

MALS 611 DOCUMENTARY: JOURNALISM AND FILM	3	MAST 366 INDEPENDENT STUDY	1-6
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.		MAST 464 MARINE SCIENCE SUMMER INTERNSHIP	1-3
MALS 613 LATIN AMERICAN EXPERIENCE	3	Students design a research project with an advisor and present it to peers, advisors and instructor.	
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.		MAST 466 INDEPENDENT STUDY	1-3
MALS 617 AMERICAN ART IN CONTEXT	3	MAST 468 UNDERGRADUATE RESEARCH	1-6
Designed to give the non-specialist in art history an understanding of how social, economic, religious, and cultural attitudes in America are reflected in its art, architecture, and decorative arts from the colonial period to the present. Discussion encompasses such subjects as patronage, regionalism, ethnicity, and gender. RESTRICTIONS: Open to majors only.		MAST 482 INTRODUCTION TO OCEAN SCIENCES	3
MALS 619 THE SCIENTIST IN SOCIETY	3	Quantitative introduction to ocean world including geography, geophysics, chemistry of water and sediments, physics of ocean circulation and waves and tides, description of oceanic and nearshore environments, and biology of the seas. PREREQ: MATH241 or MATH221; CHEM103 or CHEM111; PHYS201 or PHYS207.	
Scientific research is directly influenced by the society in which it is conducted. In addition to financial limitations, constraints are imposed by societal norms of what are acceptable topics and procedures for research. Focus on the philosophical basis of science as well as consequences to society of the scientific revolution. RESTRICTIONS: Open to majors only.		MAST 601 INTRODUCTION TO OCEANOGRAPHY	3
MALS 620 THE USE OF SCIENCE IN PUBLIC DISCOURSE	3	Topics include geology and history of the ocean floor, oceanic sediments, physics of marine environment and oceanic circulation, chemical processes in the ocean, and biological processes and production in the oceans. RESTRICTIONS: For non-oceanographers. Requires graduate status.	
Examines important questions of general interest to both individuals and to governmental bodies that depend heavily on scientific information. RESTRICTIONS: Open to majors only.		MAST 602 PHYSICAL OCEANOGRAPHY	3
MALS 621 THE IMPACTS OF EUROPEAN CONTACTS ON NATIVE AMERICANS	3	Geographic and hydrodynamic aspects of oceanography. 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.	
Considers how the arrival of the first Europeans in North America affected the indigenous Native Americans. RESTRICTIONS: Open to majors only.		MAST 603 INTRODUCTION TO MARINE AND AQUATIC EDUCATION	3
MALS 622 INTERPRETING THE PAST	3	Water environments and associated marine and aquatic curricula highlighted through inquiry learning, lecture and field trips. Emphasis on integration of science, math, language arts, history and exploratories in development of thematic curricula. RESTRICTIONS: Inservice educators only.	
Considers the different perspectives that can be applied to learning about the past. RESTRICTIONS: Open to majors only.		MAST 604 ENVIRONMENTAL DATA MANAGEMENT	1
MALS 624 INTRODUCTION TO GRADUATE RESEARCH/WRITING IN LIBERAL STUDIES	3	Emphasizes use of remotely sensed data for research and management of coastal resources. Environmental issues and data requirements discussed. Case studies illustrate use of Geographic Information Systems for integrating remotely sensed imagery with ancillary data to address coastal environmental problems. RESTRICTIONS: Requires approval of instructor.	
Focuses on developing research and writing skills by concentrating on one issue, such as the family, the environment, or education. Students are taught to narrow the focus of a topic, create an arguable thesis, gather source information from both library and on-line resources, evaluate the source of information, organize a logical argument, incorporate source information into the argument and revise into a finished paper. RESTRICTIONS: Open to majors only.		MAST 605 TOPICS: MARINE SCIENCE EDUCATION	1-4
MALS 625 FILM AND AMERICAN SOCIETY	3	Stimulates Delaware teachers into incorporating integrated marine sciences into their classroom teaching.	
Using major motion pictures, explores how Hollywood dealt with critical historical events: the Cold War, McCarthyism, the Civil Rights Movement, Vietnam, Watergate, and the modern Presidency. RESTRICTIONS: Open to graduate majors only.		MAST 606 OCEAN AND ATMOSPHERE REMOTE SENSING	3
MALS 626 STUDIES IN TWENTIETH CENTURY AMERICAN LITERATURE	3	Fundamentals of ocean and atmosphere remote sensing including space platforms, their orbits, instruments, data retrieval and image processing methods. Oceanographic and atmospheric applications of remote sensing and new developments in sensors and data analyses. May be cross-listed with CIEG606, ELEG606, GEOG606.	
Examines narrative and thematic concerns in American fiction written before and after World War II. The fiction is explored against a background of cultural, philosophical, and literary trends. RESTRICTIONS: For MALS students only.		MAST 607 WRITING PAPERS IN THE MARINE SCIENCES	3
MALS 660 ON BECOMING HUMAN	3	Process and mechanics of publishing scientific papers in marine journals. Covers organizing data in tables and figures; mechanics of drawing up effective figures; marshalling of tables, figures and scientific ideas into a coherent story; and strategies and techniques used in effective writing.	
Examines the biological and cultural evolution of humans, focusing on similarities and differences between humans and our closest primate relatives. RESTRICTIONS: Open to majors only.		MAST 615 INTRODUCTION TO MARINE BIOLOGY	3
MALS 869 MASTER'S THESIS	1-6	Involves laboratory, field and lecture study for broad understanding of marine biology and biochemistry. RESTRICTIONS: For non-biologically oriented marine studies graduate students.	
MALS 879 SYNTHESIS PROJECT	1-6	MAST 616 METHODS IN MOLECULAR BIOLOGY	3
		Conceptual experience in molecular biological techniques with emphasis on their application to marine related problems. Topics include: nucleic acid extractions, cloning, gene amplification and characterization, and expression methodologies. PREREQ: MAST634.	
<hr/> MARINE STUDIES <hr/>			
MAST 200 THE OCEANS	3	MAST 617 METHODS IN MOLECULAR BIOLOGY LABORATORY	3
Integrates physical, chemical, geological and biological principles into an overview that addresses why and how oceans work. Draws heavily on current ocean issues to illustrate processes and problems. RESTRICTIONS: Open only to non-science majors or with permission from instructor.		Provides practical experience in molecular biological techniques with emphasis on applications to marine related problems. COREQ: MAST616.	
MAST 314 COMPARATIVE TERRESTRIAL AND MARINE ECOLOGY	3	MAST 618 MARINE MICROBIAL ECOLOGY	3
See ENWC314 for course description.		Examines role of microbes in the oceans and their impact on oceanographic processes and biogeochemical cycles in marine environments. Emphasis is on bacteria and their interactions with other marine organisms. Introduces use of molecular tools to examine uncultivated microbes. RESTRICTIONS: Requires permission of instructor.	

MAST 620 ENERGY POLICY AND ADMINISTRATION	3	MAST 648 WATER WAVE MECHANICS	3
See POSC624 for course description.		See CIEG672 for course description. PREREQ: CIEG305.	
MAST 621 COASTAL FIELD BIOLOGY	2	MAST 663 DECISION TOOLS FOR POLICY ANALYSIS	3
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.		Develops quantitative decision-making skills for science and technology policy decisions. Covers decision-making under uncertainty, axioms of decision analysis, decision trees, influence diagrams, sensitivity analysis, confidence intervals, value of information, probabilistic risk assessment, and multi-attribute decision theory. May be cross-listed with POSC663 and/or UAPP663.	
MAST 622 CONSERVATION AND RENEWABLE ENERGY POLICY	3	MAST 664 MARINE TRANSPORTATION POLICY	3
See UAPP626 for course description.		Overview of marine transportation policy and analysis under local, national, and international contexts. Topics include: maritime transportation technology and fleet development; policy frameworks affecting trade, safety, and environment; quantitative analysis of shipping business economics and logistics under policy constraints.	
MAST 623 PHYSIOLOGY OF MARINE ORGANISMS	3	MAST 670 UNITED STATES OCEAN AND COASTAL POLICY	3
Processes and mechanisms of adaptation of organisms to marine environments. Examines how environmental factors affect physiological processes in marine organisms. Lectures address physiological processes at cellular, whole organism and habitat levels. PREREQ: MAST634 or equivalent. RESTRICTIONS: Requires permission of instructor.		Overview and assessment of evolution of United States' ocean and coastal policies, including such policy areas as coastal management, fisheries management, marine mammal protection, offshore oil development, and marine pollution control.	
MAST 625 MICROBIAL PHYSIOLOGY AND DIVERSITY	3	MAST 671 COASTAL PROCESSES AND MANAGEMENT	3
Emphasis on diversity of physiological strategies developed by prokaryotic microbes and some simple eukaryotes. Approach is to examine and dissect specific metabolic pathways both in isolation and in how they integrate with central metabolism. PREREQ: BISC 207/208, CHEM 321 or CHEM 331, or permission of instructor. RESTRICTIONS: Juniors, seniors, and graduate students.		Introduction to key processes operating in 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 United States and in other coastal nations.	
MAST 626 TOPICS IN HALOPHYTE BIOLOGY	1	MAST 672 APPLIED POLICY ANALYSIS	3
Analysis of current research in biology of halophytic plants. Emphasis on student seminars and group discussions of current literature. RESTRICTIONS: May be repeated for credit when topics vary.		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 627 MARINE BIOLOGY	3	MAST 673 INTERNATIONAL LAW	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.		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 LEST673 and/or POSC604. RESTRICTIONS: Requires permission of instructor.	
MAST 628 OFFSHORE WIND POWER: SCIENCE, ENGINEERING AND POLICY	1-4	MAST 674 LEGAL ASPECTS OF THE COASTAL ZONE	3
Covers multiple disciplines required to develop offshore wind resources for large-scale power production. As a case study, integrates science, engineering, and policy. RESTRICTIONS: Open to graduate students only.		Examines basic legal doctrines and public policy implications relevant to development and protection of coastal zone of United States. Use, ownership and control of water and land beneath and bordering upon water; relationships between states and the federal government in areas of marine affairs; environmental protection and legal controls of water pollution. RESTRICTIONS: Requires permission of instructor.	
MAST 629 TOPICS IN MARINE ECOLOGY	1-6	MAST 675 ECONOMICS OF NATURAL RESOURCES	3
Selected topics in marine ecology and physiology. Topics may vary and are announced in registration booklets. RESTRICTIONS: Requires permission of instructor. May be repeated for credit when topics vary.		Study of allocation of natural resources, especially marine and coastal zone resources, in modern economics. Application of economic theory to problems of misallocations and means of correction, under both free and planned markets. May be cross-listed with ECON675. RESTRICTIONS: Requires permission of instructor.	
MAST 634 MARINE BIOCHEMISTRY	3	MAST 676 ENVIRONMENTAL ECONOMICS	3
Addresses biochemical processes and enzyme, metabolic and structural adaptations of marine plants and animals. Discussions on topics such as enzyme kinetics, enzyme structure and metabolic pathways to organisms in marine environment. RESTRICTIONS: Requires sufficient background in chemistry and permission of instructor.		Study of choice of policies to protect 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 United States environmental policies. May be cross-listed with ECON676. PREREQ: ECON300.	
MAST 635 TURBULENCE IN THE ENVIRONMENT	3	MAST 677 INTERNATIONAL OCEAN AND ENVIRONMENTAL POLICY	3
Fundamentals of turbulence including dynamics of vorticity, cascade of energy and theory of Kolmogorov, turbulent diffusion and turbulence in density stratified flows. Applications to many engineering disciplines as well as to meteorology and oceanography.		Focuses on understanding strengths and weaknesses of legal framework which governs ocean resources, ocean space and environment beyond limits of national jurisdiction. Evaluates international conventions which pertain to ocean and environment as to impact and effectiveness.	
MAST 637 GEOLOGICAL OCEANOGRAPHY	3	MAST 678 ADMIRALTY AND MARITIME LAW	3
Focuses on processes that create oceanic and continental margin sedimentary record. Topics include marine particle production and composition, transport, seafloor morphology, stratigraphy and paleoceanography. Students gain broad understanding of concepts in geological oceanography and marine geology.		Introduction to United States admiralty and maritime law including jurisdiction carriage of goods by sea, personal injuries, collisions, salvage, insurance and marine pollution. Includes hands-on image analysis in GIS laboratory. May be cross-listed with POSC678 and/or UAPP678. RESTRICTIONS: Open to juniors, seniors and graduate students.	
MAST 645 GENERAL OCEANOGRAPHY	3		
Introduction to science of oceanography for teachers, emphasizing physical and natural sciences, nature of the subject matter and application to social schemes. Where applicable mid-Atlantic environments emphasized to demonstrate physical, chemical, geological and biological themes associated with oceanographic sciences. RESTRICTIONS: Offered off-campus, for public school teachers and general public.			
MAST 646 CHEMICAL OCEANOGRAPHY	3		
Composition of seawater; physiochemical properties of seawater distributions of gases, nutrients and trace metals; and effect of biological processes on seawater composition. PREREQ: CHEM103 and CHEM104.			

- MAST 679 SHIPPING AND PORT MANAGEMENT** 3
Seminar to study structure and management of shipping industry and ports, policies for ocean commerce, international trade, and merchant marine. May be cross-listed with POSC679.
- MAST 681 REMOTE SENSING OF ENVIRONMENT** 3
Detection and mapping of land and ocean resources with optical, infrared and microwave sensors. Digital analysis of satellite images using multispectral and spatial analysis techniques and correlation with ground/ship data. Application to oceanography, coastal processes, geology, land use, geography, agriculture, climate and pollution studies. May be cross-listed with ELEG681 and/or GEOG681. RESTRICTIONS: Requires permission of instructor.
- MAST 685 FUNDAMENTALS OF ACOUSTICS** 3
Fundamentals of sound and vibration, including equations governing vibrating string, vibration of bars, two-dimensional wave equation in plates, acoustic wave equation, transmission phenomena and acoustic radiation and reception. Other topics include absorption and attenuation of sound, resonators and ducts and filters, in context of environmental and underwater acoustics. PREREQ: Calculus and introduction to differential equations.
- MAST 686 REMOTE SENSING SEMINAR** 1
Basic and applied research topics in remote sensing of earth resources, coastal processes, estuarine productivity, ocean dynamics and climatic effects presented by University students, faculty and guest speakers. Stresses advanced data acquisition and spectral and spatial image analysis techniques. RESTRICTIONS: May be repeated for credit when topics vary.
- MAST 691 OCEAN FLUID DYNAMICS** 4
See CIEG639 for course description.
- MAST 692 ENVIRONMENTAL VALUES, MOVEMENTS AND POLICY** 3
Examines citizens' beliefs and values, voluntary environmental groups and ways in which individuals and groups affect environmental policy. Shows how research in areas such as environmental sociology and ecological anthropology can inform policy. May be cross-listed with UAPP692.
- MAST 693 WAVES IN THE MARINE ENVIRONMENT** 3
General principles of wave mechanics, kinematics and dynamics. Applications to surface gravity waves, acoustic waves, electromagnetic waves and large scale geophysical waves. May be cross-listed with CIEG693. PREREQ: MEEG690.
- MAST 800 DYNAMICAL PHYSICAL OCEANOGRAPHY** 3
Topics include basic definitions, conservation of mass, conservation of momentum, conservation of vorticity, horizontal frictionless flow, wind-driven circulation, stability and double diffusion, thermohaline circulation and tides. RESTRICTIONS: Requires permission of instructor.
- MAST 801 ENVIRONMENTAL MEASUREMENT TOOLS** 1-5
Provides exposure to limitations of techniques used in sampling and analyses that develop information used in resource management decision making. The 5-credit team-taught course has separate components. Students in the Marine Management degree program would take all 5 credits. RESTRICTIONS: Winter Session offering for MA program in the College of Marine and Earth Studies. Students outside the program may take portions of the full course as 1 or 2 credit components.
- MAST 802 CASE STUDY IN COASTAL AND OCEAN MANAGEMENT** 3
Analyzes issues in coastal and ocean management. Develops interdisciplinary problem-solving strategies. Engages students in real-world marine science/policy problems. Applies disciplinary knowledge, develops synthesis skills. Topics change, but case designs contain multi-disciplinary elements, e.g., physical ocean science, marine biology, oceanography, and marine policy. PREREQ: MAST801 or instructor approval.
- MAST 806 GEOPHYSICAL FLUID DYNAMICS I** 3
Development of fundamental fluid dynamics used in analyzing flows in physical oceanography and meteorology. Fundamentals of vorticity dynamics and geostrophy, inviscid theory of Rossby waves, and Ekman boundary layers. PREREQ: MEEG863 and MEEG864.
- MAST 808 COASTAL/ESTUARINE PHYSICAL DYNAMICS** 4
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 ocean-atmosphere system; fluxes of heat, water and energy in the ocean and interchanges with atmosphere; budgets and mechanisms of exchange; and interannual and long-term climate variations as related to the ocean. PREREQ: MAST602.
- MAST 811 OCEANOGRAPHIC TIME SERIES ANALYSIS** 3
Quantitative techniques for data processing and time series analysis. Topics include basic definitions, linear systems, digital filters, statistical techniques, auto-spectrum estimation, cross-spectrum estimation, Monte Carlo technique, empirical orthogonal function analysis and rotary spectrum estimation. RESTRICTIONS: Requires permission of instructor.
- MAST 814 POLITICAL ECONOMY OF THE ENVIRONMENT** 3
See UAPP810 for course description.
- MAST 816 BIOLOGICAL OCEANOGRAPHIC PROCESS** 1-4
Multidisciplinary approach to abundance and distribution of organisms in the oceans, physiological and behavioral responses of organisms to abiotic and biotic environment and role of organisms in modifying environment. Taught as six modules: algae, bacteria, protozoa, zooplankton, benthos, fish and fisheries. PREREQ: General biology, ecology, microbiology, and invertebrate biology. RESTRICTIONS: May be repeated for credit when topics vary.
- MAST 817 RESEARCH DESIGN AND METHODS** 3
Covers logic, design and practice of public policy research, and should be helpful for planning thesis or dissertation research, regardless of topic or methods used. Methods covered draw from social and political sciences, and process evaluation of policy.
- MAST 820 EXPERIMENTAL DESIGN SEMINAR** 1
Forum for presentation of research plans or results with emphasis on experimental design and data analysis. Ensuing discussion aids preparation of research proposals and sharpens critical assessment of own and colleagues' work.
- MAST 821 MARINE BIOLOGY/BIOCHEMISTRY SEMINAR** 1
With each offering, addresses a different specific topic, e.g., tropical marine biology, larval dispersal, estuarine productivity, etc. RESTRICTIONS: May be repeated for credit when topics vary.
- MAST 827 CURRENT TOPICS IN MARINE BIOLOGY** 1-4
Subject areas change each term and are announced in 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 are announced in registration booklet. Topics include marine chemical ecology, marine natural products chemistry, marine biochemistry of marine plants and animals. May include lectures, tutorials and demonstration of technique. PREREQ: Graduate course in biochemistry. RESTRICTIONS: May be repeated for credit when topics vary.
- MAST 831 COASTAL AND ESTUARINE SEDIMENT DYNAMICS** 3
Fundamentals of fluid flow and sedimentation in estuarine and coastal environments. Emphasis placed on oceanic and estuarine transport phenomena, basin morphology, sediment transport, facies distributions, and formulation of the most recent sedimentary record. PREREQ: MAST637 or permission of instructor.
- MAST 838 PUBLIC POLICY ANALYSIS** 3
See POSC838 for course description.
- MAST 843 GLOBAL GOVERNANCE: THEORY AND CASES** 3
See POSC843 for course description.
- MAST 847 CURRENT TOPICS IN CHEMICAL METHODS IN OCEANOGRAPHY** 1-3
Principles, capabilities and limitations of analytical methods to chemistry of marine waters and sediments. Analytical methods include electrochemical, spectroscopic, chromatographic, electron microscopy and surface techniques. Emphasis on analysis of trace components (biochemical, inorganic and organic) in marine environment. Laboratory experiments. Topics vary and are announced in registration booklet. PREREQ: MAST646 or analytical chemistry. RESTRICTIONS: May be repeated for credit when topics vary.
- MAST 850 MARINE INORGANIC CHEMISTRY** 3
Principles of inorganic chemistry used to explain and to understand speciation and reactivity of elements in marine environment. Emphasis on mechanistic aspects of important marine processes including mineral dissolution and formation, electron transfer reactions and role of metals in biogeochemical reactions. May be cross-listed with CHEM855. PREREQ: MAST646, aquatic chemistry or physical chemistry.

