING 3

Principles and processes involved in accepted methods of tailoring suits and coats.
PREREQ: TDCE211 or TDCE216.

TDCE 318 FASHION MERCHANDISE PRODUCTS 3

Examines various types of fashion merchandise including the range of characteristics, sources and manufacturing processes. Emphasis on leather, furs, jewelry, kitchen and home furnishings, and allied merchandise areas.

TDCE 320 FASHION MERCHANDISING INTERNSHIP 6

An off-campus supervised and coordinated field study program in selected retail stores

TDCE 321 TRAVEL STUDY PROGRAM 1-6

Study of the domestic and/or international textiles, apparel, interior and allied fashion industries through visits and research projects

RESTRICTIONS: Requires TDCE faculty approval through an application process. Offered at regular intervals.

TDCE 324 APPAREL DESIGN II 3

Advanced flat pattern, draping and drafting techniques including design and execution of tailored garment structures, as well as apparel utilizing stretch materials
PREREQ: TDCE314

TDCE 328 FASHION SALES PROMOTION 3

Fashion advertising, fashion promotion and other special purpose media utilized uniquely in the world of fashion. Emphasis not only on various components of fashion promotion media and their interrelationship, but also on interdependency of promotional strategy and fashion merchandising

TDCE 330 APPAREL DESIGN INTERNSHIP 4

An off-campus, supervised field study program in selected business concerns dealing with apparel design and/or manufacture.

RESTRICTIONS: Requires permission of instructor.

TDCE 331 INTERIOR DESIGN INTERNSHIP 4

An off-campus, supervised field study program in selected business concerns dealing with contract or residential design clients and/or products

TDCE 333 FASHION DESIGN 3

Introduction to computer graphics for fashion design, emphasizing concept development, visualization, storyboard layout, and design presentation. Focuses on trend research and presentation, and collection design for targeted markets.

TDCE 334 CONTRACT DESIGN I 3

Studio design of contract interior with emphasis on space planning, function, aesthetics, costs and codes as they relate to commercial and institutional environments. Field trips.

PREREQ: TDCE234, TDCE325 and TDCE341

TDCE 335 CONSUMER FINANCIAL MANAGEMENT 3

Analysis of financial models utilized in planning, organizing and initiating a strategy for generating and allocating earned and unearned income. Emphasis on studying consumer financial decision making during various stages of an individual's life cycle (e.g., single, newly-married, single parent, etc.).

TDCE 340 CONSUMER AFFAIRS INTERNSHIP 4

An off-campus supervised and coordinated field study in selected agencies and organizations
PREREQ: TDCE200.

RESTRICTIONS: May be repeated once for credit

TDCE 341 INTERIOR LIGHTING SYSTEMS 3

Basic lighting principles, systems, equipment and fixtures as applied to residential and commercial interior environments. Field trips

PREREQ: TDCE234

TDCE 342 CONSUMER LAWS AND REGULATIONS 3

In-depth examination of consumer legislation and regulation policies at the federal and state level. Major pieces of consumer legislation, as well as the agencies responsible for implementing and enforcing these policies, examined in terms of efficiency and effectiveness

PREREQ: TDCE200, ECON151 or ECON152.

TDCE 351 DETAIL DRAWING 3

Introduction to drawing techniques used to represent cabinet construction and related interior details. Methods of construction and assembly of wood and metal interior products. Field trips.

PREREQ: TDCE234 and TDCE325

TDCE 365 FASHION MERCHANDISING AND APPAREL DESIGN SEMINAR 1

Creates awareness of career opportunities and develop techniques for success in apparel design and textile clothing career options

RESTRICTIONS: APD and TC majors only.

TDCE 366 INDEPENDENT STUDY 1-6

TDCE 400 CONTROVERSIAL ISSUES IN CONSUMER AND FAMILY BEHAVIOR 3

Utilizes an economic approach to consumer and family behavior to examine how various economic, social, legal and corporate policies encourage or discourage family investment in human capital. Issues and their relationship to the development and utilization of human capital within the family unit vary.

PREREQ: ECON151

RESTRICTIONS: Open to Juniors and Seniors only

TDCE 401 CONSUMER POLICY ANALYSIS 3

Analysis of a consumer welfare related market practice issue. Issue may change. Use of management problem-solving tools to understand the issue and develop policies.

PREREQ: ECON151.

TDCE 410 ENVIRONMENTAL PRODUCTS 3

Analysis of and experimentation with fundamental components of contemporary interior design including wall finishes, window treatments, floor coverings, and furnishings for residential and contract environments.

PREREQ: TDCE234 and TDCE334.

TDCE 415 TOPICS IN TEXTILES 3

One topic is covered each semester; either fiber science, textile analysis, or textile dyeing and finishing.

PREREQ: TDCE315.

TDCE 416 FASHION DIRECT MARKETING 3

Examines the scope and application of direct marketing including mail-order, customer lists, catalogues, telemarketing, inserts, magazines and package goods applied to the clothing and textile industries.

TDCE 418 ADVANCED FASHION MERCHANDISING 4

Focuses on computer application related to mathematical concepts and calculations used in merchandising soft goods at the retail level. Mark-ons, markdowns, retail method inventory, open-to-buy and vendor negotiations are emphasized

TDCE 419 SOCIAL PSYCHOLOGICAL ASPECTS OF CLOTHING 3

Study of clothing and appearance as contributors to human interactions; consideration of the importance of clothing in individual and collective behavior. Analysis of how dress reflects self-feelings, establishes social identities and affects interpersonal encounters.

PREREQ: TDCE114, PSYC201 and SOC1201

TDCE 422 FAMILY FINANCIAL MANAGEMENT 3

Problem-solving approach for resolving family financial problems using a variety of financial management techniques. Primary focus oriented toward financial counseling, financial planning or a combination of the two.

PREREQ: TDCE335

TDCE 424 APPAREL DESIGN III 3

Conceptualization, design and execution of a coordinated apparel collection. Advances and expands knowledge and skills from previous courses.

PREREQ: TDCE324

TDCE 425 TEXTILE PERFORMANCE 3

Physical analysis of textiles through experimental and standard testing procedures, current literature and individual investigation

PREREQ: TDCE115

TDCE 426 FUNDAMENTALS OF TEXTILE CONSERVATION 3

Introduces scientific principles relevant to the cleaning, repair, storage and exhibition of antique textiles. Evaluates treatment procedures that eliminate damaging agents, retard their effects, or shield textiles from them.

TDCE 431 CONTRACT DESIGN II 3

Studio work in the exploration, programming, design development, specification, and presentation of major interior design problems. Field trips

PREREQ: TDCE234, TDCE334, TDCE325 and TDCE341

TDCE 432 CONSUMERS, HEALTH AND MEDICAL CARE 3

Economic perspective on consumer interests in health, medical insurance and medical care. Emphasis on unusual aspects of health care and health insurance markets and relationships between the markets. Includes important effects of uncertainty on decision making, market institutions and public policy

PREREQ: TDCE200 or ECON300 or ECON301.

TDCE 433 CAD MASS MARKET APPAREL 4

Focuses on all phases of apparel product development for a targeted market from conceptualization through execution of sample garments for mass production. Introduces computer-aided pattern designing, grading, marker making and data management (e.g. sizing, specifications, operations and costing.) Includes field trip

TDCE 435 CONSUMER AND THE ENVIRONMENT 3

Analysis of dwindling energy resources and their effect upon consumer alternatives in the marketplace; sociocultural, family and income aspects of consumer behavior in a high energy consuming society.

PREREQ: TDCE200, ECON151 or ECON152

TDCE 440 ADVANCED CONSUMER ECONOMICS 3

Application of economic tools to analyze consumer welfare in public and private markets. Efficiency and equity trade-offs, externalities, cost-benefit, program evaluation.
PREREQ: TDCE200 and TDCE342

TDCE 442 CONSUMER WELFARE AND EMPLOYEE BENEFITS 3

A critical analysis and evaluation of employee benefits, emphasizing the employee's needs, rights and alternatives. Benefits to be analyzed include social insurance; group, life, health, dental and disability insurance; qualified retirement plans; and other direct and indirect benefits.

TDCE 444 FASHION PRESENTATION 1

Portfolio preparation and fashion show production for apparel design and merchandising majors. Joint, integrated team projects required.
PREREQ: TDCE333, TDCE365 and TDCE424
RESTRICTIONS: TC and APD senior majors only.

TDCE 450 THE HISTORIC INTERIOR 3

Survey of the design and function of interior spaces and furnishings in the context of the cultures and the times from which they evolved. Primary emphasis on Western Europe and America. Primitive cultures, early civilizations and the Orient also explored. Field trips.

TDCE 451 CONTEMPORARY FURNISHINGS 3

A survey of modern design evolution in furniture, textiles and the minor arts from the late 19th century to the present. Emphasis on styling and technological forces shaping 20th-century design of interior furnishings. Field trips.

TDCE 455 TEXTILES, CLOTHING AND THE ECONOMY 3

The interplay of economic forces in the production, marketing and consumption of textiles and clothing.
PREREQ: ECON151 or ECON152

TDCE 461 BUILDING SYSTEMS II 3

Mechanical systems including HVAC, plumbing, conveying and fire protection systems as they relate to architectural and interior space planning. Emphasis on system selection, sizing and energy efficient uses.

TDCE 463 INTERIOR DESIGN SEMINAR 3

Exploration of career directions in the profession of interior design. Study of business practices and ethics, development of professional portfolios and preparation for the post-graduate professional examination. Field trips.
RESTRICTIONS: Open only to interior design majors with Senior standing.

TDCE 465 SEMINAR 1-3 PF

May be repeated to a maximum of three credits

TDCE 466 INDEPENDENT STUDY 1-6

TDCE 665 SEMINAR 1-3

TDCE 668 RESEARCH 1-6

TDCE 868 RESEARCH 1-6

TDCE 869 MASTER'S THESIS 1-6

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 205 INTRODUCTION TO MIME 3

Explores the theory and practice of theatrical performance without words. Theories of DelSarte, Laban, Decroux and others. Students engage in learning and performing short mime pieces for class.