MAST 852	ISOTOPE GEOCHEMISTRY	3
Introduction to field of isotope geochemistry and application of isotope systematics to study of geological, geochemical, hydrological, atmospheric and marine cycles. Light stable isotopes, uranium thorium decay series nuclides, and long-lived heavy isotopes considered. PREREQ: MAST646.		
MAST 853	OCEANOGRAPHY SEMINAR	1-12
Review of current oceanographic literature through student presentations. RESTRICTIONS: May be repeated for credit when topics vary.		
MAST 855	COASTAL AND ESTUARINE CHEMISTRY	3
Distributions, behavior, and chemical processes in estuarine and coastal waters examined in this advanced general chemical oceanography course. Greater heterogeneity of physical controls and anthropogenic influences give a unique nature to this coastal corridor in global flux from land to sea. PREREQ: MAST646.		
MAST 856	BIOGEOCHEMICAL OCEANOGRAPHY	1-4
Modular graduate seminar of individual offerings inspects aspects of marine biogeochemical cycle. Includes such topics as atmospheric and oceanic fluxes, climatic feed back controls involving the ocean, and the role of the marine environment in global change. RESTRICTIONS: May be repeated for credit when topics vary.		
MAST 857	PALEOCEANOGRAPHY	3
Focuses on processes related to climate change from tectonic to millennial timescales based on marine sedimentary record of past 65 million years. Topics include light stable isotopes and biogeochemical cycling of elements. Includes lectures and student-lead discussion of current literature. May be cross-listed with GEOL857. RESTRICTIONS: Requires permission of instructor.		
MAST 868	RESEARCH	1-9
MAST 869	MASTER'S THESIS	1-6
MAST 870	INTEGRATED COASTAL MANAGEMENT	3
Provides practical guide to development, implementation, operation, and evaluation of integrated coastal management (ICM) programs. Examines evolution of international prescriptions on ICM, and compares and contrasts experiences with integrated coastal management in both developed and developing countries. PREREQ: MAST670.		
MAST 871	ENVIRONMENTAL POLICY AND ADMINISTRATION	3
See POSC818 for course description.		
MAST 873	SEMINAR: MARINE POLICY	1
Current topics in marine policy based on recent journal articles and active research and policy relevant activities of students, faculty and visitors from other universities and government agencies. Emphasis on research design and formats for oral and written presentation of results. RESTRICTIONS: May be repeated for credit when topics vary.		
MAST 875	ADVANCED FISHERY ECONOMICS	3
Theoretical and applied study of optimal utilization and management of commercial and recreational fisheries with emphasis on equity issues and difficulty of deriving regulations which are biologically effective and which provide incentives for economic efficiency at reasonable costs. May be cross-listed with ECON875. PREREQ: MAST675 or ECON675.		
MAST 882	PHYSICAL OCEAN SCIENCE AND ENGINEERING SEMINAR	1
Review of current literature in physical ocean science and engineering through student presentations.		
MAST 964	PRE-CANDIDACY STUDY	3-12 PF
Research and readings in preparation of dissertation topic and/or qualifying examinations for doctoral students before admission to candidacy but after completion of all required course work. RESTRICTIONS: Not open to students who have been admitted to candidacy.		
MAST 969	DOCTORAL DISSERTATION	1-12 PF

MATHEMATICS

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

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

MATH 113	CONTEMPORARY MATHEMATICS	3
Application of scientific methods to investigate phenomena. Solution of various real-world problems using appropriate mathematical methods. Topics include descriptive and inferential statistics, probability, management science, optimization via analysis of models, coding information, social choice and decision making and size and shape. RESTRICTIONS: Only four credits from any combination of MATH113, MATH114, MATH115, MATH117, MATH127, MATH170 and MATH171 can count toward graduation.		

MATH 114	COLLEGE MATHEMATICS AND STATISTICS	3
Stresses mathematical concepts and algebraic skills with a strong emphasis on applications in the areas of management, life and social sciences. Topics include various function classes and models, linear programming and statistics including descriptive and inferential statistics. PREREQ: MATH012 or MATH010. RESTRICTIONS: Only four credits from any combination of MATH113, MATH114, MATH115, MATH117, MATH127, MATH170 and MATH171 can count toward graduation.		

MATH 115	PRE-CALCULUS	3
The various classes of functions and their graphs are explored. Function classes include linear, quadratic, polynomial, rational, exponential, logarithmic and trigonometric. Skills and concepts needed for calculus (MATH 221) are emphasized. PREREQ: MATH010 or MATH012. RESTRICTIONS: Only four credits from any combination of MATH113, MATH114, MATH115, MATH117, MATH127, MATH170 and MATH171 can count toward graduation.		

MATH 117	PRE-CALCULUS FOR SCIENTISTS AND ENGINEERS	4
Designed to prepare students for MATH241. All topics included in MATH115 are covered, as well as additional topics in functions, trigonometry, linear systems, nonlinear systems, series and sequences. PREREQ: MATH010 or MATH012 or 2 years of high school algebra. RESTRICTIONS: Only four credits from any combination of MATH113, MATH114, MATH115, MATH117, MATH127, MATH170 and MATH171 can count toward graduation.		

MATH 127	MATHEMATICS AND QUANTITATIVE REASONING	3
Mathematics driven by typical quantitative reasoning needed in everyday life. Combines critical thinking with basic mathematics in contexts encountered in various areas such as finance, social sciences, politics, the environment, etc. Includes probability and statistics, basic logic, and basic finance. PREREQ: High school algebra. RESTRICTIONS: Only four credits from any combination of MATH113, MATH114, MATH115, MATH117, MATH127, MATH170 and MATH171 can count toward graduation.		

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

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

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

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

<p>MATH 217 ALGEBRA FOR MIDDLE SCHOOL TEACHERS 3 Examines algebraic concepts developed in the middle grades, including linearity; meanings and uses of variables; and the representation of situations using functions, graphs, and equations. RESTRICTIONS: Credit is not given for mathematics majors or minors.</p>	<p>MATH 260 INTEGRATIVE SEMINAR 1 Problem-based learning instruction aimed at integrating material in mathematics and biology. RESTRICTIONS: Primarily for students in biological sciences and mathematics. Requires permission of instructor.</p>
<p>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.</p>	<p>MATH 268 PERSPECTIVES ON MATHEMATICS 1 Designed for mathematics and other majors to expand students' understanding of contemporary mathematical thought, practice, culture and tools. Features presentations from faculty and invitees on mathematical endeavors and professional activities in an informal atmosphere. PREREQ: MATH241 or equivalent.</p>
<p>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.</p>	<p>MATH 279 PROBLEM SOLVING STRATEGIES I 1 Designed to study a multitude of problem solving strategies such as working backwards, looking for a pattern, etc. Emphasizes the use of these strategies with the content that secondary mathematics teachers normally teach. PREREQ: MATH241.</p>
<p>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.</p>	<p>MATH 302 ORDINARY DIFFERENTIAL EQUATIONS 3 Solutions and applications of ordinary differential equations as well as systems. Considers initial value problems and boundary value problems. Topics include Laplace transform, the phase plane, series solutions and partial differential equations. Includes use of the computer package Maple. COREQ: MATH243. RESTRICTIONS: Credit not given for both MATH302 and either MATH341, MATH342, MATH351 or MATH352.</p>
<p>MATH 240 GEOMETRY AND MEASUREMENT FOR MIDDLE SCHOOL TEACHERS 3 Explores geometry and measurement topics and how they are developed throughout the middle school curriculum. Topics include properties of 2D and 3D figures, coordinate geometry, transformations, measurement of length, area and volume, and fundamentals of a deductive system. Includes the use of technology. RESTRICTIONS: Open only to students pursuing middle school mathematics teaching certification. Grade of C- or higher in MATH253 or permission of instructor.</p>	<p>MATH 303 DIFFERENTIAL EQUATIONS COMPUTING LAB 1 Provides computing experience in differential equations. COREQ: MATH302.</p>
<p>MATH 241 ANALYTIC GEOMETRY AND CALCULUS A 4 Functions, limits, continuity, derivatives and definite integrals. Exponential and log functions; simple differential equations modeling exponential growth and decay (linear and separable ODEs). RESTRICTIONS: Requires two years of high school algebra, one year of geometry and trigonometry. Credit cannot be received for both MATH241 and MATH221.</p>	<p>MATH 305 APPLIED MATHEMATICS FOR CHEMICAL ENGINEERING 3 Special applied mathematics course designed for chemical engineering majors. Emphasis is given on the interaction between mathematical theory and its engineering applications. May be cross-listed with CHEG305. PREREQ: Minimum grade of C- in MATH243 and CHEG112. RESTRICTIONS: For chemical engineering majors only.</p>
<p>MATH 242 ANALYTIC GEOMETRY AND CALCULUS B 4 Review of exponential and logarithmic functions; inverse trigonometric functions; integration techniques; parametric curves; polar coordinates; infinite series. Includes use of the computer package, Maple, to perform symbolic, numerical and graphical analysis. PREREQ: MATH241. RESTRICTIONS: Credit cannot be received for both MATH242 and MATH222.</p>	<p>MATH 308 HISTORICAL DEVELOPMENT OF MATHEMATICAL CONCEPTS AND IDEAS 3 Illustrates the origins of ideas, processes and topics in the history of mathematics. Biographical sketches of the creators, descriptions of their diverse cultures and a writing project are included. PREREQ: MATH241. RESTRICTIONS: Credits cannot be used to satisfy major or minor requirements in mathematics other than the secondary mathematics education program.</p>
<p>MATH 243 ANALYTIC GEOMETRY AND CALCULUS C 4 Vectors, operations on vectors, velocity and acceleration, partial derivatives, directional derivatives, optimization of functions of two or more variables, integration over two and three dimensional regions, line integrals, Green's Theorem. Includes use of the computer package, Maple, to perform symbolic, numerical and graphical analysis. PREREQ: MATH242.</p>	<p>MATH 315 DISCRETE MATHEMATICS II 3 Algorithmic graph theory and computational geometry. Topics in graph theory cover shortest path problems, coloring problems, and others. The computational geometry covers Steiner tree, convex hull, design of experiments and selected topics. PREREQ: MATH210.</p>
<p>MATH 245 AN INTRODUCTION TO PROOF 3 Basic set operations, relations, equivalence relations, functions, inverse functions, cardinality, order properties of real numbers, least upper bound, greatest lower bound, completeness axiom, topology of reals, complex numbers. PREREQ: MATH210 and MATH242.</p>	<p>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 interaction between these topics and appropriate physical systems. PREREQ: MATH242. RESTRICTIONS: Credit not given for both MATH341 and either MATH302, MATH349 or MATH351. Open to majors outside mathematics.</p>
<p>MATH 251 MATHEMATICS FOR K-8 TEACHERS: NUMBER AND OPERATIONS 3 Explores concept development in numeration systems, base ten system, the meaning of the four operations, number theory, and integers. Emphasis on problem solving and general number sense. RESTRICTIONS: Successfully pass the School of Education Competency Test.</p>	<p>MATH 342 DIFFERENTIAL EQUATIONS WITH LINEAR ALGEBRA II 3 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 interaction between these topics and physical systems. PREREQ: MATH341. RESTRICTIONS: Credit not given for both MATH342 and either MATH302, MATH349 or MATH352. Open to majors outside mathematics.</p>
<p>MATH 252 MATHEMATICS FOR K-8 TEACHERS: RATIONAL NUMBERS AND PROBABILITY 3 Explores concept development in rational numbers, operations with rational numbers, proportional reasoning, and probability. PREREQ: MATH251. RESTRICTIONS: Grade of C- or higher in MATH251.</p>	<p>MATH 349 ELEMENTARY LINEAR ALGEBRA 3 Systems of linear equations, matrix algebra and determinants. Vector spaces, linear dependence and independence, basis and dimension. Linear transformations, similarity transformations and diagonalization problems. Inner product spaces and least squares approximation. Emphasizes theory and application to other mathematics areas. Includes computer use for analysis and solution of linear algebra problems. PREREQ: MATH230 or MATH242. RESTRICTIONS: Credit not given for both MATH349 and either MATH341, MATH342 or MATH351.</p>
<p>MATH 253 MATHEMATICS FOR K-8 TEACHERS: GEOMETRY, ALGEBRA AND MEASUREMENT 3 Explores concept development in figures, the role of definitions, coordinate geometry, transformations, functions and measurements of length, area and volume. PREREQ: MATH252. RESTRICTIONS: Grade of C- or higher in MATH252.</p>	

MATH 350 PROBABILITY THEORY AND SIMULATION METHODS	3	Introduces the basic theory in both discrete and continuous aspects of probability theory. PREREQ: MATH210 or MATH230. COREQ: MATH243.
MATH 351 ENGINEERING MATHEMATICS I	3	Solutions of linear algebraic equations, Gauss elimination, vector spaces, subspaces, linear dependence, linear ordinary differential equations of 2nd order and higher, initial value and boundary value problems, eigenvalues, coupled linear ordinary differential equations, nonlinear differential equations, with engineering applications. COREQ: MATH243. RESTRICTIONS: Credit not given for both MATH351 and either MATH302, MATH341 or MATH349. Open to MEEG and CIEG students only.
MATH 352 ENGINEERING MATHEMATICS II	3	Laplace transform, application to constant coefficient ordinary differential equations, scalar and vector fields, Laplacian, line integrals, divergence theorem, Stokes' theorem, Fourier series, orthogonality, diffusion equation, Laplace's equation, wave equation, separation of variables, with engineering applications. PREREQ: MATH351. RESTRICTIONS: Open to MEEG and CIEG majors only.
MATH 353 ENGINEERING MATHEMATICS III	3	Numerical Methods in engineering, linear and non-linear algebraic equations, numerical solution of ordinary differential equations, Runge-Kutta methods, boundary value problems, finite differences, diffusion, Laplace equation, applications to engineering problems with programming. PREREQ: MATH351. RESTRICTIONS: Open to MEEG and CIEG majors.
MATH 366 INDEPENDENT STUDY	1-6	
MATH 379 PROBLEM SOLVING STRATEGIES	1	Studies multitude of problem solving strategies such as looking for a pattern, making a model, working backwards, etc. COREQ: MATH380. RESTRICTIONS: Requires permission of the Committee on Secondary School Mathematics. Not for major (B.A. or B.S.) or minor credit in mathematical sciences.
MATH 380 APPROACHES TO TEACHING MATH	3	Aims, course planning, instructional strategies, evaluation and selection of materials for teaching mathematics in secondary schools. COREQ: MATH379. RESTRICTIONS: Requires permission of the Committee on Secondary School Mathematics. Not for major (B.A. or B.S.) or minor credit in mathematical sciences.
MATH 382 STUDENT TEACHING SEMINAR IN SECONDARY MATH	2 PF	Provides student teachers opportunities to reflect upon and discuss classroom teaching experience. Focuses on classroom management and other professional issues. PREREQ: MATH380. COREQ: EDUC400.
MATH 401 INTRODUCTION TO REAL ANALYSIS	3	Rigorous treatment of one variable calculus. Topics include sequences of real numbers, limit theorems, monotone sequences, Cauchy sequences, Bolzano-Weierstrass Theorem, continuity, uniform continuity, differentiability and Riemann integral. Historical perspective on the development of these topics provided. PREREQ: MATH245.
MATH 426 INTRODUCTION TO NUMERICAL ANALYSIS AND ALGORITHMIC COMPUTATION	3	Direct and iterative methods for solution of algebraic equations and systems of linear equations, matrix inversion, pseudo-inverses, algebraic eigenvalue problems, linear least-square problems and nonlinear equations. Stresses both numerical analysis and algorithmic aspects. May be cross-listed with CISC410. PREREQ: MATH349 or MATH341 or MATH351; and CISC105 or CISC181. 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 MATHEMATICAL STATISTICS	3	Introduction to mathematical aspects of statistics. Topics include exploratory data analysis, parameter estimation, maximum likelihood method, testing of hypothesis, confidence intervals and others. Includes application of a computer software package to perform data analysis. PREREQ: MATH350 or an equivalent course in probability.
MATH 451 ABSTRACT ALGEBRA I	3	Basic properties of the integers and the rationals, fields of quotients, polynomial rings, root-finding, introduction to groups, rings and fields. A historical perspective on the development of the notion of number and algebraic structure. PREREQ: MATH349 and MATH245.
MATH 460 INTRODUCTION TO SYSTEMS BIOLOGY	3	Systems biology approach, mathematical modeling of biological systems; examples from biomedical and agricultural research areas, biotechnology, industrial processes, and others. Differential equations, stochastic, feedback and control, or network models are discussed. Hands-on work via PBL modules. May be cross-listed with CHEG460. PREREQ: CHEM527, MATH535 and one of BISC302, 305, 306, 401 or 403.
MATH 466 INDEPENDENT STUDY	1-6	
MATH 503 ADVANCED CALCULUS FOR APPLICATIONS	3	Change of variables, surface integrals, Stokes' theorem, Divergence Theorem, calculus of variations, Euler's equation, brachistochrone, isoperimetric problem. Fourier series, pointwise and mean square convergence, vibrating string. Fourier transform, inversion formula, heat equation on a half-line. PREREQ: A 300 or higher level course on differential equations.
MATH 508 INTRODUCTION TO COMPLEX VARIABLES AND APPLICATIONS	3	Introduction to analytic functions, contour integration, power series, residues and conformal mapping. PREREQ: MATH243.
MATH 512 CONTEMPORARY APPLICATIONS OF MATHEMATICS	3	Provides hands-on learning experience in contemporary applications of mathematics. Involves work with investigators from industry, national laboratories and other departments. Mathematical topics may include ordinary and partial differential equations, systems of differential equations, transform, asymptotic and numerical methods. PREREQ: A 300 or higher level course on differential equations.
MATH 518 MATHEMATICAL MODELS AND APPLICATIONS	3	Illustration and analysis of mathematical models for problems in the biological, physical and social sciences. PREREQ: Either MATH230 or MATH349, and STAT370.
MATH 529 LINEAR PROGRAMMING: METHODS AND APPLICATIONS	3	Theory of linear programming, related topics (games, integer programming), main algorithms 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 students' chosen areas. PREREQ: MATH349.
MATH 530 OPTIMIZATION AND GAME THEORY	3	Convex functions and sets, duality, fixed point theorems, elementary game theory and the theory of Nash and Walrasian equilibria; non-linear programming and the Kuhn-Tucker Theorem; dynamic optimization including dynamic programming and Pontryagin's Maximum Principle. Emphasis on applications and interpretation in terms of economic models. May be cross-listed with ECON530. PREREQ: MATH302, MATH349, ECON301 and ECON303.
MATH 535 INTRODUCTION TO PARTIAL DIFFERENTIAL EQUATIONS	3	Theory and applications of parabolic, elliptic and hyperbolic partial differential equations originating from various mathematical physics problems. PREREQ: MATH302 or MATH342 or MATH352.
MATH 540 COLLEGE GEOMETRY: A HISTORICAL APPROACH	3	Historical development of the axiomatic systems in geometry, inauguration of deductive reasoning introduced by the Greeks (Euclid) along with the axiomatic developments, extensions, algebraic methods and geometric properties which followed. Plane, analytic, transformational and projective geometries are included. PREREQ: MATH245. RESTRICTIONS: Graduate credit only for teachers.
MATH 549 CODING THEORY AND CRYPTOGRAPHY	3	Basic coding theory including correcting and detecting error patterns. Cryptography, including symmetric key encryption, DES, RSA and cryptographic protocols. PREREQ: MATH349.