THEA 206 INTRODUCTION TO DANCE 3

Survey of theatrical dance forms to include Ballet (Classical and Neo-Classical styles); Modern Dance (the pioneers through the mainstream to today's post-postmodern) and Jazz (its roots in African Dance and its development as the American art form through the minstrel era, burlesque, vaudeville, ragtime, early musical comedy and musical theatre). Lecture and studio 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 208 HISTORY OF THE AMERICAN MUSICAL THEATER 3

See MUSC208 for course description.

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 220 MOVEMENT AND NONVERBAL COMMUNICATION I 3

Emphasis on actor's physical expression of ideas, attitudes and feelings. Basic stage techniques, exploration of power and presence, and development of imagination and ability to use metaphor. Relationship of nonverbal communication to text in building a character.

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.

COREQ: Theatre majors enroll in a minimum of one credit of THEA407.

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.

COREQ: Theatre majors enroll in a minimum of one credit of THEA407.

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
COREQ: Theatre majors enroll in a minimum of 1 credit of THEA407.

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
COREQ: Theatre majors enroll in a minimum of 1 credit of THEA407.

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
COREQ: Theatre majors enroll in a minimum of 1 credit of THEA407.

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.

COREQ: Theatre Majors enroll in a minimum of 1 credit of THEA407.

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.

COREQ: Theatre majors enroll in a minimum of 1 credit of THEA407.

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.

COREQ: Theatre majors enroll in a minimum of 1 credit of THEA407.

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.

COREQ: Theatre majors enroll in a minimum of 1 credit of THEA407.

THEA 309 FUNDAMENTALS OF STAGE MANAGEMENT 3

Study of the techniques and procedures used in managing theatrical productions from conception through performance.

PREREQ: THEA200.

COREQ: Theatre majors enroll in a minimum of 1 credit of THEA407.

THEA 337 INTERMEDIATE JAZZ DANCE 3

Jazz dance as an art form and vehicle for individual and group expression. Introduces criteria for judgment and response. Develops performance potential.

PREREQ: THEA236.

RESTRICTIONS: Previous dance experience or THEA236 recommended.

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.

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

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 work. May be cross-listed with MUSC345.

THEA 346 HISTORY OF THEATRE: THE AMERICAN THEATRE 3

Survey of major historical and theoretical developments in American theatre practice and dramaturgy from Revolutionary times to the present. Readings in primary and secondary historical sources, major critical and theoretical texts, as well as representative plays of the period.

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 476 SEMINAR IN PERFORMANCE 3**

Advanced seminar in performance theories and techniques. Topics will be announced.

PREREQ: THEA226.

THEA 490 SEMINAR IN THEATRE AND DRAMA 3

Advanced seminar in theatre and drama. Topics will be announced.

RESTRICTIONS: Requires permission of instructor.

THEA 600 DISTINCTIONS OF PROFESSIONAL THEATRE PRACTICE 1

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 for up to six 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 for up to 24 credit hours.

THEA 621 STAGE DIRECTING IA 1

Fundamental techniques of planning and staging of production.

RESTRICTIONS: Requires enrollment in the Professional Theatre Training Program/Directing.

THEA 622 STAGE DIRECTING IB 1

Continuation of THEA621.

PREREQ: THEA621.

THEA 623 STAGE DIRECTING IIA 1

Continuation of THEA622, with an emphasis on techniques of script preparation and actor coaching.

PREREQ: THEA622.

THEA 624 STAGE DIRECTING IIB 1

Continuation of THEA623.

PREREQ: THEA623.

THEA 625 STAGE DIRECTING IIIA 1

Continuation of THEA624, with an emphasis on text analysis and actor coaching and an examination of styles and genres.

PREREQ: THEA624.

THEA 626 STAGE DIRECTING IIIB 1

Continuation of THEA625.

PREREQ: THEA625.

THEA 627 STAGE MANAGEMENT FOR DIRECTORS 1

Techniques and methods of stage management from the directorial point of view.

RESTRICTIONS: Requires enrollment in the Professional Theatre Training Program/Directing. May be repeated for up to two credit hours.

THEA 628 SET DESIGN FOR DIRECTORS 1

Principles of scenic design from a directorial point of view.

RESTRICTIONS: Requires enrollment in the Professional Theatre Training Program/Directing.

THEA 629 COSTUME DESIGN FOR DIRECTORS 1

Principles of costume design from a directorial point of view.

RESTRICTIONS: Requires enrollment in the Professional Theatre Training Program/Directing.

THEA 630 PRODUCTION BUDGETING 1

Principles of assessing production expenses, time and personnel requirements for the professional theatre.

RESTRICTIONS: Requires enrollment in the Professional Theatre Training Program/Directing.

THEA 631 REHEARSAL AND PERFORMANCE/DIRECTING 1-3

Practical training in stage direction through serving as assistant director on faculty-directed productions.

RESTRICTIONS: Requires enrollment in the Professional Theatre Training Program/Directing. May be repeated for up to ten credit hours.

THEA 633 STAGE MANAGEMENT ORGANIZATIONAL AND MANAGERIAL TECHNIQUES IA 1

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

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

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

Further development of organizational structuring and communication techniques for the administration of stage managerial projects.

PREREQ: THEA635.

THEA 637 STAGE MANAGEMENT ORGANIZATIONAL AND MANAGERIAL TECHNIQUES IIIA 1

Development of organizational structuring and communication techniques for the administration of stage managerial projects.