- MATH 579 GEOMETRY AND PROOF 3**
 In-depth study of high school geometry from advanced perspective. Logic and proof provide foundation for studying axiomatic systems, transformational geometry, and finite geometries.
 PREREQ: Undergraduate degree in mathematics or in secondary mathematics education.
 RESTRICTIONS: Open only to School of Education graduate students, Alternative Routes to Certification Program, practicing secondary mathematics teachers, or by permission of instructor.
- MATH 580 ANALYSIS FOR ADVANCES PLACEMENT CALCULUS TEACHERS 3**
 Prepares high school mathematics teachers to teach Advanced Placement Calculus. AP content, primarily from the AB course, is studied in depth. Participants analyze recent AP Examinations, scoring rubrics and student responses.
 PREREQ: Undergraduate degree in mathematics or in secondary mathematics education.
 RESTRICTIONS: Open only to School of Education graduate students, Alternative Routes to Certification Program, practicing secondary mathematics teachers, or by permission of instructor.
- MATH 581 ON THE NATURE OF PROOF 3**
 Designed for secondary teachers to show how to investigate a problem, develop ideas, test conjectures, and, if appropriate, prove that resulting statements are correct. Problems, including proofs, are chosen from the areas of algebra, pre-calculus, geometry and number theory.
 PREREQ: BA/BS Math or Math Ed.
 RESTRICTIONS: Credit to be used only in graduate programs in mathematics education.
- MATH 582 STUDIES IN DISCRETE MATHEMATICS 3**
 Designed to show secondary teachers how discrete mathematics underlies the science and technology specific to the computer age. Using the NCTM Standards as a guide, topics include relations, combinatorics, graph theory, sequences, and linear programming, as well as associated algorithms.
 PREREQ: MATH581.
 RESTRICTIONS: Credit to be used only in graduate programs in mathematics education.
- MATH 583 PROBABILITY AND STATISTICS FOR EDUCATION 3**
 Designed specifically for middle and secondary teachers. Topics emphasized include graphical methods, probability models, statistical inference and study design. Orientation to popular software packages. Applications selected from current literature.
 PREREQ: Undergraduate statistics course.
 RESTRICTIONS: Credit to be used only in graduate programs in mathematics education.
- MATH 584 ADVANCED SECONDARY MATHEMATICS METHODS 3**
 Designed to develop perspectives, knowledge, and frameworks which an inservice teacher can use to organize, interpret and critique their own teaching experience and that of others.
 RESTRICTIONS: Requires permission of instructor. Credit to be used only in graduate programs in mathematics education.
- MATH 585 TECHNOLOGY IN SECONDARY MATHEMATICS 3**
 Major emphasis on learning how to use computer software to enhance both the teaching and learning of algebra, geometry, statistics, probability and precalculus. Participants get hands-on experience with a function plotter, spreadsheet, geometry package and a statistic/probability package.
 RESTRICTIONS: Working knowledge of graphing calculators. Credit to be used only in graduate programs in mathematics education.
- MATH 586 MATHEMATICAL PROBLEM SOLVING: THEORIES AND PRACTICES 3**
 Designed to offer secondary teachers an opportunity to face and solve nonroutine problems. Teachers become familiar with problem solving strategies used not only with nonroutine problems but also with standard problems in an existing mathematics curriculum.
 RESTRICTIONS: Requires permission of instructor. Credit to be used only in graduate programs in mathematics education.
- MATH 587 PROPORTIONAL REASONING 3**
 Introduces and reinforces the underlying concepts of proportional reasoning and their applications in science.
 RESTRICTIONS: Restricted to middle school mathematics and science teachers.
- MATH 588 GEOMETRY AND MEASUREMENT FOR MIDDLE SCHOOL TEACHERS 3**
 Properties of 2-D and 3-D figures; measurement of length, area and volume; spatial relationships; transformations; connections with coordinate geometry; fundamentals of deductive system; van Hiele model of development of geometric reasoning, and use of Geometer's Sketchpad software to enhance package to enhance both teaching and learning of geometry and measurement.
 May be cross-listed with EDUC588.
- MATH 589 QUANTITATIVE LITERACY AND SCIENTIFIC INQUIRY 3**
 Connects mathematics and science in fundamental ways. Statistical methods used to construct scientific knowledge through evaluation of evidence and support for explanations. Scientific contexts used to investigate major statistical questions such as "Are two populations demonstrably the same or different on a given variable?"
 RESTRICTIONS: Open only to School of Education graduate students, Alternative Routes to Certification Program, practicing secondary mathematics teachers, or by permission of instructor.
- MATH 590 PATTERNS AND ALGEBRA FOR MIDDLE SCHOOL TEACHERS 3**
 Mathematical modeling and multiple representations used as overarching themes in development of algebraic concepts across grades 6-11. Topics introduced in problem-based settings, with graphing calculators used throughout.
 PREREQ: MATH587 or permission of instructor.
 RESTRICTIONS: Open only to School of Education graduate students, Alternative Routes to Certification Program, practicing teachers, or by permission of instructor.
- MATH 591 IMPLEMENTING EXEMPLARY CURRICULA: MIDDLE SCHOOL MATHEMATICS 3**
 Explores how exemplary middle school mathematics curricula promote development of students' mathematical understandings and provides context for best classroom practices. Examines in-depth topics in number and operations, algebra, geometry, measurement, and/or data analysis.
 RESTRICTIONS: Open only to School of Education graduate students, Alternative Routes to Certification Program, practicing teachers, or by permission of instructor.
- MATH 600 FUNDAMENTALS OF REAL ANALYSIS I 3**
 Rigorous introduction to classical real analysis. Brief review of real numbers and a thorough discussion of the basic topology of metric spaces. Covers in detail the following topics: the analysis of sequences and series; continuity; differentiation and Taylor's theorem; and the analysis of sequences and series of functions.
 PREREQ: MATH401.
- MATH 602 FUNDAMENTALS OF REAL ANALYSIS II 3**
 Riemann integration, an introduction to Lebesgue integration, multivariable calculus.
 PREREQ: MATH600.
- MATH 611 INTRODUCTION TO NUMERICAL ANALYSIS AND SCIENTIFIC COMPUTING 3**
 Introduction to numerical computing, analysis and solution of systems of linear equations, linear least-squares, eigenvalue problems, methods for unconstrained optimization, solution of systems of nonlinear equations. Experience with standard computer packages, code development and simulations of applied problems.
 PREREQ: MATH503 or MEEG863 or PHYS207.
- MATH 612 INTRODUCTION TO NUMERICAL METHODS FOR PARTIAL DIFFERENTIAL EQUATIONS 3**
 Basic finite difference schemes for standard model problems. Schemes for integrating time dependent problems (including ordinary differential equations). Curved boundaries. Dispersion and Von Neumann analysis. Lax equivalence theorem and the CFL condition.
 PREREQ: MATH503 or MEEG863 or PHYS207.
- MATH 616 INTRODUCTION TO APPLIED MATHEMATICS I 3**
 Introduction to ideas and techniques used in solving problems arising in a variety of physical settings. Stability of nonlinear systems of ODE's. Sturm-Liouville problems and Green's functions. The wave, heat and Laplace equations. Elementary analysis of some nonlinear PDE's. Special functions, asymptotic expansions and perturbation theory.
 PREREQ: One semester of advanced calculus.
- MATH 617 INTRODUCTION TO APPLIED MATHEMATICS II 3**
 Continuation of MATH616.
 PREREQ: MATH616.
- MATH 630 PROBABILITY THEORY AND APPLICATIONS 3**
 Introduction to probability theory as background for further work in statistics or stochastic processes. Sample spaces and axioms of probability; discrete sample spaces having equally likely events; conditional probability and independence; random variables and describing their distributions; classical discrete and continuous random variables; mathematical expectation and moments of a distribution; the distribution of a function of a random variable; Chebyshev's inequality; the law of large numbers; central limit theorem.
- MATH 631 INTRODUCTION TO STOCHASTIC PROCESSES 3**
 Classical stochastic processes with emphasis on their properties which do not involve measure theory. Markov chains in discrete and in continuous time with examples from random walk, birth and death processes, branching processes and queuing theory. Renewal and Markov renewal processes. Basic notions of Brownian motion and second-order processes.
 PREREQ: MATH630.

MATH 650 ABSTRACT ALGEBRA	3	Elementary number theory, polynomial and abstract rings, ideals and quotient rings, PID's and Euclidean rings, groups, cyclic and Abelian groups, direct products, algebraic field extensions, splitting fields, field automorphisms, finite fields. PREREQ: Undergraduate abstract algebra.	MATH 835 PARTIAL DIFFERENTIAL EQUATIONS I	3	Methods of analysis and solution for partial differential equations, both initial and boundary value problems. Brings mathematical techniques to vital and current systems of equations arising in many fields. Topics include elliptic, hyperbolic and parabolic systems from a classical and variational perspective. PREREQ: MATH617.
MATH 668 SEMINARS-COLLOQUIA	1	Requires attendance at 8 departmental seminars/colloquia each semester. Short written summary on one of the talks must be submitted to graduate chair. RESTRICTIONS: Required of all MS and Ph.D. students in their first and second years. For meeting the requirement each semester students receive one credit.	MATH 836 PARTIAL DIFFERENTIAL EQUATIONS II	3	Cauchy's problem and initial boundary value problems for hyperbolic and parabolic equations and systems. Boundary value problems for elliptic equations and systems. Sobolev space and semigroup methods will be emphasized. PREREQ: MATH806 and a course on partial differential equations.
MATH 672 VECTOR SPACES	3	Vector spaces, linear transformations, decomposition theorems and bilinear forms. PREREQ: MATH349.	MATH 838 NUMERICAL METHODS FOR PARTIAL DIFFERENTIAL EQUATIONS	3	Introduces concepts of consistency, stability and convergence of numerical schemes. Finite element and finite difference schemes and their applications to fundamental partial differential equations are emphasized. PREREQ: MATH612 or equivalent.
MATH 688 COMBINATORICS AND GRAPH THEORY I	3	Combinatorial enumeration, designs and geometries, graphs, set systems, partially ordered sets, existence and construction of various combinatorial objects, Ramsey theory. PREREQ: MATH650 or consent of instructor.	MATH 845 GROUPS AND THEIR APPLICATIONS	3	Review of elementary group theory, permutation groups, group actions, Sylow theorems, semi-direct and wreath products, classical matrix groups, automorphism groups of combinatorial structures, Polya enumeration. May also include representation theory, free groups, finite groups of isometries of Euclidean spaces. PREREQ: MATH650 or consent of instructor.
MATH 689 COMBINATORICS AND GRAPH THEORY II	3	Methods of linear algebra in combinatorics and graph theory, basics of coding theory and associated designs, number theory and cryptography, communication complexity. PREREQ: Knowledge of linear algebra.	MATH 850 THEORY OF PROBABILITY	3	Mathematically rigorous treatment of probability theory with emphasis on methods and tools for applications. Axioms of probability and independence. An introduction to large deviation theory and Martingale theory. Probabilistic methods in combinatorics and analysis. PREREQ: MATH602 or consent of instructor.
MATH 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 868 RESEARCH	1-6	
MATH 805 REAL ANALYSIS	3	Lebesgue measure and integration, differentiation and absolute continuity, L_p spaces, distributions and Sobolev spaces. PREREQ: MATH602.	MATH 869 MASTER'S THESIS	1-6	
MATH 806 FUNCTIONAL ANALYSIS	3	Fundamental results for normed linear spaces with special emphasis on the theory of Hilbert space, spectral theorems and application to integral and differential equations. PREREQ: MATH602.	MATH 870 READING IN MATHEMATICS	1-6	
MATH 807 COMPLEX ANALYSIS	3	Complex numbers; analytic functions; geometry of elementary functions; integrals; power series; residues and poles. PREREQ: MATH602.	MATH 884 FINITE GEOMETRIES AND DESIGNS	3	Classical projective and affine spaces, non-desarguesian planes, coordinate systems, spreads and packings, conics and unitals, collineation groups and Singer cycles. Further topics chosen from related geometrical designs, associated codes and algebraic surfaces/varieties. PREREQ: MATH688 and MATH845.
MATH 810 ASYMPTOTIC AND PERTURBATION METHODS	3	Asymptotic expansions of real and complex integrals; singular perturbation theory for ODEs and PDEs, WKB and multiple-scale expansion techniques. Selected applications. PREREQ: MATH617 and knowledge of analytic function theory or consent of instructor.	MATH 885 EXTREMAL COMBINATORICS	3	Topics from extremal graph theory, extremal set theory and combinatorial geometry. Algebraic, geometric and probabilistic methods are used. PREREQ: MATH688 and MATH689.
MATH 812 INVERSE PROBLEMS	3	Ill-posed problems, regularization methods, Tikhonov regularization, the discrepancy principle, regularization by discretization. Selected topics from nonlinear inverse problems. PREREQ: MATH617 and MATH806.	MATH 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 821 TOPICS IN APPLIED ANALYSIS	3	Topics chosen from ordinary differential equations, harmonic analysis, optimization theory and integral equations. RESTRICTIONS: Requires permission of instructor.	MATH 969 DOCTORAL DISSERTATION	1-12 PF	
MATH 824 TOPICS IN APPLIED MATHEMATICS	3	Topics chosen from numerical analysis, elasticity, electromagnetic theory, fluid dynamics and other areas. RESTRICTIONS: Requires permission of instructor.	<hr/> <hr/> MEDICAL TECHNOLOGY <hr/> <hr/>		
MATH 826 TOPICS IN PURE MATHEMATICS	3	Topics vary and are chosen from a variety of areas in pure mathematics. RESTRICTIONS: Requires permission of instructor.	MEDT 100 INTRODUCTION TO MEDICAL TECHNOLOGY	1	Orientation to profession of medical technology with overview of clinical laboratory science areas. Discussion of laboratory's critical role in healthcare delivery and diversity of employment and career opportunities.
MATH 827 TOPOLOGY	3	Generation and properties of topological spaces including connectedness and compactness. Continuity, separation and countability properties; convergence of nets and filters.	MEDT 210 INFORMATION TECHNOLOGIES AND COMMUNICATION SKILLS	2	Focuses on use of computer and education technology such as PowerPoint, Word, Excel, WWW browsers and e-mail as tools to achieve effective communication necessary for success in biomedical sciences. RESTRICTIONS: Open to sophomores, juniors and seniors. Requires permission of instructor.
			MEDT 366 INDEPENDENT STUDY	1-6	
			MEDT 370 PHLEBOTOMY PRACTICUM	1	Introduction to the theory and performance of phlebotomy. Supervised clinical experience in the application of laboratory theory and techniques in phlebotomy. RESTRICTIONS: Open to medical technology majors only.

MEDT 372	DIAGNOSTIC PARASITOLOGY	2	MEDT 414	HEMATOLOGY I LABORATORY	1
Study of human parasites, emphasizing detection and identification of diagnostic forms. RESTRICTIONS: Open to medical technology majors only.			Study and implementation of laboratory procedures that correlate with material taught in MEDT404. COREQ: MEDT404.		
MEDT 375	CLINICAL LABORATORY PRINCIPLES AND STATISTICS	2	MEDT 415	HEMATOLOGY II LABORATORY	2
Basic laboratory principles including solution preparation, mathematics, safety, quality assurance and spectrophotometry. Introductory statistics including applications to laboratory information systems and research. RESTRICTIONS: Requires permission of instructor.			Study and implementation of laboratory procedures in hematology consistent with material taught in MEDT405. COREQ: MEDT405.		
MEDT 380	CLINICAL IMMUNOLOGY AND MEDICAL VIROLOGY	4	MEDT 416	MEDICAL MICROBIOLOGY LABORATORY	2
Introductory immunology concepts and use of immunological assays, such as complement fixation, enzyme immunoassays, and fluorescent antibody assays, for diagnosis of infectious diseases and immunological disorders. Study of viruses, diseases they cause, and methods used to diagnose viral infections. PREREQ: BISC208, BISC300, and CHEM213 or CHEM321. RESTRICTIONS: Requires permission of instructor.			Laboratory study of microorganisms important in normal flora and infectious diseases of humans. COREQ: MEDT406.		
MEDT 390	INTRODUCTION TO MOLECULAR DIAGNOSTICS	2	MEDT 418	MEDICAL TECHNOLOGY SENIOR SEMINAR	0 PF
Introduction to molecular biology principles and techniques used in clinical laboratory for diagnosis, prognosis and treatment of disease. Topics include isolation of DNA, RNA, and proteins from biological fluids, electrophoresis, PCR, viral load testing and DNA sequencing. PREREQ: BISC208, and CHEM213 or CHEM321. RESTRICTIONS: Requires permission of instructor.			Readings, case studies, career planning and orientation for clinical education. RESTRICTIONS: Requires senior and major status.		
MEDT 391	INTRODUCTION TO MOLECULAR DIAGNOSTICS LABORATORY	1	MEDT 419	IMMUNOHEMATOLOGY I LABORATORY	1
Laboratory exercises that correlate with MEDT390. Techniques include isolation of nucleic acids from biological fluids, electrophoresis, PCR, viral load testing and DNA sequencing. PREREQ: BISC208, and CHEM213 or CHEM321. COREQ: MEDT390. RESTRICTIONS: Requires permission of instructor.			Laboratory procedures consistent with MEDT409. COREQ: MEDT409.		
MEDT 400	URINALYSIS AND BODY FLUIDS	2	MEDT 420	IMMUNOHEMATOLOGY II	1
Study of routine urinalysis examination, renal function and body fluid testing procedures. RESTRICTIONS: Open to medical technology majors only.			Study of blood and component transfusions, their risks, complications and quality assurance. Also blood component therapy and testing of neonate and adult. PREREQ: MEDT409.		
MEDT 401	CLINICAL PHYSIOLOGICAL CHEMISTRY I	3	MEDT 421	IMMUNOHEMATOLOGY II LABORATORY	1
Application and theory of manual and automated techniques used in diagnostic and therapeutic medicine. Emphasis on clinical procedures for carbohydrates, proteins, lipids, nonprotein nitrogenous compounds, blood gases and pH, and electrolytes. RESTRICTIONS: Open to medical technology majors only.			Laboratory procedures consistent with MEDT420. COREQ: MEDT420.		
MEDT 403	CLINICAL PHYSIOLOGICAL CHEMISTRY II	4	MEDT 430	DIAGNOSTIC BACTERIOLOGY AND MEDICAL MYCOLOGY	2
Application and theory of methodologies in enzymology, endocrinology and toxicology. Relationship of normal and abnormal laboratory findings in organ functional tests. PREREQ: MEDT401.			Diagnostic bacteriology, emphasizing correlation of in vitro and in vivo findings in diagnosis and treatment of infectious disease, including human mycoses. Identification of pathogenic and nonpathogenic bacteria and fungi in clinical specimens. PREREQ: MEDT406 and MEDT416. COREQ: MEDT431.		
MEDT 404	HEMATOLOGY I	2	MEDT 431	DIAGNOSTIC BACTERIOLOGY AND MEDICAL MYCOLOGY LABORATORY	2
Quantitative and qualitative study of formed elements of blood with emphasis on normal state, as well as study of normal and abnormal coagulation and hemostasis. RESTRICTIONS: Open to medical technology majors only.			Study and implementation of laboratory procedures that correlate with material taught in MEDT430. COREQ: MEDT430.		
MEDT 405	HEMATOLOGY II	2	MEDT 450	ANATOMY OF PROFESSIONALISM	1-3
Study of pathophysiology of erythrocytic and leukocytic disorders and laboratory findings of these disorders. PREREQ: MEDT404.			Introduces medical technology majors and those already in clinical laboratory field to aspects of professional development essential for success in modern healthcare arena and for life-long learning. Includes first-hand experience at national clinical laboratory science annual meeting, accompanied by on-site discussions and student presentations on campus. RESTRICTIONS: Restricted to MT/MTI majors and MT graduates.		
MEDT 406	MEDICAL MICROBIOLOGY	3	MEDT 461	LABORATORY PRACTICE AND LEADERSHIP I	1
Study of occurrence and pathogenesis of human infections and microorganisms associated with humans in health and disease. RESTRICTIONS: Open to medical technology majors only.			Introduction to clinical laboratory practice and leadership with emphasis on management styles, motivational techniques, communication skills, organizational leadership and administration of personnel. RESTRICTIONS: Requires permission of instructor.		
MEDT 409	IMMUNOHEMATOLOGY I	1	MEDT 466	INDEPENDENT STUDY	1-6
Study of antigen and antibody systems of human red cells and compatibility testing of blood for transfusion. RESTRICTIONS: Open to medical technology majors only.			Discussion of clinical laboratory practice and leadership. Emphasis on responsibilities relating to daily operation of laboratory, including human resource management, financial planning, cost analysis, laboratory design, laboratory information systems, marketing, government regulations and accreditation. PREREQ: MEDT461. RESTRICTIONS: Requires permission of instructor.		
MEDT 411	CLINICAL PHYSIOLOGICAL CHEMISTRY LABORATORY I	2	MEDT 471	LABORATORY PRACTICE AND LEADERSHIP II	1
Laboratory exercises that complement topics covered in MEDT401. COREQ: MEDT401.			Discussion of clinical laboratory practice and leadership. Emphasis on responsibilities relating to daily operation of laboratory, including human resource management, financial planning, cost analysis, laboratory design, laboratory information systems, marketing, government regulations and accreditation. PREREQ: MEDT461. RESTRICTIONS: Requires permission of instructor.		
MEDT 413	CLINICAL PHYSIOLOGICAL CHEMISTRY LABORATORY II	2	MEDT 472	CLINICAL URINALYSIS PRACTICUM	1 PF
Laboratory exercises that complement topics covered in MEDT403. COREQ: MEDT403.			Clinical experience in application of laboratory theory and techniques in urinalysis. PREREQ: MEDT400.		
			MEDT 473	CLINICAL CHEMISTRY PRACTICUM	3 PF
			Supervised experience in application of laboratory theory and techniques in clinical chemistry. PREREQ: MEDT403 and MEDT413.		
			MEDT 475	CLINICAL HEMATOLOGY PRACTICUM	3 PF
			Supervised experience in application of laboratory procedures in hematology. PREREQ: MEDT405 and MEDT415.		