PREREQ: THEA636.

THEA 638 STAGE MANAGEMENT ORGANIZATIONAL AND MANAGERIAL TECHNIQUES IIIB 1

Further development of organizational structuring and communication techniques for the administration of stage managerial projects.

PREREQ: THEA637.

THEA 639 STAGE MANAGEMENT PRODUCTION SKILLS IA 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 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 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 2

Further development of stage managerial skills for organizing, preparing and fulfilling theatrical productions from inception through rehearsals and performance.

PREREQ: THEA641.

THEA 643 STAGE MANAGEMENT PRODUCTION SKILLS IIIA 2

Development of stage managerial skills for organizing, preparing and fulfilling theatrical productions from inception through rehearsals and performance.

PREREQ: THEA642.

THEA 644 STAGE MANAGEMENT PRODUCTION SKILLS IIIB 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 1-3

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 for up to 24 credits.

THEA 647 STAGE MAKEUP 1

Study and practical work in all aspects of stage makeup. Emphasis on the use of materials, the effects of light and color and character analysis.

RESTRICTIONS: Requires enrollment in the Professional Theatre Training Program/Costume Production.

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 649 COSTUME DESIGN 1

An approach to the designing of costumes for plays through an appreciation and understanding of the basic principles of design. Covers in-depth theatrical rendering technique, color theory and the elements of design.

RESTRICTIONS: Requires enrollment in the Professional Theatre Training Program/Costume Production.

THEA 650 HISTORICAL COSTUME I 1

Examines theatrical costume as well as concurrent fashion trends from primitive ritual to Restoration theatrical works in the 17th century.

THEA 651 HISTORICAL COSTUME II 1

A study of costume and theatrical costume history from 1670 to the present. Emphasis on sociological changes in patterns of fashion behavior and recreating that attitude for stage.

THEA 652 TAILORING I 1

Construction of stage costumes: intermediate and advanced dressmaking and tailoring techniques, textiles survey, cutting, fitting and alterations.

RESTRICTIONS: Requires enrollment in the Professional Theatre Training Program/Costume Production.

THEA 653 TAILORING II 1

Construction of stage costumes: advanced tailoring techniques and practical application of skills in costume shop.

PREREQ: THEA652.

THEA 654 PATTERNMAKING I 1

Basic patternmaking, includes drafting of basic slopers, sleeves, collars, pants, etc. Emphasis on theatrical costumes.

RESTRICTIONS: Requires enrollment in the Professional Theatre Training Program/Costume Production.

THEA 655 PATTERNMAKING II 1

Advanced pattern drafting of period patterns, coats, suits and menswear for the theatre.

PREREQ: THEA654.

THEA 656 PATTERNMAKING III 1

Continuation of THEA655. Emphasis on Renaissance and Restoration costumes.

PREREQ: THEA655.

THEA 657 PATTERNMAKING IV 1

Continuation of THEA656. Emphasis on 19th-century men's and women's costumes.

PREREQ: THEA656.

THEA 658 COSTUME CRAFTS I 1

Study and practical work in dyeing and painting for costumes.

RESTRICTIONS: Requires enrollment in the Professional Theatre Training Program/Costume Production.

THEA 659 COSTUME CRAFTS II 1

Advanced projects in costume accessory construction. Emphasis on millinery, hat blocking, wigmaking and new techniques in related areas.

PREREQ: THEA658.

THEA 660 COSTUME CRAFTS III 1

Study and practical work in three-dimensional construction techniques to include maskmaking, armor, molding and leatherwork and sculptural foam animals.

PREREQ: THEA659.

THEA 661 DRAPING I 1

Advanced study in construction of stage costumes with an emphasis on draping.

RESTRICTIONS: Requires enrollment in the Professional Theatre Training Program/Costume Production.

THEA 662 DRAPING II 1

Emphasis on advanced draping problems with detailed period and contemporary costumes.

PREREQ: THEA661.

THEA 663 DRAPING III 1

Continuation of THEA662 with emphasis on Renaissance and Restoration costume.

PREREQ: THEA662.

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 for 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 for up to 12 credit hours.

THEA 668 RESEARCH 1-6**THEA 669 DRAPING IV 1**

Continuation of THEA663 with emphasis on 18th- and 19th-century costume.

PREREQ: THEA663.

THEA 670 COSTUME SHOP MANAGEMENT 1

Problems and techniques of costume shop management, personnel organization, equipment, inventory and supply control, and financial organization and management.

RESTRICTIONS: Requires enrollment in the Professional Theatre Training Program/Costume Production.

THEA 671 APPLIED COSTUME SHOP MANAGEMENT 1

Practical application of skills learned in THEA670.

PREREQ: THEA670.

THEA 672 PRODUCTION PREPARATION AND PERFORMANCE 1-4

Practical instruction and assignments in the preparation, construction and mounting of costumes and costume accessories for theatrical performances.

RESTRICTIONS: May be repeated for up to 22 credits.

THEA 674 SCENERY AND PROPERTIES PRODUCTION IA 1

Development of the skills necessary for the construction of scenery and properties including woodworking, metal working and plastics fabrication. Emphasis on basic stagecraft theory and skills.