MEDT 477 CLINICAL MICROBIOLOGY PRACTICUM 3 PF
Supervised experience in application of laboratory procedures in diagnostic microbiology.
PREREQ: MEDT430 and MEDT431.

MEDT 479 CLINICAL IMMUNOHEMATOLOGY PRACTICUM 3 PF
Supervised experience in application of laboratory procedures in immunohematology.
PREREQ: MEDT420 and MEDT421.

MECHANICAL ENGINEERING

MEEG 101 INTRODUCTION TO MECHANICAL ENGINEERING 3
Introduces the mechanical engineering profession. Uses team design project to illustrate engineering design process. Introduces computational tools.

MEEG 102 INTRODUCTION TO MECHANICAL ENGINEERING LABORATORIES 1
Introduces laboratory techniques and procedures focusing on data acquisition and reporting; also introduces mechanical engineering disciplines.

MEEG 112 STATICS 3
To recognize, idealize and solve problems involving rigid bodies in static equilibrium using scalar and vector techniques. Introduces free body diagrams, friction, center of gravity, moment of inertia. emphasizes the role of statics in the design process.
COREQ: MATH242 and PHYS207.

MEEG 202 COMPUTER-AIDED ENGINEERING DESIGN 3
Introduces computer-aided mechanical engineering design by developing student's ability to 1) think visually, 2) communicate spatial information to engineering audience through parametric solid modeling drafting standards and 3) begin to recognize connection between virtual design and actual component.

MEEG 211 DYNAMICS 3
Intermediate-level development of kinematics and dynamics of particle systems and rigid bodies. Solution of engineering problems by force, momentum and energy methods with applications to mechanisms, machines, and vehicles. Computer problems.
PREREQ: MEEG112.

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

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

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

MEEG 311 VIBRATION AND CONTROL 4
Modeling and simulation of single and multi-degree-of-freedom systems, nonlinear models, linearization, transient and steady state response. Controller designs: root locus, bode plots, PID, digital implementation. Engineering case studies: experiments and demonstrations: Resonant frequency and response and analysis examples.
PREREQ: MEEG211.
RESTRICTIONS: Open to majors only.

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

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

MEEG 332 FLUID MECHANICS II 3
Compressible flows, isentropic flow, shock waves; lift and drag; inviscid flows, potential and stream functions, elementary wing theory; boundary layers; computational fluid dynamics.
PREREQ: MEEG331 and MATH352.
RESTRICTIONS: Open to majors only.

MEEG 342 HEAT TRANSFER 3
Conductive, convective and radiative heat transfer. Finite difference methods for solving transient, multi-dimensional problems numerically. Analysis of fins and heat exchanges.
PREREQ: PHYS310, MATH352, MATH353.
RESTRICTIONS: Open to majors only.

MEEG 344 THERMODYNAMICS 3
Properties of non-ideal gases. Properties of mixtures as applied to humidity and chemical equilibrium. Analysis and computer-aided optimization of air conditioning and combustion systems.
PREREQ: PHYS310 and MATH243.
RESTRICTIONS: Open to majors only.

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

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

MEEG 366 INDEPENDENT STUDY 1-6

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

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

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

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

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

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

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

MEEG 432 AERODYNAMICS 3
Theoretical and computational aerodynamics. Review of fluid mechanics. Airfoils and finite wings in incompressible flow. Panel and vortex-lattice methods. Complex variable techniques. Boundary-layer theory.
PREREQ: MEEG 331.

- MEEG 433 BIOENGINEERING FLUIDS AND TRANSPORT 3**
Anatomy and physiology of pulmonary, cardiac, genitourinary, cerebrospinal and synovial systems. Application of fluid, heat and mass transport fundamentals to analysis of these biological systems.
PREREQ: MEEG332 and MEEG342.
- MEEG 434 AIR POLLUTION PROCESSES 3**
Physical, chemical, and meteorological processes that govern photochemistry and transport of gas-phase and aerosol-phase air pollutants in atmosphere. Topics include air quality, pollutant emissions, gas-phase and liquid-phase chemistry, aerosol dynamics, plumes, turbulent transport in geophysical flows, meteorology, and deposition.
RESTRICTIONS: Requires upper division status in engineering.
- MEEG 435 WIND POWER ENGINEERING 3**
Includes historical overview, energetics of wind power, wind turbine aerodynamics, and basics of related dynamical, structural and electrical aspects of wind power. Class visits nearby wind farm.
PREREQ: MEEG331 or CIEG305, MATH351.
RESTRICTIONS: May be counted towards the MEEG Aerospace Engineering Concentration.
- MEEG 442 INTRODUCTION TO FUEL CELLS 3**
Basic principles of fuel cells, fuel cell types and their applications, fuel processing and hydrogen storage.
PREREQ: MEEG331, MEEG342, MEEG344, or equivalent.
- MEEG 445 SENIOR RESEARCH I 3**
Investigation of experimental nature carried out and reported upon by each student.
RESTRICTIONS: Open to seniors only.
- MEEG 446 SENIOR RESEARCH II 3**
Investigation of experimental nature carried out and reported upon by each student.
RESTRICTIONS: Open to seniors only.
- MEEG 453 MANUFACTURING PROCESSES AND SYSTEMS 3**
Explains key concepts and elements of basic processes (metal cutting, forming, plastic molding, more), technologies (robotics, ergonomics, material handling, quality management, machine vision, more), industries/systems (pharmaceutical, automotive, packaging, food, more) and current advances (lean mfg., just-in-time, more).
PREREQ: MEEG321 or consent of instructor.
- MEEG 466 INDEPENDENT STUDY 1-6**
- MEEG 481 COMPUTER SOLUTION OF ENGINEERING PROBLEMS 3**
Overview of numerical modelings in continuum mechanics. Case studies in fluid and solid mechanics using commercially available software packages. Overview of common features, capabilities and limitations of commercial codes.
- MEEG 482 CLINICAL BIOMECHANICS 3**
Biomechanics and patho-mechanics of various human musculoskeletal joint systems. Normal joint anatomy and biomechanics; mechanical effects of pathology and goals of surgical repairs to counteract them explored through in vitro, in vivo and mathematical modeling studies of joint system mechanics.
- MEEG 483 ORTHOPAEDIC BIOMECHANICS 3**
Anatomy and physiology including microanatomy and mechanics of bone, cartilage, tendon and muscle. Mechanical modeling of body including joint loads, motion analysis, muscle forces and interaction with orthopaedic devices.
PREREQ: PHYS201 or 207.
- MEEG 484 BIOMATERIALS AND TISSUE ENGINEERING 3**
Biomaterials for mechanical replacement of orthopaedic tissues: bone, cartilage, ligament, tendon and whole joint systems. Topics include normal tissue mechanics and biocompatibility, mechanical behavior, degradation and host response to biomaterials. Experimental methods to assess biomaterials along with design and manufacturing considerations for joint and tissue replacements.
- MEEG 485 CONTROL OF HUMAN MOVEMENT 3**
Examines current topics in biomechanics research relevant to control of human movement including anatomy of neuro-musculo-skeletal system, experimental techniques for study of CNS organization, and coordination principles of simple and complex tasks.
PREREQ: PHYS201 or 207, or permission of instructor.
- MEEG 486 CELL AND TISSUE TRANSPORT 3**
Analysis of water, solute, gas, and heat exchange in microcirculation and relationship between structure and function. Transport in biological porous media examined and applied to arterial wall, bone, and cartilage. Active transport across membranes considered and applied to kidney and secretory organs. Introduction to transport across cell membrane and role of receptors in transport, cell adhesion, and intracellular signaling presented.
PREREQ: MEEG331.
- MEEG 610 INTERMEDIATE SOLID MECHANICS 3**
Indicial notation, tensors; displacement, strain, compatibility; traction and stress, equations of motion; constitutive description of an elastic material; solutions to boundary value problems including torsion, bending, plane problems in elasticity (Airy stress function) and elements of linear elastic fracture mechanics.
- MEEG 611 SANDWICH STRUCTURES 3**
Composite and isotropic sandwich structures studied for stresses, deformations, buckling loads, natural frequencies and dynamic response under mechanical and environmental loads, involving honeycomb, solid, foam, web and trusscore sandwich comprising beam, plate, ring and shell structures. Design and minimum weight optimization treated.
- MEEG 612 BIOMECHANICS OF HUMAN MOVEMENT 3**
Mechanics of musculoskeletal system with emphasis on control of human movement. Topics include how nervous system activates muscles, mechanical properties of skeletal muscle and mechanisms for controlling limb movement. Applications include gait analysis, sports biomechanics and hand trajectory formation. Involves computer modeling of musculoskeletal systems.
PREREQ: PHYS201 or 207.
- MEEG 615 MECHANICAL PROPERTIES OF MATERIALS 3**
See MSEG615 for course description.
- MEEG 616 COMPOSITE MATERIALS STRUCTURES 3**
Introduction to composite materials; anisotropic elasticity and laminate theory; plates and panels of composite materials; beams, columns and rods; composite material shell structures; energy methods; strength and failure theories; adhesive bonding and mechanical fastening; hygrothermal effects; stress analysis, buckling, vibrations and impact.
- MEEG 617 COMPOSITE MATERIALS 3**
Fiber and matrix materials, fiber-matrix interface, polymer, metal, ceramic and carbon matrix composites, geometric aspects, elastic properties, lamination theory, strength of unidirectional composites, strength of laminates, durability, hybrid composites, flexible composites and textile structural composites.
- MEEG 618 FRACTURE OF SOLIDS 3**
Introduction to field of fracture mechanics, covering both theoretical approaches and practical applications. Examines fundamentals of linear elastic and elastic-plastic fracture mechanics, and offers short introduction to basic premises and approaches for treatment of dynamic fracture mechanics.
May be cross-listed with MSEG618.
- MEEG 619 MECHANICAL BEHAVIOR OF MATERIALS AND STRUCTURES 3**
Examines how material properties influence structural response and failure mechanisms under influence of external loads. Includes plasticity; thermal stresses; fracture and damage mechanics; and buckling. Problem solving based on both analytical methods and computational mechanics.
May be cross-listed with CIEG619.
PREREQ: MEEG610 or similar.
- MEEG 620 INTERMEDIATE DYNAMICS 3**
Reference frames, angular velocity, linear velocity, angular acceleration, linear acceleration, multibody systems, inertia properties, kinetic energy, equations of motion, generalized d'Alembert's principles, numerical integration, computer simulation.
- MEEG 621 OPTIMIZATION OF DYNAMIC SYSTEMS 3**
Static optimization, numerical methods for static optimization, calculus of variations. Dynamic optimization: basic results, direct solution, indirect solution. Linear systems: finite time optimal control, steady state optimal control, multi-degree-of-freedom mechanical systems.
RESTRICTIONS: Undergraduates require permission of instructor.
- MEEG 623 NONLINEAR DYNAMICS AND CHAOS 3**
Nonlinear dynamics and chaotic phenomenon as applied to natural and engineering systems. Geometric and computational techniques, analytical methods for qualitative analysis of dynamical systems modeled by differential equations and iterated maps. Planar and non-planar phase space analysis, local and global bifurcation analysis, catastrophes, resonances.
PREREQ: MATH351 or equivalent.
- MEEG 624 CONTROL OF DYNAMIC SYSTEMS 3**
Review of modeling and analysis of dynamic systems. Transient and steady-state responses. Introduction to theory of feedback controls and stability for continuous time systems. Control system design studies via root-locus, frequency domain and state space methods. Brief introduction to digital controls.
PREREQ: MEEG211, MEEG311 and MATH352.

- MEEG 630 INTERMEDIATE FLUID MECHANICS 3**
Algebra and analysis of Cartesian Tensors. Descriptions of motion, kinematics. Conservation equations. Constitutive theory, Newton-Stokes fluids. Irrotational flow of an inviscid fluid. Dimensional analysis. Some exact solutions of Navier-Stokes equations. Asymptotic flows: creeping flow, flow in boundary layer. Introduction to turbulent flow. One dimensional compressible flow.
- MEEG 633 BIOENGINEERING FLUIDS AND TRANSPORT 3**
Anatomy and physiology of pulmonary, cardiac, genitourinary, cerebrospinal and synovial systems. Applications of fluid, heat and mass transport fundamentals to analysis of these biological systems.
- MEEG 634 AIR POLLUTION PROCESSES 3**
Physical, chemical, and meteorological processes that govern photochemistry and transport of gas-phase and aerosol-phase air pollutants in atmosphere. Topics include air quality, pollutant emissions, gas-phase and liquid-phase chemistry, aerosol dynamics, plumes, turbulent transport in geophysical flows, meteorology, and deposition.
RESTRICTIONS: Requires graduate standing in engineering.
- MEEG 636 FLUID MECHANICS MEASUREMENTS 3**
Point-wise velocity measurement including differential pressure measurement, hot-wire anemometry, and laser-Doppler anemometry. Global measurement techniques based on particle imaging and digital image processing. Signal processing, statistics and uncertainty analysis.
- MEEG 637 MULTIPHASE FLOW AND TRANSPORT 3**
Principles of multiphase flows with particles, droplets, and bubbles. Local and averaging formulations of interfacial mass, momentum, energy transfers and related transport processes. Applications to industrial and environmental processes.
PREREQ: MEEG630 or permission of instructor.
- MEEG 640 INTERMEDIATE HEAT TRANSFER 3**
Theory and equations of heat conduction, boundary conditions, steady and transient heat conduction, theory of convection, forced convection in laminar flows, derivation of conservation equations, numerical methods.
- MEEG 642 INTRODUCTION TO FUEL CELLS 3**
Basic principles of fuel cells, fuel cell types and their applications, fuel processing and hydrogen storage.
PREREQ: MEEG331, MEEG342, MEEG344.
- MEEG 652 FLOW OF VISCOUS MATERIALS 3**
Applied fluid dynamics with emphasis on flow processes dominated by viscous effects. Flow phenomena in polymeric, ceramic and composite materials. Modeling of flows in processing and manufacturing and its application to design of molds and machinery.
- MEEG 653 MANUFACTURING PROCESSES AND SYSTEMS 3**
Explains key concepts and elements of basic processes (metal cutting, forming, plastic molding, more), technologies (robotics, ergonomics, material handling, quality management, machine vision, more), industries/systems (pharmaceutical, automotive, packaging, food, more) and current advances (lean mfg., just-in-time, more).
PREREQ: MEEG321 or consent of instructor.
- MEEG 655 PRINCIPLES OF COMPOSITES MANUFACTURING 3**
Introduces fundamental principles involved in composites manufacturing. Modeling of such processes emphasized with applications of injection molding, compression molding, filament winding, pultrusion and resin transfer molding.
PREREQ: MEEG332 and MEEG342.
- MEEG 658 METALS AND ALLOYS 3**
Introductory alloy theory: free electron theory, metallic bonding. Alloy structure: solid solutions, ordered and intermetallic phases. Physical metallurgy. Mechanical properties and annealing. Production, applications and structure/property relationships of major engineering alloys, intermetallics, superalloys, metallic glasses.
PREREQ: MSEG302, MEEG321 or equivalent.
- 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: MATH351.
- MEEG 671 INTRODUCTION TO ROBOTICS 3**
Topics include: rigid motions and transformations, forward kinematics, Denavit-Hartenberg representations, inverse kinematics, velocity kinematics, dynamics, independent joint control, multivariable control, force control.
PREREQ: Requires familiarity with kinematics and basic dynamics.
RESTRICTIONS: Recommended for seniors and graduate students.
- MEEG 681 COMPUTER SOLUTIONS OF ENGINEERING PROBLEMS 3**
Overview of numerical modelings in continuum mechanics. Case studies in fluid and solid mechanics using commercially available software packages. Overview of common features, capabilities and limitations of consumer codes.
- MEEG 682 CLINICAL BIOMECHANICS 3**
Biomechanics and patho-mechanics of various human musculoskeletal joint systems. Normal joint anatomy and biomechanics; mechanical effects of pathology and goals of surgical repairs to counteract them explored through in vitro, in vivo and mathematical modeling studies of joint system mechanics.
- MEEG 683 ORTHOPEDIC BIOMECHANICS 3**
Anatomy and physiology including microanatomy and mechanics of bone, cartilage, tendon and muscle. Mechanical modeling of body including joint loads, motion analysis, muscle forces and interaction with orthopedic devices.
PREREQ: MEEG211 and MEEG215.
- MEEG 684 BIOMATERIALS AND TISSUE ENGINEERING 3**
Biomaterials for mechanical replacement of orthopaedic tissues: bone, cartilage, ligament, tendon and whole joint systems. Topics include normal tissue mechanics and biocompatibility, mechanical behavior, degradation and host response to biomaterials. Experimental methods to assess biomaterials along with design and manufacturing considerations for joint and tissue replacements.
- MEEG 685 CONTROL OF HUMAN MOVEMENT 3**
Examines current topics in biomechanics research relevant to control of human movement including anatomy of neuro-musculo-skeletal system, experimental techniques for study of CNS organization, and coordination principles of simple and complex tasks.
PREREQ: PHYS201 or 207, or permission of instructor.
- MEEG 686 CELL AND TISSUE TRANSPORT 3**
Analysis of water, solute, gas, and heat exchange in microcirculation and relationship between structure and function. Transport in biological porous media examined and applied to arterial wall, bone, and cartilage. Active transport across membranes considered and applied to kidney and secretory organs. Introduction to transport across cell membrane and role of receptors in transport, cell adhesion, and intracellular signaling presented.
PREREQ: MEEG331.
- MEEG 690 INTERMEDIATE ENGINEERING MATHEMATICS 3**
Linear algebra: generalized vector space, eigenvalue problem, diagonalization, quadratic forms. Field theory: divergence theorem, Stokes' theorem, irrotational fields. Sturm-Liouville theory, Bessel functions, Legendre polynomials. Partial differential equations: diffusion and Laplace equations by separation of variables and Sturm-Liouville theory, wave equation. Engineering applications.
- MEEG 801 ADVANCED THERMODYNAMICS 3**
Critical examination of thermodynamic principles, equations of state for liquids, gases and mixtures. Interpretation of thermodynamic functions and applications to processes, reactions and equilibrium states.
- MEEG 803 CONVECTION HEAT TRANSFER 3**
Forced convection heat transfer in laminar and turbulent boundary layers including viscous dissipation effects. Forced convection heat transfer in pipes and external boundary layers. Free convection boundary layers.
PREREQ: MATH352.
- MEEG 805 SPECIAL TOPICS IN THERMODYNAMICS 3**
Selection of topics that may include thermodynamics of irreversible processes, statistical mechanics, nonequilibrium statistical mechanics, thermodynamics of materials with memory, etc.
- MEEG 811 SANDWICH STRUCTURES 3**
Composite and isotropic sandwich structures studied for stresses, deformations, buckling loads, natural frequencies and dynamic response under mechanical and environmental loads, involving honeycomb, solid, foam, web and truss core sandwich comprising beam, plate, ring and shell structures. Design and minimum weight optimization are treated.
- MEEG 813 THEORY OF ELASTICITY 3**
Index notation. Concepts of stress and strain. Equations of equilibrium and compatibility and elastic constitutive response. Applications to problems in applied mechanics.
- MEEG 814 THEORY OF PLASTICITY 3**
Experimental foundations. Additional stress and strain relations. Geometric representation of yield criteria. Elasto-plastic flow laws and energy theorems. Incremental solutions, slip line theory and creep.
PREREQ: MEEG610 or MEEG813.
- MEEG 816 ADVANCED CONTINUUM MECHANICS 3**
Rigorous study of kinematics of finite deformation and field equations of mechanics and thermodynamics of continua. Tensor analysis employed throughout.

MEEG 817 COMPOSITE MATERIALS	3	MEEG 868 RESEARCH	1-9
Introduction, thermoelastic behavior of laminated composites, statistical strength theories of continuous-fiber composites, short-fiber composites, hybrid composites, two-dimensional textile structural composites, three-dimensional textile structural composites, flexible composites, and nonlinear elastic finite deformation of flexible composites. May be cross-listed with MSEG817. PREREQ: MEEG610 or MEEG616 or MEEG617.		MEEG 869 MASTER'S THESIS	1-6
MEEG 818 PLATES AND SHELLS IN AEROSPACE STRUCTURES I	3	Experimental investigation conducted for purpose of contributing new useful data and theory in some field of mechanical engineering. Although supervised, investigation independent in character to encourage development of initiative.	
Theory of plates from three-dimensional equations of elasticity. Small deflection analysis of rectangular and circular plates. Thermoelastic effects. Analysis of orthotropic plates, multilayered plates and sandwich panels. Green's functions. Energy methods. Reissner variational theorem for plates of moderate thickness. Large deflections of plates.		MEEG 871 RANDOM VIBRATIONS	3
MEEG 819 PLATES AND SHELLS IN AEROSPACE STRUCTURES II	3	Review of theory of statistics and probability. Introduction to random processes of spectral analysis. Characterization of random excitations and random responses of degree of freedom linear systems with application to engineering structures. Level crossing probability and fatigue damage estimate. Random vibration of nonlinear dynamic systems. Methods for analyzing nonlinear stochastic systems. PREREQ: CIEG311 (for CIEG students), MEEG311 (for MEEG students). Knowledge of MEEG824 is desirable but not required.	
General theory of thin shells from three-dimensional equations of elasticity; shells of revolution under axially symmetric loads; asymmetric loads; thermoelastic effects; general bending theory, membrane theory, inextensional theory; Donnell equations; edge load solutions; orthotropic shells; laminated shells.		MEEG 872 PLANNING AND OPTIMIZATION OF DYNAMIC SYSTEMS	3
MEEG 821 ADVANCED DYNAMICS	3	Overview of cutting edge research methods in planning, control and optimization of dynamic systems that integrate tools from nonlinear systems theory, motion planning and functional optimization. RESTRICTIONS: Permission of instructor required.	
General principles of spatial dynamics. Lagrangian and Hamiltonian methods. Application to engineering problems.		MEEG 873 APPLIED NONLINEAR CONTROL	3
MEEG 823 VIBRATION ANALYSIS	3	Review of analysis of nonlinear dynamic systems. Lyapunov stability theory. Optimal control of nonlinear systems. Feedback linearization. Robust and adaptive sliding mode controls and the backstepping design of sliding mode control. Feedforward control of nonlinear systems. Discussion of current research topics of nonlinear controls and their engineering applications. PREREQ: MEEG824 or equivalent, MEEG690, and permission of instructor.	
Engineering analysis of vibrations of machines and structures. Free, forced and random vibrations with emphasis on linear, multidegree-of-freedom systems by matrix and energy methods. Introduction to the Lagrangian method and normal coordinate analysis of complex systems.		MEEG 881 ADVANCED MUSCULOSKELETAL BIOMECHANICS	3
MEEG 824 STRUCTURAL DYNAMICS AND CONTROL	3	Examines current topics in biomechanics research including musculoskeletal modeling, muscle physiology, anthropometric analysis, biomedical imaging techniques, neural control of movement and/or clinical biomechanics. PREREQ: MEEG612 and MEEG683.	
Reviews vibration analysis of uniform/composite beams, plates and shells. Introduces analysis of structural sound radiation into enclosures and open field. Structural vibration controls and feedback strategies including modal, natural and optimal controls and uniform damping. Reduction of structural sound radiation by adaptive feedforward structural controls. PREREQ: MEEG211, MEEG311 and MATH352.		MEEG 891 ADVANCED ENGINEERING MATHEMATICS	3
MEEG 830 SPECIAL TOPICS IN FLUID MECHANICS	3	Integral transform and Green's Function Solution of Partial Differential Equations, complex variables, variational calculus and introduction to perturbation methods. PREREQ: MEEG690.	
Offered occasionally and with varying subject matter. Topics may include turbulence, plasma kinetic theory, stability, etc.		MEEG 964 PRE-CANDIDACY STUDY	3-12 PF
MEEG 831 FLUID DYNAMICS	3	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.	
Bodies, configurations and motions. Kinematics and basic laws. Constitutive theory, simple fluids, viscometric motion. Differential, rate type and integral models. Navier-Stokes fluids, stability theorems, uniqueness. PREREQ: MATH630, MEEG690, or permission of instructor.		MEEG 969 DOCTORAL DISSERTATION	1-12 PF
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.		<hr/> MANAGEMENT INFORMATION SYSTEMS <hr/>	
MEEG 837 MULTIPHASE FLOW AND TRANSPORT	3	MISY 160 INTRODUCTION TO BUSINESS INFORMATION SYSTEMS I	3
Principles of multiphase flows with particles, droplets, and bubbles. Local and averaging formulations of interfacial mass, momentum, energy transfers and related transport processes. Applications to industrial and environmental processes. PREREQ: MEEG630 or permission of instructor.		Introduction to computers: components and operations. Introduction to management information/decision support systems and the system development process. Emphasis on microcomputers and software packages used in business.	
MEEG 840 SPECIAL TOPICS IN CONTINUUM MECHANICS	3	MISY 225 MODERN BUSINESS COMPUTING	3
Study of advanced principles of continuum mechanics in one or more special fields. Topics selected by instructor. Special subjects may include general theory of constitutive equations, hyperelasticity, electroelasticity, hypoelasticity, simple and nonsimple fluids, and solutions of special problems in these areas.		Use of higher level contemporary computing languages to structure prototyping applications of systems. PREREQ: MISY160 or CISC101.	
MEEG 855 PRINCIPLES OF COMPOSITES MANUFACTURING	3	MISY 261 INTRODUCTION TO BUSINESS INFORMATION SYSTEMS II	3
Fundamental principles and application involving composites manufacturing introduced. Modeling of such processes emphasized and specific project required. Assignments include open-ended problems. Areas of manufacturing include: injection molding, compression molding, filament winding, pultrusion and resin transfer molding.		Introduction to management information systems. Programming techniques for problem solving with business productivity tools and software. Emphasis on business applications. PREREQ: MISY160 or CISC101.	
MEEG 856 NANOCRYSTALLINE AND NANOCOMPOSITE MATERIALS	3	MISY 330 DATABASE DESIGN AND IMPLEMENTATION	3
Covers developments in polymer, ceramic and metal nano systems, current applications, major processing routes, and novel mechanical and physical properties of nanocomposites.		Design and implementation of enterprise databases in business environment. Networked setting and its effect on database management is emphasized. PREREQ: MISY225 or CISC181. RESTRICTIONS: MIS majors and minors only. Not open to computer science majors in the MIS minor.	
MEEG 862 ADVANCED ENGINEERING ANALYSIS	3	MISY 395 GLOBAL ISSUES IN INFORMATION TECHNOLOGY	3
Emphasis on asymptotic and perturbation methods. Topics from among 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.		Explores selected information technology topics facing global organizations. Emphasis on enterprise systems and challenges of managing global systems. Company visits abroad deliver this perspective. RESTRICTIONS: Taught abroad.	

MISY 427 INFORMATION TECHNOLOGY APPLICATIONS IN MANAGEMENT 3

Explores practical applications of information technology in all aspects of management organizational behavior, human resource management, international management and strategic decision making. Issues of managing emerging technologies, integrating technologies with people, organizational culture and structure, and strategic decision making discussed.

PREREQ: BUAD309.

RESTRICTIONS: Open to management majors only.

MISY 430 SYSTEMS ANALYSIS AND IMPLEMENTATION 3

Covers challenges of developing and managing systems analysis and design projects. Determine systems requirements, analyze systems problems, model potential solutions and design and implement these solutions. Other current topics included to reflect changing information systems environment.

PREREQ: MISY225 and MISY330, or CISC181 and CISC437.

RESTRICTIONS: Open to MIS majors and minors only.

MISY 431 TECHNOLOGICAL PROBLEM SOLVING 3

Design and implementation of behavioral and quantitative models to aid decision makers. Requires a project designing and implementing actual decision support system. Emphasis on effective design, implementation and use of existing models of decision support.

PREREQ: MISY430.

COREQ: MISY432.

RESTRICTIONS: Open to MIS majors and minors only.

MISY 432 PROBLEM SOLVING PROJECT MANAGEMENT 3

Capstone in business and economics minor. Emphasis on applying project management concepts to real management information problems.

PREREQ: MISY430.

COREQ: MISY431.

RESTRICTIONS: Open to MIS majors and minors only.

MISY 830 DECISION SUPPORT AND ANALYSIS 3

Considers how to structure and define complex business decision problems, analytical framework and techniques required to understand the problem, where the data needed for the analysis resides in the organization, and the tools and techniques needed to obtain it.

RESTRICTIONS: Preference given to students in M.S. in Information Systems and Technology Management.

MISY 840 PROJECT MANAGEMENT AND COSTING 3

Provides technical knowledge needed to successfully plan, execute and evaluate IT projects. Strong emphasis on costing of IT projects.

RESTRICTIONS: Preference given to students in M.S. in Information Systems and Technology Management.

MISY 850 SECURITY AND CONTROL 3

Considers state-of-the-art technological and organizational approaches to enhancing security and integrity of corporate information resources in a cost-effective manner.

RESTRICTIONS: Preference given to students in M.S. in Information Systems and Technology Management.

MISY 865 SEMINAR 1-12

Taught from an IT perspective. Provides background for understanding information needs of an organization's business processes. Topics include accounting for an IT environment; business processes and operations management; finance; marketing; management; and programming.

RESTRICTIONS: Open only to students in M.S. in Information Systems and Technology Management.

MISY 870 STRATEGIC INFORMATION TECHNOLOGY MANAGEMENT 2

Explores information technologies to enhance strategic goals of the organization. Examines relationship between broad strategic goals and organizational mission, and specific tactical IT responses. Considers strategic importance of ERP, CRM, corporate intelligence, knowledge sharing, etc.

RESTRICTIONS: Preference given to students in M.S. in Information Systems and Technology Management.

MISY 871 HIGH TECHNOLOGY SEMINAR 1

Series of guest speakers on various IT topics.

RESTRICTIONS: Preference given to students in M.S. in Information Systems and Technology Management.

MISY 873 INFORMATION TECHNOLOGY AND ORGANIZATIONAL EFFECTIVENESS 3

Examines how information and communication technologies combine with work processes and organizational structures to enhance organizational performance. Develops skills in recognizing opportunities for technology interventions and in effectively implementing technologically enhanced change.

PREREQ: BUAD870.

MILITARY SCIENCE**MLSC 105 INTRODUCTION TO LEADERSHIP I 1**

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

MLSC 106 INTRODUCTION TO LEADERSHIP II 1

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

MLSC 205 BASIC LEADERSHIP I 1

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

MLSC 206 BASIC LEADERSHIP II 1

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

MLSC 215 LEADER DEVELOPMENT 4

Introductory six week off-campus, hands-on leadership education and assessment course. Real life individual and collective leadership challenges and opportunities. All expenses paid. Multiple scholarship opportunities.

RESTRICTIONS: Permission of instructor required.

MLSC 305 APPLIED LEADERSHIP I 2

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

RESTRICTIONS: Requires permission of instructor.

MLSC 306 APPLIED LEADERSHIP II 2

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

PREREQ: MLSC305.

MLSC 315 LEADER EVALUATION 4

Advanced six week off-campus, hands-on leadership education and assessment course. Real life individual and collective leadership challenges and opportunities. All expenses paid.

PREREQ: MLSC305 and MLSC306.

RESTRICTIONS: Requires permission of instructor.

MLSC 365 MILITARY HISTORY STUDIES 3

Selected topics in American military history, current military trends and future military requirements.

MLSC 366 INDEPENDENT STUDY 1-3**MLSC 405 ADVANCED LEADERSHIP I 2**

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

PREREQ: MLSC306.

MLSC 406 ADVANCED LEADERSHIP II 2

Builds on leadership skills from MLSC405 and helps complete the transition from cadet to Lieutenant. Cadets are assigned new leadership positions to broaden their leadership experience. Focuses on officer professional development subjects needed to manage a military career and personal affairs. Commitment to military service required.

PREREQ: MLSC306.

MLSC 466 INDEPENDENT STUDY 1-3

MATERIALS SCIENCE

- MSEG 302 MATERIALS SCIENCE FOR ENGINEERS** 3
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.
PREREQ: CHEM103 or equivalent and PHYS207 or equivalent.
- MSEG 366 INDEPENDENT STUDY** 1-6
- MSEG 406 CORROSION AND PROTECTION** 3
Degradation of structural materials through interaction with their environment. Electrochemical attack on alloys and its relation to metallurgical structure. Forms of corrosion including high temperature oxidation and biological effects. Corrosion monitoring and deterioration of polymers, concrete and advanced materials. Emphasis on materials selection and corrosion methods.
PREREQ: CHEM103/104 or equivalent, MSEG302 or consent of instructor.
Physical chemistry helpful.
- MSEG 410 EXPERIMENTAL MECHANICS OF COMPOSITE MATERIALS** 3
Study of micromechanical and thermomechanical response of composite materials. Execution and assessment of experiments conducted to investigate strength and stiffness characteristics of composite materials.
May be cross-listed with CIEG410.
- MSEG 420 CAREER SURVIVAL OUTSIDE THE UNIVERSITY** 1
Provides mechanisms to overcome cultural barriers existing between university and industrial cultures. Topics include leadership vs. management, professional and cultural ethics, individual responsibility vs. teamwork, and networking and mentorship in accomplishing career goals. Includes guest speakers from local industries, technical writing and oral communication exercises.
- MSEG 441 NANOMATERIALS AND THIN-FILM PROCESSES** 3
Includes physical and chemical vapor deposition processes. Topics selected from Vacuum Science and Technology, Thin-Film Evaporation Processes, Discharges, Plasmas, Ion-Surface Interactions, Chemical Vapor Deposition, Laser Ablation, Substrate Surfaces and Thin-Film Nucleation, Epitaxy, Film Structure, Characterization of Thin Films and nanostructures, etc.
- MSEG 442 SEMICONDUCTORS FOR MICRO- AND NANO-TECHNOLOGY** 3
Introduction to some main themes of physics of semiconductors, emphasizing unique properties at micro- and nanometer scale. Reviews basic properties of bulk semiconductors and discusses how these properties modify at micro- and nanometer scale. Applications-oriented. Select range of applications in electronics, photonics, biology, chemistry, and medicine discussed to illustrate range of utility of micro- and nano-structures.
RESTRICTIONS: Upper-class undergraduate (at 4xx level) and graduate (at 6xx level) students in materials science and engineering, electrical engineering, and physics.
- MSEG 445 ENTREPRENEURSHIP AND RISK: MEETING THE CHALLENGES** 3
Deals with critical financial, legal, scientific and engineering issues confronted during initial planning stages of high technology start-up enterprise. Range of speakers from finance, marketing, engineering, law and early- and late-stage start-up companies provide perspective on challenges of launching new business venture. Work in cross-disciplinary teams to develop R&D strategic and business plan for new high tech product offering.
- MSEG 446 SENIOR RESEARCH** 1-6
Research general areas of materials science and/or engineering under direction of member of materials science faculty or other faculty in science or engineering subject to approval of materials science chair.
RESTRICTIONS: Open to seniors only. Science background required.
- MSEG 466 INDEPENDENT STUDY** 1-6
- MSEG 601 STRUCTURE AND PROPERTIES OF POLYMER MATERIALS** 3
Measurement and control of microstructure and properties of solid polymers. Structure generation, structure-property models and effects of processing on properties.
May be cross-listed with CHEG601.
PREREQ: MSEG302.
- MSEG 602 STRUCTURE OF MATERIALS** 3
Crystal structure analysis by X-ray and electron diffraction. Characterization of materials by optical microscopy, scanning and transmission electron microscopy, thermal analysis and spectroscopy.
PREREQ: MSEG302.
- MSEG 603 ANALYTICAL TECHNIQUES IN MATERIALS SCIENCE** 3
Laboratory in optical microscopy, X-ray diffraction, scanning and transmission electron microscopy, electron diffraction. X-ray fluorescence and microanalysis. Auger analysis and other spectroscopic techniques.
PREREQ: MSEG302.
COREQ: MSEG602.
- MSEG 604 PHASE TRANSFORMATIONS** 3
Introduction to thermodynamic functions: enthalpy, entropy and free energy. Fick's first and second laws of diffusion. Liquid/solid and solid/solid phase equilibria and transformations. Nucleation and growth. Massive and martensitic transformations. Phase transformations in polymers, ceramics and electronic materials.
PREREQ: MSEG302.
- MSEG 606 CORROSION AND PROTECTION** 3
Degradation of structural materials through interaction with their environment. Electrochemical attack on alloys and its relation to metallurgical structure. Forms of corrosion including high temperature oxidation and biological effects. Corrosion monitoring and deterioration of polymers, concrete and advanced materials. Emphasis on materials selection and corrosion control methods.
PREREQ: CHEM103/104 or equivalent, MSEG302 or consent of instructor.
Physical chemistry helpful.
- MSEG 607 PHYSICAL PROPERTIES OF MATERIALS I** 3
Basic models of electrical, magnetic optical and thermal properties of solid materials. Introduction to quantum physics to describe electronic structure of atoms, atomic bonds and crystals. Electronic, magnetic and optical effects in metals, semiconductors, ceramics, polymers and amorphous materials. Operation of basic electronic devices and semiconductor.
PREREQ: MSEG302 and PHYS208.
- MSEG 610 EXPERIMENTAL MECHANICS OF COMPOSITE MATERIALS** 3
Study of micromechanical and thermomechanical response of composite materials. Execution and assessment of experiments conducted to investigate strength and stiffness characteristics of composite materials.
May be cross-listed with CIEG610.
- MSEG 615 MECHANICAL PROPERTIES OF MATERIALS** 3
Stress, strain, tensor notation and elementary elasticity. Plasticity and ductility based upon continuum mechanics. Ideal strength of crystalline, polymer and amorphous materials. Real materials: amorphous, polymers, ceramics, metals and composites. Dislocations, strengthening of solids. Mechanisms of fracture, fracture mechanics, fatigue, creep and stress rupture.
May be cross-listed with MEEG615.
RESTRICTIONS: Requires graduate status.
- MSEG 616 CHEMISTRY AND PHYSICS OF SURFACES AND INTERFACES** 3
See CHEG616 for course description.
- MSEG 618 FRACTURE OF SOLIDS** 3
See MEEG618 for course description.
- MSEG 620 CAREER SURVIVAL OUTSIDE THE UNIVERSITY** 1
Provides mechanisms to overcome cultural barriers existing between university and industrial cultures. Topics include leadership vs. management, professional and cultural ethics, individual responsibility vs. teamwork, and networking and mentorship in accomplishing career goals. Includes guest speakers from local industries, technical writing and oral communication exercises.
- MSEG 624 PRACTICAL ELECTRON MICROSCOPY** 3
Basic theories and in-depth practical aspects of scanning electron microscopy, transmission electron microscopy, elemental analysis, and sample preparation techniques. Hands-on oriented. For some lab assignments, students can be accommodated to prepare and analyze real samples from their own research.
- MSEG 625 ENTREPRENEURSHIP AND RISK: MEETING THE CHALLENGES** 3
Deals with critical financial, legal, scientific and engineering issues confronted during initial planning stages of high technology start-up enterprise. Range of speakers from finance, marketing, engineering, law and early- and late-stage start-up companies provide perspective on challenges of launching new business venture. Work in cross-disciplinary teams to develop R&D strategic and business plan for new high tech product offering.
- MSEG 630 INTRODUCTION TO SCIENCE AND ENGINEERING OF POLYMER SYSTEMS** 3
Provides understanding of science and engineering of macromolecules from structure/property perspective. Topics include polymerization, chain structure and configuration, polymer size and shape, phase separation behavior, amorphous and crystalline state, glass-rubber transition, cross linking/rubber elasticity, viscoelasticity, rheology polymer processing and mechanical behavior.