RESTRICTIONS: Requires enrollment in the Professional Theatre Training Program/Technical Production.

THEA 675 SCENERY AND PROPERTIES PRODUCTION IB 1

Continuation of THEA674, with emphasis on properties production and organization.

PREREQ: THEA674.

THEA 676 SCENERY AND PROPERTIES PRODUCTION IIA 1

Continuation of THEA675, with emphasis on weight-bearing construction, basic metal working and stage rigging techniques.

PREREQ: THEA675.

THEA 677 SCENERY AND PROPERTIES PRODUCTION IIB 1

Continuation of THEA676, with emphasis on furniture construction and finished carpentry, plastics fabrication, sewing skills and basic upholstery.

PREREQ: THEA676.

THEA 678 SCENERY AND PROPERTIES PRODUCTION IIIA 1

Continuation of THEA677, with emphasis on scenic shifting and rigging techniques, upholstery, and casting and molding techniques.

PREREQ: THEA677.

THEA 679 SCENERY AND PROPERTIES PRODUCTION IIIB 1

Continuation of THEA678, with emphasis on pneumatics, hydraulics and motorized rigging in addition to pyrotechnique and special effects.

PREREQ: THEA678.

THEA 680 ELECTRICS AND AUDIO PRODUCTION IA 1

Development of skills necessary for producing lighting and sound for theatre productions. Emphasis on basic stage lighting practice and electrical theory.

RESTRICTIONS: Requires enrollment in the Professional Theatre Training Program/Technical Production.

THEA 681 ELECTRICS AND AUDIO PRODUCTION IB 1

Continuation of THEA680, with emphasis on basic theatre sound practice and building production sound tapes.

PREREQ: THEA680.

THEA 682 ELECTRICS AND AUDIO PRODUCTION IIA 1

Continuation of THEA681, with emphasis on electrical control devices and techniques, studio and field recording techniques, and mixing and editing techniques.

PREREQ: THEA681.

THEA 683 ELECTRICS AND AUDIO PRODUCTION IIB 1

Continuation of THEA682, with emphasis on electrical distribution. Systems and sound reinforcement techniques.

PREREQ: THEA682.

THEA 684 ELECTRICS AND AUDIO PRODUCTION IIIA 1

Continuation of THEA683, with emphasis on maintenance and repair of electrical and audio equipment.

PREREQ: THEA683.

THEA 685 ELECTRICS AND AUDIO PRODUCTION IIIB 1

Continuation of THEA684, with emphasis on advanced mixing and editing techniques and advanced electrical control techniques.

PREREQ: THEA684.

THEA 686 PAINTING, GRAPHICS AND DESIGN FOR PRODUCTION IA 1

Development of skills in theatre graphic communications, scenic painting and design theory. Emphasis on basic drafting techniques for lighting and scenic productions.

RESTRICTIONS: Requires enrollment in the Professional Theatre Training Program/Technical Production.

THEATRE

THEA 687 PAINTING, GRAPHICS AND DESIGN FOR PRODUCTION IB 1

Continuation of THEA686, with emphasis on basic scene painting techniques
PREREQ: THEA686

THEA 688 PAINTING, GRAPHICS AND DESIGN FOR PRODUCTION IIA 1

Continuation of THEA687, with emphasis on advanced work in perspective, color theory in painting and scene design theory
PREREQ: THEA687

THEA 689 PAINTING, GRAPHICS AND DESIGN FOR PRODUCTION IIB 1

Continuation of THEA688, with emphasis on advanced drafting: true shape analysis, basic lighting design theory and process, and reproducing painter's elevations
PREREQ: THEA688

THEA 690 PAINTING, GRAPHICS AND DESIGN FOR PRODUCTION IIIA 1

Continuation of THEA689, with emphasis on advanced work in scene painting and drafting as well as sound design theory
PREREQ: THEA689

THEA 691 PAINTING, GRAPHICS AND DESIGN FOR PRODUCTION IIIB 1

Continuation of THEA690, with emphasis on advanced work in scene painting and drafting
PREREQ: THEA690

THEA 692 PRODUCTION PREPARATION AND PERFORMANCE/TECHNICAL 1-4

Practical instruction and assignments in the technical preparation and production of Professional Theatre Training Program public performances. Assignments include Master Carpenter, Master Electrician, Property Master, Sound Technician, 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 COORDINATION 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

THEA 694 CAREER PREPARATION AND DEVELOPMENT 1

Development and organization of portfolio, resume and interview techniques in preparation for careers in stage management, costume production and technical production
RESTRICTIONS: Requires enrollment in the Professional Theatre Training Program

UNIVERSITY COURSE

UNIV 120 UNIVERSITY FORUM 1 PF

Course taught in conjunction with the University Forum Lecture Series. Students attend all Forum lectures (approximately ten), read selected texts and/or journal essays designed to supplement the lecture series, and take a final exam.