- MSEG 632 PRINCIPLES OF POLYMERIZATION** 3
Provides background in theoretical and synthetic considerations of polymer synthesis. Topics include theoretical descriptions of molecular weight distributions, step growth polymerizations, chain growth polymerizations, living polymerizations, as well as chemical strategies for production of various polymers. Specialized topics in current polymer chemistry literature may also be discussed. PREREQ: MSEG630 to be taken as a prerequisite or corequisite.
- MSEG 633 POLYMER SYNTHESIS AND CHARACTERIZATION LABORATORY** 3
Provides direct laboratory experience with synthesis of variety of conventional polymers via step growth, radical, and ionic polymerization methods. Polymers synthesized also characterized via common polymer characterization methods such as IR spectroscopy, gel permeation chromatography, differential scanning calorimetry, and NMR spectroscopy. PREREQ: MSEG632 to be taken as a prerequisite or corequisite.
- MSEG 635 PRINCIPLES TO POLYMER PHYSICS** 3
Chain statistics, thermodynamics, and kinetics discussed in context of modern polymer physics characterization techniques, such as dynamic and static light scattering and elastic/inelastic neutron scattering.
- MSEG 641 NANOMATERIALS AND THIN-FILM PROCESSES** 3
See PHYS641 for course description.
- MSEG 642 SEMICONDUCTORS FOR MICRO- AND NANO-TECHNOLOGY** 3
Introduction to some main themes of physics of semiconductors, emphasizing unique properties at micro- and nanometer scale. Review of basic properties of bulk semiconductors and discuss how these properties modify at micro- and nanometer scale. Applications-oriented. Select range of applications in electronics, photonics, biology, chemistry, and medicine discussed to illustrate range of utility of micro- and nano-structures.
RESTRICTIONS: Upper-class undergraduate (at 4xx level) and graduate (at 6xx level) students in materials science and engineering, electrical engineering, and physics.
- MSEG 666 SPECIAL PROBLEM** 1-12
- MSEG 803 EQUALIBRIA 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. Partial molar properties, non-ideal mixtures. Equilibrium in multi-phase, multi-component systems. Phase Rule.
PREREQ: MSEG302.
- MSEG 804 KINETICS IN MATERIAL SYSTEMS** 3
Theory of reaction kinetics. Transport mechanisms in solids. Nucleation and spinodal decomposition. Interfacial attachment and migration. Transition state theory applied to diffusion and phase transformation. Elementary non-equilibrium thermodynamics and phenomenological equations in material transport and phase transformation.
PREREQ: MSEG302.
- MSEG 806 PHYSICAL PROPERTIES OF SOLIDS** 3
Bonding, structure and growth of crystalline solids, glasses and superlattices. Phonons. Energy bands and band gaps. Photons and photonic properties of solids. Defects in solids and their effects on electrical and optical properties. Carrier generation, transport and recombination. Solids in magnetic fields.
- MSEG 807 PHYSICAL PROPERTIES OF MATERIALS II** 3
Continuation of MSEG607 with emphasis on electrical transport properties of material. Topics include electronic structure and energy band diagrams of semiconductors, metals and insulators; Fermi surfaces; dynamics of electrons; Semiconductor materials and devices; band structure and transport properties of selected semiconductors; band-gap engineering; novel materials systems; electron emission; particularly field emission.
PREREQ: MSEG607.
- MSEG 811 ADVANCED TOPICS IN MATERIALS** 1
Discussion of topic of current interest in science or engineering of materials.
- MSEG 817 COMPOSITE MATERIALS** 3
See MEEG817 for course description.
- MSEG 821 DIFFRACTION OF RADIATION BY MATTER** 3
Theory and analysis of diffraction from ideal and imperfect crystals, gases and liquids, and other atomic aggregations.
- MSEG 823 TRANSMISSION ELECTRON MICROSCOPY IN MATERIALS SCIENCE** 3
Transmission electron microscope, lens defects and resolution. Diffraction and Kikuchi pattern formation and analysis. Image formation: kinematical and dynamical theories of electron diffraction. Burger's vector and other fault analysis. Convergent beam and microdiffraction techniques. High resolution electron microscopy.
May be cross-listed with CHEG823.

- MSEG 866 SPECIAL PROBLEM** 1-12
- MSEG 868 RESEARCH** 1-9
- MSEG 964 PRE-CANDIDACY STUDY** 3-12 PF
Research and readings in preparation of dissertation topic and/or qualifying examinations for doctoral students before admission to candidacy but after completion of all required course work.
RESTRICTIONS: Not open to students who have been admitted to candidacy.
- MSEG 969 DOCTORAL DISSERTATION** 1-12 PF

MUSEUM STUDIES

- MSST 165 INTERNATIONAL DECORATIVE ARTS** 3
Introduction to history of decorative arts in world cultures, ancient times to present. Ornamental and functional arts in metalwork, glass, and ceramics in art historical, cultural, symbolic, and technological contexts. Case studies from Asia, Africa, the Islamic World, Europe, and the Americas.
May be cross-listed with ARTH165.
- MSST 205 SCIENCE AND THE DETECTION OF ART FORGERIES** 3
Concepts from many scientific disciplines are useful for interpreting works of art. Analytical techniques based on those concepts often reveal art forgeries. Case studies will use basic scientific principles to investigate a wide variety of known or alleged art forgeries.
May be cross-listed with ARTH205.
- MSST 215 QUEER SEXUAL IMAGERY IN THE VISUAL ARTS** 3
Introduction to the diversities of representation of the human body in western visual art with an emphasis on coded as well as explicit images of queer sexuality.
May be cross-listed with WOMS215.
- MSST 403 HISTORY, PHILOSOPHY, FUNCTIONS AND FUTURE OF MUSEUMS** 3
Introduction to philosophy, purposes, structure, historical development and future of museums, and botanical and zoological gardens. Examines functions of collection, conservation, research, exhibition/interpretation, and social/cultural services; museum field growth.
May be cross-listed with ARTH403 and/or HIST403.
- MSST 408 PUBLIC HISTORY: RESOURCES, RESEARCH AND PRACTICE** 3
See HIST408 for course description.
- MSST 444 TECHNOLOGY OF CULTURAL MATERIALS: CERAMICS AND GLASS** 3
Nature of raw materials, processing methods, chemistry and structure of finished products, deterioration mechanisms and effects, scientific methods of analysis, and case studies of ancient and historic ceramic and glass objects from the point of view of technology, aesthetics and function. Case studies from a wide variety of cultural traditions.
May be cross-listed with ANTH444 and/or ARTC444.
- MSST 445 TECHNOLOGY OF CULTURAL MATERIALS: METALS** 3
Nature of raw materials, processing methods, chemistry and structure of finished products, deterioration mechanisms and effects, scientific methods of analysis, and case studies of ancient and historic metal objects from the point of view of technology, aesthetics and functions. Case studies from a wide variety of cultural traditions.
May be cross-listed with ANTH445 and/or ARTC445.
- MSST 463 HISTORICAL ARCHEOLOGY AND THE PUBLIC** 3
See ANTH463 for course description.
- MSST 464 MUSEUM STUDIES INTERNSHIP** 3
Internship practicum supplementing theoretical and methodological background in administration, collections management, exhibition, research, interpretation, and public programming and services of museums. Students intern at the University museum or other acceptable museum, related institution or organization in the United States.
PREREQ: MSST403.
- MSST 480 STUDIO IN THE MATERIALS AND TECHNIQUES OF DRAWING IN THE WEST** 3
Lecture-studio presentation on materials and tools, supports and techniques of wet and dry media drawing in the West from about the year 1400 to the present. Topics include the development and manufacture of paper, pens, brushes, inks, watercolor paint, charcoal, metal points, graphite pencils, natural and fabricated chalks, crayons, pastels, erasers and fixatives. Studio reconstructions of masterworks, lectures and library research.
May be cross-listed with ART424, ARTC480 and/or ARTH480.
RESTRICTIONS: Requires permission of instructor.

- MSST 485 COLOR MIXING AND MATCHING 3**
Lecture-studio presentation covering analytical and practical aspects of mixing and matching colorants without instrumentation. Pigments, dyes and the manufacture of paint studied. Major topics include color interaction and the Munsell system of color description.
May be cross-listed with ART426 and/or ARTC485.
RESTRICTIONS: Requires permission of instructor.
- MSST 488 STUDIO MATERIALS AND TECHNIQUES OF PAINTING I 3**
Major masters and the materials, tools, supports and techniques of architectural painting and panel painting in tempera from about 1500 BC to AD 1500. Topics include true fresco and egg tempera painting. Studio reconstructions, lectures and library research.
May be cross-listed with ART427, ARTC488 and/or ARTH488.
RESTRICTIONS: Requires permission of instructor.
- MSST 489 STUDIO MATERIALS AND TECHNIQUES OF PAINTING II 3**
Major masters and the materials, tools and techniques of indirect and direct oil painting. Time frame: 1500 to the present. Major topics include the development of canvas, brushes, oil paint, mediums, varnishes, solvents and the complex relationship between indirect and direct techniques. Includes studio reconstruction of masterworks, lectures and library research.
May be cross-listed with ART428, ARTC489 and/or ARTH489.
RESTRICTIONS: Requires permission of instructor.
- MSST 490 STUDIO IN THE MATERIALS AND TECHNIQUES OF PRINTMAKING I 3**
Major masters and the materials, tools and techniques of relief, planographic and intaglio printmaking. Time frame: ca. 1400-1920. Major topics include woodcut, copperplate engraving, etching, drypoint, aquatint, mezzotint, lithograph and wood engraving. Studio reconstructions, lectures and library research.
May be cross-listed with ART429, ARTC490 and/or ARTH490.
RESTRICTIONS: Requires permission of instructor.
- MSST 606 ISSUES IN AMERICAN MATERIAL CULTURE 3**
See EAMC606 for course description.
RESTRICTIONS: Requires permission of instructor.
- MSST 608 PUBLIC HISTORY: RESOURCES, RESEARCH, AND PRACTICE 3**
See HIST608 for course description.
- MSST 629 THEORY AND PRACTICE OF HISTORICAL PRESERVATION PLANNING 3**
See UAPP629 for course description.
- MSST 644 TECHNOLOGY OF CULTURAL MATERIALS: CERAMICS AND GLASS 3**
Nature of raw materials, processing methods, chemistry and structure of finished products, deterioration mechanisms and effects, scientific methods of analysis, and case studies of ancient and historic ceramic and glass objects from the point of view of technology, aesthetics and function. Case studies from a wide variety of cultural traditions.
May be cross-listed with ANTH644 and/or ARTC644.
- MSST 645 TECHNOLOGY OF CULTURAL MATERIALS: METALS 3**
Nature of raw materials, processing methods, chemistry and structure of finished products, deterioration mechanisms and effects, scientific methods of analysis, and case studies of ancient and historic metal objects from the point of view of technology, aesthetics, and functions. Case studies from a wide variety of cultural traditions.
May be cross-listed with ANTH645 and/or ARTC645.
- MSST 654 VERNACULAR ARCHITECTURE 3**
See HIST654 for course description.
- MSST 663 HISTORICAL ARCHEOLOGY AND THE PUBLIC 3**
See ANTH663 for course description.
- MSST 680 STUDIO IN THE MATERIALS AND TECHNIQUES OF DRAWING IN THE WEST 3**
Lecture-studio presentation on materials and tools, supports and techniques of wet and dry media drawing in the West from about the year 1400 to the present. Topics include: the development and manufacture of paper, pens, brushes, inks, watercolor paint, charcoal, metal points, graphite pencils, natural and fabricated chalks, crayons, pastels, erasers and fixatives. Studio reconstructions of masterworks, lectures and library research.
May be cross-listed with ART682, ARTC680 and/or ARTH680.
RESTRICTIONS: Requires permission of instructor.
- MSST 681 MATERIALS AND TECHNIQUES OF THE CONTEMPORARY PAINTER AND DRAFTSMAN 3**
Twentieth century artists' materials. Topics: acrylic emulsion and acrylic solution alkyd resin, PVA paints: collage-assemblage; solvent-photo transfer; synthetic fiber canvas, paper, panels, oil pastels, paint sticks, felt-tip markers, colored inks and pencils: airbrush spray gun; and non-art materials. Potential health hazards. Conservation topics: pH, lightfastness, adhesion and storage environments.
May be cross-listed with ART681, ARTC681 and/or ARTH681.
- MSST 685 COLOR MIXING AND MATCHING 3**
Lecture-studio presentation covering analytical and practical aspects of mixing and matching colorants without instrumentation. Pigments, dyes and the manufacture of paint studied. Major topics include color interaction, and the Munsell system of color description.
May be cross-listed with ART685 and/or ARTC685.
RESTRICTIONS: Requires permission of instructor.
- MSST 688 STUDIO MATERIALS AND TECHNIQUES OF PAINTING I 3**
Major masters and the materials, tools, supports and techniques of architectural and panel painting in tempera from about 1500 BC to AD 1500. Topics include true fresco and egg tempera painting. Studio reconstructions, lectures and library research.
May be cross-listed with ART688, ARTC688 and/or ARTH688.
RESTRICTIONS: Requires permission of instructor.
- MSST 689 STUDIO MATERIALS AND TECHNIQUES OF PAINTING II 3**
Major masters and the materials, tools and techniques of indirect and direct oil painting. Time frame: 1500 to the present. Topics include the development of canvas, brushes, oil paint, mediums, varnishes, solvents and the complex relationship between indirect and direct techniques. Includes studio reconstruction of masterworks, lectures and library research.
May be cross-listed with ART689, ARTC689 and/or ARTH689.
RESTRICTIONS: Requires permission of instructor.
- MSST 690 STUDIO IN THE MATERIALS AND TECHNIQUES OF PRINTMAKING I 3**
Major masters and the materials, tools, and techniques of relief, planographic and intaglio printmaking. Time frame: ca. 1400-1920. Major topics include woodcut, copperplate engraving, etching, drypoint, aquatint, mezzotint, lithograph and wood engraving. Studio reconstructions, lectures and library research.
May be cross-listed with ART690, ARTC690 and/or ARTH690.
RESTRICTIONS: Requires permission of instructor.
- MSST 801 MUSEUM CURATORSHIP: COLLECTIONS MANAGEMENT 3**
Collections management theory and practices that focus on the administration, handling, physical care, recording and study of museum collections. Combines classroom instruction, demonstrations and field trips with "hands on" projects in the University Gallery and other area museums.
RESTRICTIONS: Open to graduate students only.
- MSST 803 MUSEUMS AND MODERN TECHNOLOGY 3**
Examines the use of digital technology in museums. Topics include communication strategies, digital image processing, collections databases, geographic information systems, CAD, animation, exhibitions, and web design. Students will plan and prepare a web site that deals with a museum-related topic.
- MSST 804 MUSEUM INTERNSHIP 3**
Internship practice in administration, collections management, exhibition and interpretation at museums and related institutions. Students spend ten full weeks, or the equivalent, at the University museum, Winterthur Museum, Hagley Museum, Longwood Gardens or other acceptable institution.
May be 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
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.

MUSIC EDUCATION

MUED 179 FRESHMAN SEMINAR IN MUSIC EDUCATION 1
Introduction to issues and approaches in music education. Helps students examine their own interests and aptitude for teaching while presenting discussion on current trends in the profession and attributes of successful teachers. Provides guidelines for developing student portfolios.
RESTRICTIONS: Offered fall semester only. Restricted to music education majors.

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.
PREREQ: MUED179 with a grade of C- or better.
RESTRICTIONS: Restricted to music education majors. Offered in fall semester only.

MUED 336 CHORAL CONDUCTING 2
Specific problems in conducting choral literature. Comparative analysis of works to be conducted.
PREREQ: MUSC335 with a grade of C- or better.
RESTRICTIONS: For vocal music education majors. Offered spring semester only.

MUED 337 INSTRUMENTAL CONDUCTING 2
Specific problems in conducting instrumental literature. Practical application of conducting techniques through supervised conducting of instrumental ensembles.
PREREQ: MUSC335 with a grade of C- or better.
RESTRICTIONS: For instrumental music education majors. Offered spring semester only.

MUED 366 INDEPENDENT STUDY 1-3

MUED 379 MUSIC IN ELEMENTARY AND JUNIOR HIGH (OR MIDDLE) SCHOOL 3
Introduction to music materials and approaches through clinical experiences.
PREREQ: MUED379 with a grade of C- or better, and MUED336 or MUED337 with a grade of C- or better.
COREQ: MUED336 or MUED337, MUSC351 or MUSC352.
RESTRICTIONS: Restricted to music education majors. Offered spring semester only. Students must successfully complete Praxis I Exam prior to enrollment.

MUED 390 MUSIC IN EARLY CHILDHOOD 3
Introduction to early childhood music materials and approaches through lecture and clinical experiences.
RESTRICTIONS: For child development and elementary education majors. Must be taken prior to student teaching. Offered in fall and spring semesters.

MUED 391 AESTHETICS AND EDUCATION 3
Exploration of philosophical basis in performing and visual arts in education and strategies for their integration into core curriculum subjects. Satisfies Fine Arts requirement for Elementary Education majors.

MUED 479 SECONDARY MUSIC MATERIALS AND APPROACHES 3
Procedures and materials used for teaching music in the secondary school.
PREREQ: MUED379 with a grade of C- or better, and MUED336 or MUED337 with a grade of C- or better.
RESTRICTIONS: Restricted to music education majors. Offered in fall semester only.

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: Requires permission of instructor.

MUSIC

MUSC 100 RECITAL ATTENDANCE 0 PF
Recital experience; see Department of Music Student Handbook for details.
RESTRICTIONS: May be repeated. Open to music majors only. Offered in fall and spring semesters.

MUSC 101 APPRECIATION OF MUSIC 3
Introduction to Western music literature through non-technical presentation of various musical styles and forms.
RESTRICTIONS: Open to non-music majors. Offered in fall and spring semesters.

MUSC 102 APPRECIATION OF MUSIC 3
Music literature through non-technical presentation of various musical styles and forms. Continuation of MUSC101 with emphasis on larger forms - symphonies, operas, oratorios, concertos - and the twentieth century.
PREREQ: MUSC101 or permission of instructor.

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

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

MUSC 105 FUNDAMENTALS OF MUSIC I 3
Introduction into the elements of music theory including ear training, music reading and harmony with keyboard application.
RESTRICTIONS: Designed for non-music 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.
RESTRICTIONS: Open to non-music majors.

MUSC 107 HISTORY OF ROCK 3
Study of various styles of rock music. Introduction to folk, country, blues, and jazz as predecessors to rock. Intended for the non-music major. No music reading skills required.
May be cross-listed with BAMS107.
RESTRICTIONS: Offered in fall and spring semesters.

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

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

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

MUSC 111 CONCERT CHOIR 0-1
Select ensemble open to all students by permission of professor, as determined by audition. Rehearses and performs exemplary choral repertoire ranging from the Renaissance to works by contemporary composers. Additional emphasis given to fostering healthy vocal production and development of sight singing skills.
PREREQ: Audition/permission of instructor.

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

- MUSC 114 SYMPHONIC BAND 0-1**
Sixty-five to 70 member ensemble that performs standard concert literature as well as new compositions.
RESTRICTIONS: Requires audition. May be repeated for credit. Offered in fall and spring semesters. Students may sign up for 0-credit only if they have reached the 17-credit limit. Music majors and minors must be enrolled for credit in at least one departmentally approved ensemble during each semester of private study.
- MUSC 115 WIND ENSEMBLE 0-1**
Select 45-member group of woodwind, brass and percussion players that performs original band music, chamber music and transcriptions.
RESTRICTIONS: Requires audition and may be repeated for credit. Offered in fall and spring semesters. Students may sign up for 0-credit only if they have reached the 17-credit limit. Music majors and minors must be enrolled for credit in at least one departmentally approved ensemble during each semester of private study.
- MUSC 116 JAZZ ENSEMBLE 0-1**
Study and performance of the diverse styles characteristic of the medium.
RESTRICTIONS: Requires audition. May be repeated for credit. Offered in fall and spring semesters. Students may sign up for 0-credit only if they have reached the 17-credit limit. Music majors and minors must be enrolled for credit in at least one departmentally approved ensemble during each semester of private study.
- MUSC 117 UNIVERSITY ORCHESTRA 0-1**
Plays at least four public programs per year, drawn from music masterworks in all styles and periods from Baroque to Contemporary. Featured are faculty, professional soloists, conductors and collaborations with other University ensembles.
RESTRICTIONS: Requires audition. May be repeated for credit. Offered in fall and spring semesters. Students may sign up for 0-credit only if they have reached the 17-credit limit. Music majors and minors must be enrolled for credit in at least one departmentally approved ensemble during each semester of private study.
- MUSC 118 PERCUSSION ENSEMBLE 0-1**
Study and performance of works for percussion instruments.
RESTRICTIONS: Requires audition. May be repeated for credit. Offered in fall and spring semesters. Students may sign up for 0-credit only if they have reached the 17-credit limit. Music majors and minors must be enrolled for credit in at least one departmentally approved ensemble during each semester of private study.
- MUSC 120 PEP BAND 0-1**
Attends all home basketball games performing a variety of pop, rock and jazz selections. Performs at select games during Winter Session. Attendance at these games is mandatory.
RESTRICTIONS: May be repeated for credit. Offered in spring semester only. Students may sign up for 0-credit only if they have reached the 17-credit limit. Music majors and minors must be enrolled for credit in at least one departmentally approved ensemble during each semester of private study.
- MUSC 123 STEEL BAND 0-1**
Teaches music and theory through rote learning, reading, and improvisation to students with no musical training. Students perform in a traditional Caribbean Steel Drum Band.
RESTRICTIONS: May be repeated for credit. Offered in fall and spring semesters. Students may sign up for 0-credit only if they have reached the 17-credit limit. Music majors and minors must be enrolled for credit in at least one departmentally approved ensemble during each semester of private study.
- MUSC 124 STEEL BAND: ADVANCED ENSEMBLE 0-1**
Traditional Caribbean Steel Drum ensemble. Students rehearse and perform music of the Caribbean tradition.
PREREQ: MUSC123 or permission of instructor.
RESTRICTIONS: Permission of instructor. Students may sign up for 0-credit only if they have reached the 17-credit limit. Music majors and minors must be enrolled for credit in at least one departmentally approved ensemble during each semester of private study.
- MUSC 125 COLLEGIUM MUSICUM 0-1**
Ensemble for the performance of instrumental and vocal music of the Medieval, Renaissance and Early Baroque periods. Size, instrumentation and repertoire for the group varies from semester to semester dependent upon resources at hand, players' skills and other factors.
PREREQ: Audition.
RESTRICTIONS: May be repeated for credit. Offered in fall and spring semesters. Students may sign up for 0-credit only if they have reached the 17-credit limit. Music majors and minors must be enrolled for credit in at least one departmentally approved ensemble during each semester of private study.
- MUSC 150 FRESHMAN HONORS PRIVATE STUDY 1**
Private study for qualified freshman honors students. Student adds to the course title the branch of study elected: piano, organ, voice, or an orchestral instrument. Includes a one-hour studio class.
PREREQ: Requires audition.
RESTRICTIONS: Restricted to freshman honors students only. May be repeated for credit. Offered in fall and spring semesters.
- MUSC 151 PRIVATE STUDY FOR BACHELOR OF MUSIC I 2**
Private study for freshman Bachelor of Music students. Student adds to the course title the branch of study elected: piano, organ, voice, or an orchestral instrument. Includes a one-hour studio class.
PREREQ: Audition and acceptance into bachelor of music program.
COREQ: One of MUSC108, 109, 110, 113, 114, 115, 116, 117, 118, 321.
RESTRICTIONS: For bachelor of music students only. Offered in fall and spring semesters.
- MUSC 152 PRIVATE STUDY FOR BACHELOR OF MUSIC II 2**
Continuing private study for freshman Bachelor of Music students. Student adds to the course title the branch of study elected: piano, organ, voice, or an orchestral instrument. Includes a one-hour studio class.
PREREQ: MUSC151 with a grade of C- or better.
COREQ: One of MUSC108, 109, 110, 113, 114, 115, 116, 117, 118, 321.
RESTRICTIONS: For bachelor of music students only. Offered in fall and spring semesters.
- MUSC 153 PRIVATE STUDY FOR BACHELOR OF ARTS AND MINORS I 2**
Private study for bachelor of arts (music) students and music minors. Student adds to the course title the branch of study elected: piano, organ, voice, or an orchestral instrument. Includes a one-hour studio class.
PREREQ: Audition and acceptance into bachelor of arts (Music) or music minor.
COREQ: One of MUSC108, 109, 110, 113, 114, 115, 116, 117, 118, 321.
RESTRICTIONS: For bachelor of art and spring semesters.
- MUSC 154 PRIVATE STUDY FOR MUSIC BACHELOR OF ARTS AND MINORS II 2**
Continuing private study for bachelor of arts (music) students and music minors. Student adds to the course title the branch of study elected: piano, organ, voice, or an orchestral instrument. Includes a one-hour studio class.
PREREQ: MUSC153 with a grade of C- or better.
COREQ: One of MUSC108, 109, 110, 113, 114, 115, 116, 117, 118, 321.
RESTRICTIONS: For bachelor of arts (music) students and music minors only. Offered in fall and spring semesters.
- MUSC 155 PRIVATE STUDY FOR SECONDARY AND MERIT I 1**
Private study for music majors pursuing a secondary area, and qualified students not enrolled in a music degree program. Student adds to course title the branch of study elected: piano, organ, voice, or orchestral instrument. Includes a one-hour studio class. May be repeated for credit.
COREQ: One of MUSC108, 109, 110, 113, 114, 115, 116, 117, 118, 321.
RESTRICTIONS: Requires permission of instructor. Offered in fall and spring semesters.
- MUSC 171 DICTION: ENGLISH AND ITALIAN 1**
Study of pronunciation rules for singing in English and Italian. Includes practicum.
RESTRICTIONS: Restricted to applied music-voice majors.
- MUSC 173 CLASS VOICE 1**
Fundamentals and techniques of singing.
RESTRICTIONS: For nonmusic majors.
- MUSC 174 CLASS VOICE: BEGINNING 1**
Fundamentals of singing for the nonvocal music major. Study of basic technique, repertoire and function of vocal mechanism.
PREREQ: Requires one semester of University vocal experience.
RESTRICTIONS: Open to instrumental music education majors only. Offered in spring semester only.
- 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.
RESTRICTIONS: Preference for enrollment given to music majors and minors. Nonmusic majors require permission of instructor.
- MUSC 176 CLASS PIANO: ELEMENTARY II 1**
Continuation of MUSC175. Scale and arpeggio playing, keyboard harmony, repertoire of pieces appropriate to technical ability.
PREREQ: MUSC175 and MUSC195 with grades of C- or better.
RESTRICTIONS: Preference for enrollment given to music majors and minors. Nonmusic majors require permission of instructor.
- MUSC 177 CLASS GUITAR I 1**
Introduction to the fundamentals of guitar technique and note reading for non-music majors. Topics include guitar history, repertoire, scales and exercises with an emphasis on classical as well as folk music. Music Education majors may also find this course particularly useful for classroom teaching.
RESTRICTIONS: Offered in fall and spring semesters.
- MUSC 178 CLASS GUITAR II 1**
Continuation of Class Guitar I with a stronger emphasis on ensemble playing and development of a repertoire.
PREREQ: MUSC177 with a grade of C- or better.
RESTRICTIONS: Offered in spring semester only.

- MUSC 179 ORGAN CLASS** 1
Students learn basic techniques needed to play the organ. Students apply these skills in a class setting, focusing on introductory organ literature and hymn playing.
RESTRICTIONS: Requires permission of instructor.
- MUSC 181 PRIVATE STUDY FOR APPLIED JAZZ STYLES AND TECHNIQUES** 2
Private studio instruction covering improvisational techniques and interpretation used in jazz performance. Examines a cross-section of styles and repertoire.
RESTRICTIONS: Requires audition and permission of instructor. Offered in fall and spring semesters.
- MUSC 182 PRIVATE STUDY FOR APPLIED JAZZ STYLES AND TECHNIQUES** 2
Private studio instruction covering improvisational techniques and interpretation used in jazz performance. Examines a cross-section of styles and repertoire.
PREREQ: MUSC181 with a grade of C- or better.
RESTRICTIONS: Requires audition and permission of instructor. Offered in fall and spring semesters.
- 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: Must pass department musicality test. Offered in fall and winter semesters.
- 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 with grades of C- or better.
COREQ: MUSC196.
RESTRICTIONS: Open to music majors and minors only. Offered in spring semester.
- 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. Offered in fall and spring semesters.
- MUSC 194 SIGHT READING AT THE KEYBOARD II** 1
Continuation of MUSC193.
PREREQ: MUSC193 with a grade of C- or better.
RESTRICTIONS: For keyboard majors. Offered in fall and spring semesters.
- MUSC 195 HARMONY I** 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: Must pass department Musicality Test. Offered in fall and winter semesters.
- MUSC 196 HARMONY II** 3
Continuation of harmony: diatonic through chromatic harmony with keyboard application. Chord structures and functional relationships. Basic melodic and contrapuntal compositional techniques. Writing, playing and analysis.
PREREQ: MUSC185 and MUSC195 with grades of C- or better.
COREQ: MUSC186.
RESTRICTIONS: Open to music majors and minors only. Offered in spring semester.
- 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 with a grade of C- or better.
RESTRICTIONS: Offered in odd numbered years, fall semesters only.
- MUSC 205 MUSIC OF THE 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.
- MUSC 206 MUSIC OF CHINA, KOREA AND JAPAN** 3
Systematically examines origin and historical development of musical cultures of the Far East. Studies how musical and cultural influence of Chinese musical culture has had an enormous impact on 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 nineteenth century to the present. Emphasis on the sociological, economic and technological influences of the period and on the principal personalities who have been primarily responsible for change.
May be cross-listed with BAMS207.
PREREQ: MUSC105 with a C- or better.
RESTRICTIONS: Offered in spring semester only.
- MUSC 209 HISTORY OF SPANISH MUSIC** 3
Covers the most outstanding traditions of Spanish music, including Arab-influenced Andalusian music, thirteenth century music, schools of the "Renacimiento", seventeenth century court music, the "Zarzuela", nineteenth century Nationalism, and the most modern tendencies of the twentieth century.
RESTRICTIONS: Taught abroad only.
- MUSC 210 MUSIC OF BRITAIN** 3
Chronological study of music of Britain with emphasis on English music from 1485 to present. Explores music for various media (including choral, instrumental, opera) and principal British composers, relating the development of musical styles to events in British history. When taught as part of UD London Semester, will include attendance at variety of London performances.
RESTRICTIONS: Requires permission of instructor.
- MUSC 211 INTRODUCTION TO MUSIC HISTORY** 3
Survey of selected works in music history with emphasis on selected basic terminology, forms and style changes, through score reading and listening.
PREREQ: MUSC195 with a grade of C- or better.
RESTRICTIONS: Offered in fall semester only.
- MUSC 212 HISTORY OF LITURGY AND HYMNS** 3
Study of the evolution, structure and content of historical liturgies and of the hymnody which developed within them. Includes an examination of Jewish and Eastern elements while focusing on the texts and music of the services and hymns of various traditions within the Western Church.
- MUSC 213 FRENCH MUSICAL CULTURE** 3
Explores the contributions of French culture to the history of Western Music. Special focus on major trends in music written and performed in Paris from the Middle Ages through the twentieth century, and on the musical institutions that made Paris a world capital of music.
RESTRICTIONS: Taught abroad only.
- MUSC 214 STRINGED INSTRUMENTS CLASS: VIOLIN, VIOLA, CELLO, BASS** 1
Development of performing and teaching skills.
RESTRICTIONS: Open only to music education and theory/composition majors. Offered in fall semester.
- MUSC 215 HIGH BRASS INSTRUMENTS CLASS** 1
Development of performing and teaching skills.
RESTRICTIONS: MUSC215 and MUSC216 to be taken consecutively in one academic year. Open only to sophomore music education and theory/composition majors. Offered in fall semester.
- MUSC 216 LOW BRASS INSTRUMENTS CLASS** 1
Development of performing and teaching skills.
PREREQ: MUSC215 with a grade of C- or better.
RESTRICTIONS: MUSC215 and MUSC216 to be taken consecutively in one academic year. Open only to sophomore music education and theory/composition majors. Offered in spring semester.
- MUSC 217 WOODWIND INSTRUMENTS CLASS I** 1
Development of performing and teaching skills.
RESTRICTIONS: MUSC217 and MUSC218 to be taken consecutively in one academic year. Open only to freshmen music education and theory/composition majors. Offered in fall semester.
- MUSC 218 WOODWIND INSTRUMENTS CLASS II** 1
Development of performing and teaching skills.
PREREQ: MUSC217 with a grade of C- or better.
RESTRICTIONS: MUSC217 and MUSC218 to be taken consecutively in one academic year. Open only to freshmen music education and theory/composition majors. Offered in spring semester.
- MUSC 219 PERCUSSION INSTRUMENTS** 1
Development of performing and teaching skills.
RESTRICTIONS: Open only to music education and theory/composition majors. Offered in spring semester.
- MUSC 220 MARCHING BAND TECHNIQUES** 1
Focuses on designing and charting a show of the complete contemporary marching band. Overview of history and development of the marching band, as well as "hands-on" sessions in marching percussion and color guard.
PREREQ: MUSC113 with a grade of C- or better.
RESTRICTIONS: Offered spring semester only.
- MUSC 221 MARCHING PERCUSSION TECHNIQUES** 1
Focuses on advancing skills on the marching snare drum, multi-tenors, bass drum, cymbals or front ensemble. Emphasizes techniques through an opportunity to learn basic arranging skills. Open to students of all skill levels.
RESTRICTIONS: Offered spring semester only.

- MUSC 241 ACCOMPANYING CHAMBER MUSIC: PIANO 1**
Accompanying vocalists and instrumentalists in the performance of chamber music with keyboard.
PREREQ: Sight-Reading Placement Test.
RESTRICTIONS: Requires permission of instructor. Offered fall and spring semesters. May be repeated 4 times for credit.
- MUSC 251 PRIVATE STUDY FOR BACHELOR OF MUSIC III 2**
Continuing private study for sophomore bachelor of music students. Student adds to the course title the branch of study elected: piano, organ, voice, or an orchestral instrument. Includes a one-hour studio class.
PREREQ: MUSC152 with a grade of C- or better.
COREQ: One of MUSC108, 109, 110, 113, 114, 115, 116, 117, 118, 321.
RESTRICTIONS: For bachelor of music students only. Offered fall and spring semesters.
- MUSC 252 PRIVATE STUDY FOR BACHELOR OF MUSIC IV 2**
Continuing private study for sophomore bachelor of music students. Student adds to the course title the branch of study elected: piano, organ, voice, or an orchestral instrument. Includes a one-hour studio class. In lieu of a jury, Student performs a Sophomore Review which must be passed in order to continue on to Junior-level private study (see student handbook for details).
PREREQ: MUSC251 with a grade of C- or better.
COREQ: One of MUSC108, 109, 110, 113, 114, 115, 116, 117, 118, 321.
RESTRICTIONS: For bachelor of music students only. Offered fall and spring semesters.
- MUSC 253 PRIVATE STUDY FOR BACHELOR OF ARTS AND MINORS III 2**
Continuing private study for bachelor of arts (music) students and music minors. Student adds to the course title the branch of study elected: piano, organ, voice, or an orchestral instrument. Includes a one-hour studio class.
PREREQ: MUSC154 with a grade of C- or better.
COREQ: One of MUSC108, 109, 110, 113, 114, 115, 116, 117, 118, 321.
RESTRICTIONS: For bachelor of arts (music) students and music minors only. Offered fall and spring semesters.
- MUSC 254 PRIVATE STUDY FOR MUSIC BACHELOR OF ARTS AND MINORS IV 2**
Continuing private study for bachelor of arts (music) students and music minors. Student adds to the course title the branch of study elected: piano, organ, voice, or an orchestral instrument. Includes a one-hour studio class.
PREREQ: MUSC253 with a grade of C- or better.
COREQ: One of MUSC108, 109, 110, 113, 114, 115, 116, 117, 118, 321.
RESTRICTIONS: For bachelor of arts (music) students and music minors only. Offered fall and spring semesters only.
- MUSC 271 DICTION: GERMAN 1**
Study of pronunciation rules for singing in German. Includes practicum.
COREQ: Enrollment in applied study.
PREREQ: MUSC171 with a grade of C- or better.
RESTRICTIONS: Offered fall semester only.
- MUSC 272 DICTION: FRENCH 1**
Study of pronunciation rules for singing in French. Includes practicum.
COREQ: Enrollment in applied study.
PREREQ: MUSC171 with a grade of C- or better.
RESTRICTIONS: Offered spring semester only.
- MUSC 275 CLASS PIANO: INTERMEDIATE I 1**
Piano techniques applicable to the levels and needs of Students; a continuation of reading and transposition; and improvisation and repertory of grade two pieces.
PREREQ: MUSC176 and MUSC196 with grades of C- or better.
RESTRICTIONS: Restricted to bachelor of music majors, or permission of instructor. Offered in fall semester.
- MUSC 276 CLASS PIANO: INTERMEDIATE II 1**
Continuation of MUSC275.
PREREQ: MUSC275 with a grade of C- or higher.
RESTRICTIONS: Restricted to bachelor of music majors and music minors, or permission of instructor. Offered in spring semester.
- MUSC 279 INTRODUCTION TO THE ORGAN 2**
Designed to provide information about the organ: its history, use and literature as well as tonal and mechanical aspects of its design.
- MUSC 281 PRIVATE STUDY FOR APPLIED JAZZ STYLES AND TECHNIQUES I 2**
Private studio instruction covering improvisational techniques and interpretation used in jazz performance. Examines a cross-section of styles and repertoire.
PREREQ: MUSC182 with a grade of C- or better.
RESTRICTIONS: Requires permission of instructor. Offered fall and spring semesters.
- MUSC 282 PRIVATE STUDY FOR APPLIED JAZZ STYLES AND TECHNIQUES II 2**
Private studio instruction covering improvisational techniques and interpretations used in jazz performance. Examines a cross-section of styles and repertoire.
PREREQ: MUSC281 with a grade of C- or better.
RESTRICTIONS: Requires permission of instructor. Offered fall and spring semesters.
- MUSC 283 PRIVATE STUDY FOR APPLIED JAZZ STYLES AND TECHNIQUES III 2**
Private studio instruction covering improvisational techniques and interpretations used in jazz performance. Examines a cross-section of styles and repertoire.
PREREQ: MUSC282 with a grade of C- or better.
RESTRICTIONS: Requires permission of instructor. Offered fall and spring semesters.
- MUSC 285 ADVANCED EAR TRAINING AND SIGHT SINGING I 2**
Continuation of MUSC185 and MUSC186.
PREREQ: MUSC186 and MUSC196 with grades of C- or better.
COREQ: MUSC295.
RESTRICTIONS: Open to music majors and music minors, or by permission of instructor. Offered in fall semester only.
- MUSC 286 ADVANCED EAR TRAINING AND SIGHT SINGING II 2**
Continuation of MUSC185, MUSC186 and MUSC285.
PREREQ: MUSC285 and MUSC295 with grades of C- or better.
COREQ: MUSC296.
RESTRICTIONS: Open to music majors and music minors, or by permission of instructor. Offered in spring semester only.
- MUSC 287 MUSIC TECHNOLOGY I 3**
Overview and experience with commercially-available music-related hardware and software. Hardware includes IBM and Macintosh microcomputers, electronic keyboards and tone generators incorporating Musical Instrument Digital Interface (MIDI), digital recording systems, CD-ROM and videodisc. Software includes sequencers, notation packages, interactive composers, educational programs and hypermedia applications.
PREREQ: MUSC105 or MUSC195 with a grade of C- or better.
RESTRICTIONS: Offered fall and spring semesters.
- MUSC 291 PRACTICUM IN CHURCH MUSIC 1**
Introduces a variety of skills, techniques and information needed in the practice of church music. Students will learn to apply these skills through in-class experience with various instruments and resources.
- MUSC 292 ORGAN IMPROVISATION AND SERVICE PLAYING 2**
Students learn and apply skills used in improvising at the organ and playing for church services. Basic conducting component is included.
RESTRICTIONS: Offered spring semester only.
- MUSC 295 ADVANCED HARMONY I 3**
Review of chromatic harmony. Study, writing and analysis of eighteenth century counterpoint. Introduction to instrumentation. Introduction to form and analysis. Eighteenth and nineteenth century harmony, techniques and styles. Original compositions.
PREREQ: MUSC186 and MUSC196 with grades of C- or better.
COREQ: MUSC285.
RESTRICTIONS: Open to music majors and music minors, or by permission of instructor. Offered in fall semester only.
- MUSC 296 ADVANCED HARMONY II 3**
Continuation of MUSC295. Study of late nineteenth and 20th century harmony, techniques and styles. Continuation of instrumentation. Original compositions.
PREREQ: MUSC285 and MUSC295 with grades of C- or better.
COREQ: MUSC286.
RESTRICTIONS: Open to music majors and music minors, or by permission of instructor. Offered in spring semester only.
- MUSC 298 BEGINNING MUSIC COMPOSITION 1**
Private study in beginning composition. Creative writing in vocal and instrumental media.
RESTRICTIONS: Open to theory/composition majors only. May be repeated for up to 4 credits. Offered fall and spring semesters.
- MUSC 301 JUNIOR RECITAL 0 PF**
Thirty-minute public recital.
COREQ: MUSC351, 352, 357 or 358.
RESTRICTIONS: Offered in fall and spring semesters.
- MUSC 302 WOMEN IN MUSIC: AN ALTERNATE SURVEY 3**
Survey of women's contributions to Western art music traditions from 12th century to present day through the study of women as composers, performers, patrons, and as the subject of musical expression. Explores cultural systems that have alternately encouraged and suppressed women's creativity. May be cross-listed with WOMS302.
- MUSC 309 PATTERNS OF PATRONAGE 3**
Examines the creation, performance and transmission of music within broader context of the economic, political, social and technological environment. Emphasizes interdependency of musical activity and its patrons, including traditional functions of state, church, civic, mercantile, private; also contemporary interaction with public, private, and third sectors.
RESTRICTIONS: Open to juniors and seniors. Offered spring semester only.