UNIV 330 DEL CENTRAL YEAR ABROAD 0 NR

UNIV 350 NATIONAL STUDENT EXCHANGE PROGRAM 0 NR

UNIV 351 SEMESTER IN COPENHAGEN 0 NR

UNIV 354 SEMESTER IN LONDON 0 NR

UNIV 368 HONORS WORKSHOP: ADVANCED TOPICS 1

Multidisciplinary seminar with emphasis on discussion of state-of-the-art research topics by Accounting/Business/Economics faculty. New topic each semester. Includes assessment of the research approach, substantive findings, related research and possible extensions
PREREQ: BUAD301 and BUAD311

RESTRICTIONS: Requires GPA of 3.0 or higher and Junior or Senior status

UNIV 369 HONORS: UNDERGRADUATE RESEARCH SUSTAINING 0 PF

Research apprenticeship with faculty mentor.

RESTRICTIONS: Limited to those appointed as Undergraduate Research Scholars in the Undergraduate Research Program. Must have approval of the Coordinator of Undergraduate Research, 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 three students per semester. Readings of classical works in the humanities described. Group as well as individual discussions.

RESTRICTIONS: Requires 3.4 GPA, Sophomore 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 three 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, Sophomore 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 NR

UNIV 999 PH.D. SUSTAINING 0 NR

URBAN AFFAIRS

URAF 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 for up to nine credits when topics vary.

URAF 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.

URAF 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.

URAF 611 HISTORY OF THEORIES IN MATERIAL CULTURE 3

See EAMC605 for course description

URAF 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.

URAF 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.

URAF 615 URBAN AND REGIONAL 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

URAF 616 URBAN COMMUNITY ORGANIZATION SEMINAR 3

Studies the varied community organization concepts, methods and models, and analyzes the organizational structure and service delivery systems of selected social agencies that sponsor community organization and social action activities.

URAF 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.

URAF 624 SEMINAR IN CRIMINAL JUSTICE 3

Discussion and evaluation of institutional components of criminal justice systems. Topics include police, judicial and correctional systems.

URAF 625 ENERGY POLICY AND ADMINISTRATION 3

See POSC624 for course description.

URAF 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.

URAF 630 HISTORIC PRESERVATION STUDIO 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 MSST630.

URAF 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.

URAF 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.

URAF 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.

URAF 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.

URAF 637 PERSONNEL SELECTION AND EVALUATION 3

Review of the varied legal issues, federal agency guidelines, court decisions and research-psychometric principles that influence the practice of employee selection and evaluation.

URAF 640 INTERNATIONAL AND DEVELOPMENT ADMINISTRATION 3

See POSC640 for course description.

URAF 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.

URAF 647 PHILOSOPHY OF TECHNOLOGY 3

See PHIL647 for course description.

URAF 654 VERNACULAR ARCHITECTURE 3

See HIST654 for course description.

URAF 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.

URAF 659 TOPICS IN PUBLIC ADMINISTRATION 3

Focuses on micro and macro Public Administration issues, i.e., privatization, health care cost containment, flex benefits packages, ethics, organizational productivity, concession and productivity bargaining.

URAF 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.

URAF 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.

URAF 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).

URAF 678 ADMIRALTY AND MARITIME LAW 3

See MAST678 for course description.

URAF 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.

PREREQ: URAF834 or microeconomics.

URAF 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-surburban shifts, and neighborhoods. Various kinds of regional policies are analyzed.

PREREQ: URAF834 or microeconomics.

URAF 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.

PREREQ: URAF 837* Based on prior coursework and professional experience, may be waived with instructor approval.

URAF 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.

URAF 800 RESEARCH DESIGN AND METHODOLOGIES 3

Provides skills and examines issues in research design, data acquisition and data analysis in urban affairs.

URAF 801 PROCESSES OF SOCIAL INQUIRY 3

Explores the philosophical underpinnings of social inquiry and the issues surrounding the development and use of social research for urban and policy analysis.

URAF 803 SEMINAR: PUBLIC ADMINISTRATION 3

See POSC803 for course description.

URAF 804 PROGRAM EVALUATION 3

Survey of theory and methods for the evaluation of human service programs. When possible, students participate in actual evaluative research.

URAF 806 SURVEY RESEARCH 3

Methods and procedures for the design, administration and analysis of sample surveys.

URAF 810 POLITICAL ECONOMY OF THE ENVIRONMENT 3

Centers on theoretical perspectives for understanding natural resource assumptions of private and public institutions.

URAF 813 DATA BASE AND DECISION SUPPORT SYSTEMS 3

Focuses on the interface between the decision maker and the information system that supports those individuals. Topics include system design, methods of retrieval, graphics and related hardware and software issues.

URAF 814 COMPUTER IN PUBLIC MANAGEMENT 3

Provides a comprehensive overview of data processing and systems development as seen from the viewpoint of the manager. Presents concepts in hardware, software and data communications followed by sessions on the production of software, acquisition of software and hardware, data base management systems, electronic mail and decision support systems.

URAF 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.

URAF 816 ADVANCED SOCIAL STATISTICS 3

See POSC816 for course description.

URAF 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.

URAF 818 ENVIRONMENTAL POLICY AND ADMINISTRATION 3

See POSC818 for course description.

URAF 819 MANAGEMENT DECISION MAKING 3

Focuses on analytical decision making within public 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: Lotu 123.

URAF 821 TECHNOLOGY AND SOCIETY SEMINAR 3

Examines institutional, political and economic factors influencing the role of technology in urban society. Discusses public policies directly and indirectly related to technology development, diffusion and control. Presents a wide range of theoretical and policy perspectives, including sociology, political science, economics, urban planning, environmental studies, and history and philosophy of technology. May be cross-listed with POSC821.

URAF 822 PROSEMINAR IN PLANNING AND GOVERNANCE 3

Deals with policy and research issues concerning the making, administering and out comes of public policies affecting urban populations and with how urban planning and governance processes are influenced by the interaction of the public, private and third sectors at the local, regional, national and international scales.

URAF 823 PROSEMINAR IN SOCIAL POLICY ANALYSIS AND EVALUATION 3

Introduces primary theoretical frameworks, policy issues and research concerns of this field. Topics include the nature of social policy, means to evaluate social policy, the role of research in the determination of social policy and current research issues in social policy analysis and evaluation.

URAF 825 COMPARATIVE PUBLIC ADMINISTRATION 3

See POSC825 for course description.

URAF 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: URAF815*

RESTRICTIONS: *A statistics course that introduces regression analysis.

URAF 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.

URAF 828 URBAN THEORY & 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.

URAF 829 ADVANCED PUBLIC FINANCE 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.

URAF 833 PUBLIC FINANCE AND FISCAL MANAGEMENT 3

The theory and practice of public finance and public sector economics as they relate to the financial management of state and local governments in the context of a federal system. General topics include revenues, expenditures, intergovernmental fiscal relationships and selected techniques of public resource managements such as budgeting and debt management. May be cross-listed with POSC839.

PREREQ: URAF834

URAF 834 PUBLIC ECONOMICS 3

Develops the framework and concepts of microeconomics for the purpose of applying them to the analysis of urban and public sector policies and issues from such topical areas as education, transportation, housing, energy, ecology, public health, community development, law enforcement, recreation and regulation.

URAF 835 ORGANIZATION THEORY AND ADMINISTRATION 3

See POSC835 for course description.

URAF 837 PUBLIC SECTOR HUMAN RESOURCES MANAGEMENT 3

Personnel management topics of importance to the manager in the public agency setting; public employee labor relations, grievance and dispute settlement, merit systems, pay and classification systems, affirmative action, modern selection techniques, and the personnel specialist in designing and implementing employee and management developmental programs. May be cross-listed with POSC837.

URAF 838 PUBLIC POLICY ANALYSIS 3

See POSC838 for course description.

URAF 840 INTRODUCTION TO 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. Voluntarism and philanthropy are emphasized. The role of nonprofit organizations in furthering the goals of community development is explored.

URAF 841 ISSUES IN THE MANAGEMENT AND GOVERNANCE OF NONPROFIT ORGANIZATIONS 3

Provides an introduction to the leadership and management issues facing nonprofit executives. Topics include board relationships and voluntary leadership, financial management and budgeting, human resource management (organizational change, managing diversity and career development), organizational culture and stakeholder relationships.

URAF 842 STRATEGIC PLANNING FOR 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.

URAF 845 SCOPE OF URBAN AFFAIRS AND PUBLIC POLICY 3

Consideration of issues related to the development of urban affairs and public policy as an area of inquiry.

URAF 850 URBAN AFFAIRS PRACTICUM 1-6

Applied projects that generally draw upon organization or public agency resources. Projects carried out with faculty supervision and may involve one or more students or student-faculty teams.

URAF 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.

URAF 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.

URAF 864 INTERNSHIP FIELDWORK 2

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

URAF 868 RESEARCH 1-6

URAF 869 MASTER'S THESIS 1-6

URAF 870 READINGS 1-6

URAF 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.

URAF 969 DOCTORAL DISSERTATION 1-12 PF

VOCATIONAL STUDIES

VOCS 658 FIELD RESEARCH IN VOCATIONAL STUDIES 1-3

Supervised research in vocational studies. Required for students electing nonthesis option.

RESTRICTIONS: Requires permission of instructor and advisor.

VOCS 664 FIELD EXPERIENCE IN VOCATIONAL STUDIES 1-6

Supervised activities in an educational, community or work setting.

RESTRICTIONS: Requires permission of instructor and advisor.

VOCS 665 SEMINAR IN VOCATIONAL STUDIES 1-3

Analyzes specially selected topics of contemporary importance.

VOCS 666 SPECIAL PROBLEM 1-6

VOCS 868 RESEARCH 1-6

Research in applied technology education.

RESTRICTIONS: Requires permission of instructor and advisor.

VOCS 869 MASTER'S THESIS 1-6

WOMEN'S STUDIES

WOMS 200 PHILOSOPHIES OF LIFE 3

See PHIL100 for course description.

WOMS 201 INTRODUCTION TO WOMEN'S STUDIES 3

Study of the causes and conditions determining women's status in society, as evidenced in institutional structures and personal relations between men and women. Taught from multidisciplinary perspectives.

WOMS 202 INTRODUCTION TO INTERNATIONAL WOMEN'S STUDIES 3

Examines how public policies and traditional customs affect women's lives around the world. Focuses on the effects of political and economic status, social norms and institutional structures on women's conditions in family life, education and employment.

WOMS 203 CONTEMPORARY MORAL PROBLEMS 3

See PHIL202 for course description.

WOMS 204 GENDER AND KNOWLEDGE 3

Women have been largely absent from the historical record and from the traditional liberal arts curriculum. Introduces, via guest lecturers, the new scholarship on women in disciplines from English literature to biology to the social sciences.

WOMS 205 WOMEN IN THE ARTS AND HUMANITIES 3

Interdisciplinary survey of women's contributions to the arts and humanities, also including literary/artistic images of women, contributions of minority and non-Western women, and study of the relationship between women's social-economic roles and cultural expressions

WOMS 206 WOMEN AND WORK 3

Covers a variety of topics including women in traditional and non-traditional occupations, gender-based discrimination (wage inequities, sexual harassment, exclusionary policies), the contributions of women to the economy and the role of law in shaping conditions for women in the workplace. May be cross-listed with SOCI206

WOMS 207 WOMEN, POWER AND SUCCESS 3

Research, theory and possible strategies related to expanding the horizons in achieving "power" and "success" in women's lives. Topics include socializing girls to be successful, evaluating personal strengths and goals, and a new model of women and power

WOMS 208 INTRODUCTION TO DRAMA 3

See ENGL208 for course description

WOMS 209 INTRODUCTION TO THE NOVEL 3

See ENGL209 for course description

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

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 214 LITERATURE AND GENDER 3

See ENGL214 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

See CSCI233 for course description

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 290 HISTORY OF WOMEN AND EDUCATION 3

See EDST290 for course description

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

WOMS 297 RESEARCH IN LESBIAN, GAY AND BISEXUAL STUDIES 1 PF

Lectures by social science, arts and humanities scholars and researchers on new issues raised by gays, lesbians and bisexuals; their social movements and history; history of their lives and achievements; heterosexism, homophobia and the social construction of sexuality in social relations, cross-culturally and historically

WOMS 298 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 and/or SOCI298

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 THE WORLD IN OUR TIME 3

See HIST302 for course description

WOMS 305 THE EVOLUTION OF HUMAN SEX ROLES AND REPRODUCTION 3

See ANTH305 for course description

WOMS 307 SOCIOLOGY OF SEX AND GENDER 3

See SOCI307 for course description

WOMS 318 STUDIES IN FILM 3

See ENGL318 for course description

WOMS 320 VARYING AUTHORS AND GENRES 3

See FLIT320 for course description

WOMS 323 INTRODUCTION TO WOMEN AND POLITICS 3

See POSC323 for course description

WOMS 324 TOPICS: FRENCH LITERATURE IN TRANSLATION 3

See FLIT324 for course description

WOMS 325 TOPICS: GERMAN LITERATURE IN TRANSLATION 3

See FLIT325 for course description

WOMS 326 TOPICS: HISPANIC LITERATURE IN TRANSLATION 3

See FLIT326 for course description

WOMS 328 TOPICS: JAPANESE LITERATURE IN TRANSLATION 3

See FLIT328 for course description

WOMS 330 VARYING AUTHORS, THEMES AND MOVEMENTS 3

See FLIT330 for course description

WOMS 333 PSYCHOLOGY OF WOMEN 3

See PSYC333 for course description

WOMS 335 WOMEN AND MENTAL HEALTH 3

Focuses on sociocultural dynamics influencing the psychological development of women, prevalent mental disorders among women and the common types of psychotherapeutic treatment of women.

WOMS 338 TOPICS IN PHILOSOPHY AND GENDER 3

See PHIL338 for course description

WOMS 350 WOMEN AND CRIMINAL JUSTICE 3

See CRJU350 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 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 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 CSCI389 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 ARSC392 for course description. May be cross-listed with PHIL392

WOMS 409 VARIETIES OF MODERN FEMINISM 3

See HIST409 for course description

WOMS 411 SEMINAR IN AMERICAN HISTORY 3

See HIST 411 for course description

WOMEN'S STUDIES

WOMS 413 PROBLEMS IN AMERICAN GOVERNMENT 3

See POSC413 for course description.

WOMS 415 RACE, CLASS AND GENDER 3

See SOCI415 for course description.

WOMS 416 THE AMERICAN FAMILY 1608-1900 3

See HIST416 for course description.

WOMS 430 TEACHING FAMILY LIFE 3

See IFST430 for course description.

WOMS 436 POLITICS AND LITERATURE 3

See POSC436 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 470 SEMINAR 3

Seminar course on special topics.

PREREQ: WOMS201

WOMS 471 ADVANCED PHILOSOPHICAL TOPICS 3

See PHIL470 for course description.

WOMS 473 STUDIES IN EARLY MODERN EUROPEAN HISTORY 3

See HIST473 for course description.

WOMS 480 SEMINAR 3

See ENGL480 for course description.

WOMS 484 WOMEN IN SPORTS 3

See HPER485 for course description.

WOMS 498 INTERNSHIP IN WOMEN'S STUDIES 3

Students work eight hours per week in an agency or program catering to women's issues. Academic knowledge applied to actual working situations. Biweekly seminar with faculty discusses internship experience in light of academic research and theory.

RESTRICTIONS: Requires permission of instructor

WOMS 607 SOCIOLOGY OF SEX AND GENDER 3

See SOCI607 for course description.