- MUSC 310 CHURCHES AND CATHEDRALS OF LONDON** 3
Study of ecclesiastical architecture of the twelfth-twentieth centuries, noting structure, architectural style and historical role, as well as the way in which music, liturgy and the visual arts unfold within each building.
RESTRICTIONS: Taught in London only.
- MUSC 311 MUSIC HISTORY: 400 THROUGH 1600** 3
History of musical style and theory in the Middle Ages (fifth through fourteenth centuries) and the Renaissance (fifteenth and sixteenth centuries).
PREREQ: MUSC211 with a grade of C- or better, or permission of instructor.
RESTRICTIONS: Offered spring semester only.
- MUSC 312 MUSIC HISTORY: 1600 THROUGH 1827** 3
History of musical style and theory during the Baroque period (1600-1750), and the Classic period through the death of Beethoven (1827).
PREREQ: MUSC211 with a grade of C- or better or permission of instructor.
RESTRICTIONS: Offered fall semester only.
- MUSC 313 MUSIC HISTORY: 1827 TO THE PRESENT** 3
The Romantic era, Impressionism and the twentieth century. Musical thought and style from 1827 to the present.
PREREQ: MUSC211 with a grade of C- or better or permission of instructor.
RESTRICTIONS: Offered spring semester only.
- MUSC 321 ENSEMBLE: INSTRUMENTAL, PIANO, OR VOCAL** 0-1
Performance of chamber literature for instrument, piano or voice.
RESTRICTIONS: May be repeated for credit. Offered fall and spring semesters. Students may sign up for 0-credit only if they have reached the 17-credit limit. Music majors and minors must be enrolled for credit in at least one departmentally approved ensemble during each semester of private study.
- MUSC 328 CHORAL LITERATURE** 2
Study of style, structure and interpretations of representative choral works, including large and small forms composed since 1500.
PREREQ: MUSC211 with a grade of C- or better.
RESTRICTIONS: Offered fall semester only.
- MUSC 335 BASIC CONDUCTING** 2
Principles of conducting and score reading.
PREREQ: MUSC286 and MUSC296 with grades of C- or better.
RESTRICTIONS: Offered fall semester only.
- MUSC 339 VIENNESE COMPOSERS** 3
Selected Viennese composers including Mozart, Beethoven, Schubert and the Strausses. Emphasis on Viennese music. A combination of music history and music appreciation.
RESTRICTIONS: Taught in Semester in Vienna program only.
- MUSC 345 HISTORY OF THEATRE: AMERICAN MUSICAL THEATRE** 3
Musical-dramatic forms of the eighteenth, nineteenth and twentieth centuries in the United States and their impact on the modern musical theatre. Complete works read and compared to a series of criteria that are found in successful modern shows. Comparison of older and current works.
May be cross-listed with THEA345.
RESTRICTIONS: Offered fall semester only.
- MUSC 351 PRIVATE STUDY FOR MUSIC EDUCATION V** 2
Continuing private study for junior music education majors. Student adds to the course title the branch of study elected: piano, organ, voice, or an orchestral instrument. Includes a one-hour studio class.
PREREQ: MUSC252 with a grade of C- or better.
COREQ: One of MUSC108, 109, 110, 113, 114, 115, 116, 117, 118, 321.
RESTRICTIONS: For music education majors only. Offered fall and spring semesters.
- MUSC 352 PRIVATE STUDY FOR MUSIC EDUCATION VI** 2
Continuing private study for junior music education majors. Student adds to the course title the branch of study elected: piano, organ, voice, or an orchestral instrument. Includes a one-hour studio class.
PREREQ: MUSC351 with a grade of C- or better.
COREQ: One of MUSC108, 109, 110, 113, 114, 115, 116, 117, 118, 321.
RESTRICTIONS: For music education majors only. Offered fall and spring semesters.
- MUSC 353 PRIVATE STUDY FOR BACHELOR OF ARTS AND MINORS V** 2
Continuing private study for bachelor of arts (music) students and music minors. Student adds to the course title the branch of study elected: piano, organ, voice, or an orchestral instrument. Includes a one-hour studio class.
PREREQ: MUSC254 with a grade of C- or better and permission of instructor.
COREQ: One of MUSC108, 109, 110, 113, 114, 115, 116, 117, 118, 321.
RESTRICTIONS: For bachelor of arts (music) students and music minors, or permission of instructor. Does not count toward bachelor of arts degree credit. Offered fall and spring semesters.
- MUSC 354 PRIVATE STUDY FOR MUSIC BACHELOR OF ARTS AND MINORS VI** 2
Continuing private study for bachelor of arts (music) students and music minors. Student adds to the course title the branch of study elected: piano, organ, voice, or an orchestral instrument. Includes a one-hour studio class.
PREREQ: MUSC353 with a grade of C- or better, and permission of instructor.
COREQ: One of MUSC108, 109, 110, 113, 114, 115, 116, 117, 118, 321.
RESTRICTIONS: For bachelor of arts (music) students and music minors, or permission of instructor. Does not count toward bachelor of arts degree credit. Offered fall and spring semesters.
- MUSC 357 PRIVATE STUDY FOR APPLIED MUSIC V** 3
Continuing private study for junior applied music majors, including preparation for Junior Recital. Student adds to the course title the branch of study elected: piano, organ, voice, or an orchestral instrument. Includes a one-hour studio class.
PREREQ: MUSC252 with a grade of C- or better.
COREQ: One of MUSC108, 109, 110, 113, 114, 115, 116, 117, 118, 321.
RESTRICTIONS: For applied music majors only. Offered in fall and spring semesters.
- MUSC 358 PRIVATE STUDY FOR APPLIED MUSIC VI** 3
Continuing private study for junior applied music majors, including preparation for Junior Recital. Student adds to the course title the branch of study elected: piano, organ, voice, or an orchestral instrument. Includes a one-hour studio class.
PREREQ: MUSC357 with a grade of C- or better.
COREQ: One of MUSC108, 109, 110, 113, 114, 115, 116, 117, 118, 321.
RESTRICTIONS: For applied music majors only. Offered in fall and spring semesters.
- MUSC 363 KEYBOARD LITERATURE** 3
Style, structure and technical performance of keyboard music from the 17th century to the present.
PREREQ: MUSC252 or MUSC254 with a grade of C- or better.
- MUSC 366 INDEPENDENT STUDY** 1-3
- MUSC 387 MUSIC TECHNOLOGY II** 3
Explores intermediate to advanced applications of music technology including professional level implementation of MIDI hardware and software. Topics include multiport interfaces, synchronization, MIDI sequencing and notation techniques, multimedia, and music related Internet services. Additional topics may be examined depending on student experience.
PREREQ: MUSC287 with a grade of C- or better.
- MUSC 389 ELEMENTS OF MUSIC MANAGEMENT** 3
Introduces principles involved in planning and management for performing arts organizations. Includes basic concepts of project development and implementation, production issues for public performances, communication skills and marketing techniques, utilization of new technologies, and aspects of resource planning and advocacy.
RESTRICTIONS: Open to juniors and seniors.
- MUSC 390 HONORS COLLOQUIUM** 3
- MUSC 392 CONTRAPUNTAL WRITING** 2
Contrapuntal techniques with emphasis on sixteenth- and eighteenth-century styles and forms.
PREREQ: MUSC295 with a grade of C- or better.
RESTRICTIONS: Offered in odd numbered years, spring semesters only.
- MUSC 393 KEYBOARD HARMONY** 2
Practical course for the development of facility in applying knowledge of harmony to the keyboard. Emphasis on figured basis, score reading and improvisation.
PREREQ: MUSC296 and 276 with grades of C- or better.
RESTRICTIONS: Requires two years of class or private piano. Offered in even numbered years, spring semesters only.
- MUSC 395 FORM ANALYSIS** 3
Structure of homophonic and polyphonic music representing different periods of musical history.
PREREQ: MUSC296 with a grade of C- or better.
RESTRICTIONS: Offered in even numbered years, spring semesters only.
- MUSC 400 INTERNSHIP IN CHURCH MUSIC** 1-3
Capstone course for Church Music minor providing students with opportunities to gain skills and knowledge through practical application while working under the supervision of professional musicians.
PREREQ: MUSC179, MUSC212, MUSC291 and MUSC292 with grades of C- or better in each.
RESTRICTIONS: Requires permission of instructor.
- MUSC 401 SENIOR RECITAL** 0 PF
Sixty-minute public recital.
COREQ: MUSC457 or MUSC458.
RESTRICTIONS: Requires senior status. Offered in fall and spring semesters.

- MUSC 403 CHAMBER MUSIC LITERATURE** 3
Survey of chamber music literature from the seventeenth century to the present.
PREREQ: MUSC312 with a grade of C- or better.
RESTRICTIONS: Requires permission of instructor. Offered in even numbered years, in spring semesters only.
- MUSC 405 SYMPHONIC LITERATURE** 3
Historical and structural analysis of major symphonic works from the eighteenth century to the present.
PREREQ: MUSC312 with a grade of C- or better.
RESTRICTIONS: Requires permission of instructor. Offered in odd numbered years, in spring semesters only.
- MUSC 407 CONTEMPORARY MUSIC LITERATURE** 3
Analysis of styles and techniques of contemporary composers beginning with compositions of the late 1950s.
PREREQ: MUSC313 with a grade of C- or better, or permission of instructor.
RESTRICTIONS: Offered in fall semester only.
- MUSC 419 MUSIC THEORY RESEARCH** 3
Designed to prepare the music theory major for MUSC421. Student learns how to do research in music theory, does a survey of the literature appropriate to his/her area of interest, and focuses on the thesis to be written while taking MUSC421.
RESTRICTIONS: Permission of Instructor.
- MUSC 420 PRIVATE STUDY FOR ADVANCED COMPOSITION** 3
Creative writing in vocal and instrumental media.
PREREQ: MUSC298 with a grade of C- or better.
RESTRICTIONS: May be repeated for up to six credit hours. Offered in fall and spring semesters.
- MUSC 421 SPECIAL PROJECTS IN MUSIC THEORY** 3
Theory majors do research and study under guidance of a faculty advisor on an approved topic for a formal paper to be presented at a public lecture.
PREREQ: MUSC419 with a grade of C- or better.
RESTRICTIONS: Offered in fall and spring semesters.
- MUSC 426 GERMAN LIEDER** 2
Literature survey of the standard vocal repertoire of the German tradition. Includes examples of the works of such composers as Schubert, Brahms, Schumann, Wolf and Strauss.
PREREQ: MUSC211 with a grade of C- or better.
RESTRICTIONS: Offered every third spring semester, in rotation with MUSC427 and MUSC428.
- MUSC 427 FRENCH ART SONG** 2
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.
PREREQ: MUSC211 with a grade of C- or better.
RESTRICTIONS: Requires junior or senior status. Offered every third spring semester, in rotation with MUSC426 and MUSC428.
- MUSC 428 TWENTIETH CENTURY ART SONG** 2
Literature survey of the standard vocal repertoire of the Twentieth Century. Includes examples of the works of such composers as Barber, Britten, Schonberg, Ives, Vaughan Williams and Rorem.
PREREQ: MUSC211 with a grade of C- or better.
RESTRICTIONS: Offered every third spring semester, in rotation with MUSC426 and MUSC427.
- MUSC 431 ORCHESTRATION** 2
Advanced orchestral and band arranging; review of instrumental ranges and colors; scoring for small ensembles; special problems in scoring accompaniments. Final arrangement performed by a University Ensemble.
PREREQ: MUSC296 with a grade of C- or better.
RESTRICTIONS: Requires permission of instructor. Offered in spring semester only.
- MUSC 441 ACCOMPANYING CHAMBER MUSIC: PIANO** 1
Accompanying vocalists and instrumentalists and experiences with piano, chamber and large ensembles, and degree recitals.
PREREQ: MUSC241 with a grade of C- or better.
RESTRICTIONS: Requires permission of instructor. Offered fall and spring semesters. May be repeated 1 time for credit.
- MUSC 451 PRIVATE STUDY FOR MUSIC EDUCATION VII** 2
Continuing private study for senior music education majors. Student adds to the course title the branch of study elected: piano, organ, voice, or an orchestral instrument. Includes a one-hour studio class.
PREREQ: MUSC352 with a grade of C- or better.
COREQ: One of MUSC108, 109, 110, 113, 114, 115, 116, 117, 118, 321.
RESTRICTIONS: For music education majors only. Offered fall and spring semesters.
- MUSC 452 PRIVATE STUDY FOR MUSIC EDUCATION VIII** 2
Optional continuing private study for senior music education majors. Student adds to the course title the branch of study elected: piano, organ, voice, or an orchestral instrument. Includes a one-hour studio class.
PREREQ: MUSC451 with a grade of C- or better.
COREQ: One of MUSC108, 109, 110, 113, 114, 115, 116, 117, 118, 321.
RESTRICTIONS: For music education majors only by permission of instructor. Offered in fall and spring semesters.
- MUSC 453 PRIVATE STUDY FOR BACHELOR OF ARTS AND MINORS VII** 2
Continuing private study for bachelor of arts (music) students and music minors. Student adds to the course title the branch of study elected: piano, organ, voice, or an orchestral instrument. Includes a one-hour studio class.
PREREQ: MUSC354 with a grade of C- or better and permission of instructor.
COREQ: One of MUSC108, 109, 110, 113, 114, 115, 116, 117, 118, 321.
RESTRICTIONS: For bachelor of arts (music) students and music minors only. Does not count for bachelor of arts degree credit. Offered fall and spring semesters.
- MUSC 454 PRIVATE STUDY FOR MUSIC BACHELOR OF ARTS AND MINORS VIII** 2
Continuing private study for bachelor of arts (music) students and music minors. Student adds to the course title the branch of study elected: piano, organ, voice, or an orchestral instrument. Includes a one-hour studio class.
PREREQ: MUSC453 with a grade of C- or better and permission of instructor.
COREQ: One of MUSC108, 109, 110, 113, 114, 115, 116, 117, 118, 321.
RESTRICTIONS: For bachelor of arts (music) students and music minors only. Does not count for bachelor of arts degree credit. Offered fall and spring semesters.
- MUSC 457 PRIVATE STUDY FOR APPLIED MUSIC VII** 4
Continuing private study for senior applied music majors, including preparation for Senior Recital. Student adds to the course title the branch of study elected: piano, organ, voice, or an orchestral instrument. Includes a one-hour studio class.
PREREQ: MUSC358 with a grade of C- or better.
COREQ: One of MUSC108, 109, 110, 113, 114, 115, 116, 117, 118, 321.
RESTRICTIONS: For applied music majors only. Offered in fall and spring semesters.
- MUSC 458 PRIVATE STUDY FOR APPLIED MUSIC VIII** 4
Continuing private study for senior applied music majors, including preparation for Senior Recital. Student adds to the course title the branch of study elected: piano, organ, voice, or an orchestral instrument. Includes a one-hour studio class.
PREREQ: MUSC457 with a grade of C- or better.
COREQ: One of MUSC108, 109, 110, 113, 114, 115, 116, 117, 118, 321.
RESTRICTIONS: For applied music majors only. Offered in fall and spring semesters.
- MUSC 464 INTERNSHIP** 1-3
Field experience with nonprofit performing arts organizations or commercial music businesses relevant to student's area of interest.
RESTRICTIONS: Open to music management studies majors and minors only. Offered fall and spring semesters.
- MUSC 466 INDEPENDENT STUDY** 1-3
- MUSC 480 VOCAL PEDAGOGY** 3
Designed for those who plan to work with the singing voice. Includes vocal research, comparative pedagogy, observation of teaching and practical teaching experience.
RESTRICTIONS: Offered fall semester only.
- MUSC 481 PEDAGOGY AND LITERATURE** 3
Study of teaching methods and literature (music scores, books, and other media). Shows teaching skills needed at the secondary level and lower.
RESTRICTIONS: Requires permission of instructor.
- MUSC 484 RECORDING TECHNIQUES** 3
Covers three parameters: history of recording and recording technology; recording techniques with hands-on experiences; and aesthetics of recording and its impact on music through the twentieth and twenty-first centuries.
PREREQ: MUSC105.
RESTRICTIONS: Requires permission of instructor.
- MUSC 488 PRINCIPLES OF MUSIC INDUSTRY PRACTICE** 3
Offers an understanding of the fundamental workings of the music industry. Examines theory/practice of core principles, focusing on provisions of copyright law, standard agreements, and professional organization influences. Emphasis on framework for interaction among writers, artists, performers, publishers, record companies, producers.
RESTRICTIONS: Requires permission of instructor.

- MUSC 489 OPERA WORKSHOP 0-3**
Dramatic and musical preparation of operatic roles through the production of a complete opera/operetta.
RESTRICTIONS: Admission by audition, with permission of private instructor, and preference given to vocal performance majors. Offered fall and spring semesters. Students may sign up for 0-credit only if they have reached the 17-credit limit. Music majors and minors must be enrolled for credit in at least one departmentally approved ensemble during each semester of private study.
- MUSC 561 NON-DEGREE PRIVATE STUDY 1-2**
Continuing private study for all music majors. Student adds to the course title the branch of study elected: piano, organ, voice, or an orchestral instrument. Includes a one-hour studio class.
PREREQ: MUSC452, MUSC454, or MUSC458, with C- or better and permission of instructor.
COREQ: One of MUSC108, 109, 110, 113, 114, 115, 116, 117, 118, 321.
RESTRICTIONS: Music majors only. May be repeated for credit.
- MUSC 600 MASTER'S PERFORMANCE IN CONDUCTING 2 PF**
Reflects the culmination of student performances as a conductor with one or more large ensembles in the Department of Music.
PREREQ: MUSC662.
RESTRICTIONS: For students in the Master of Music degree, Performance Concentration (Conducting).
- MUSC 601 MASTER'S RECITAL 2 PF**
Sixty-minute public recital.
COREQ: MUSC663.
- MUSC 602 ADVANCED KEYBOARD LITERATURE 3**
Historical survey of selected keyboard works from various style periods, including structural analysis and performance implications.
RESTRICTIONS: Requires permission of instructor.
- MUSC 603 CHAMBER MUSIC LITERATURE 3**
Survey of chamber music literature from the seventeenth century to the present.
RESTRICTIONS: Requires permission of instructor. Offered in even numbered years, in spring semester only.
- MUSC 604 STRING QUARTET LITERATURE 3**
Survey of music for the string quartet from Haydn through the present day.
RESTRICTIONS: Requires permission of instructor.
- MUSC 605 SYMPHONIC LITERATURE 3**
Historical and structural analysis of major symphonic works from the eighteenth century to the present.
RESTRICTIONS: Requires permission of instructor. Offered in odd numbered years, in spring semester only.
- MUSC 606 WIND LITERATURE 3**
History of the wind band and its music from the Renaissance to the present, with emphasis on the wind music from the nineteenth and twentieth centuries for wind ensemble and concert band. Examines wind literature suitable for secondary school and college-level performing groups.
RESTRICTIONS: Requires permission of instructor.
- MUSC 607 CONTEMPORARY MUSIC LITERATURE 3**
Analysis of styles and techniques of contemporary composers beginning with compositions of the late 1950s.
RESTRICTIONS: Requires permission of instructor. Offered in fall semester only.
- MUSC 608 VOCAL MUSIC LITERATURE 3**
Survey of important literature for solo voice. Area of emphasis varies by year and includes German Lieder, French Art Song, and twentieth century Art Song.
RESTRICTIONS: Requires permission of instructor. May be repeated when topics vary.
- MUSC 609 CHORAL MUSIC LITERATURE I 3**
Study of style, structure and interpretations of representative choral works, including large and small forms composed since 1450. Particular emphasis on current research as related to the use of primary source material as applied to the modern edition.
RESTRICTIONS: Requires permission of instructor.
- MUSC 610 CHORAL MUSIC LITERATURE II 3**
Survey of the development of major choral genres (e.g. mass, motet, requiem) from 1500 to the present. Evolution of musical style and structure examined through analysis and discussion regarding performance practice.
RESTRICTIONS: Requires permission of instructor.
- MUSC 611 STUDIES IN MUSIC HISTORY 3**
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: Offered in spring semester only.
- 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. Offered in fall semester only.
- MUSC 631 ADVANCED ARRANGING 3**
Advanced arranging for chamber, choral and orchestral ensembles, concert band and marching band percussion section.
PREREQ: MUSC296.
RESTRICTIONS: Enrollment by permission of instructor.
- MUSC 637 ADVANCED INSTRUMENTAL CONDUCTING 3**
Advanced conducting techniques for directors of instrumental performing groups.
RESTRICTIONS: Requires permission of instructor.
- MUSC 638 LARGE ENSEMBLE PRACTICUM 1**
Participation in a large ensemble and seminar with ensemble director.
RESTRICTIONS: Requires permission of instructor.
- MUSC 640 HISTORY AND PHILOSOPHY OF MUSIC EDUCATION 3**
Topics include philosophical issues concerning the role of arts in education, intrinsic and extrinsic rationales for music in the schools, and arts advocacy at the local, state, and national levels. Also includes the history and philosophy of music education in the United States from the colonial period to the present.
RESTRICTIONS: Requires permission of instructor.
- MUSC 643 ADVANCED CHAMBER MUSIC PERFORMANCE 1**
In-depth survey of chamber music literature through performance. Emphasis is placed on the development of advanced ensemble skills while exploring music from the Baroque Period through the present day. Open to both majors and non-majors and open to voice, string, piano, and wind players.
- MUSC 661 ADVANCED PRIVATE STUDY 3-4**
Advanced instruction in voice, instrument, composition or conducting. Student adds to course title the branch of study elected: piano, organ, voice or an orchestral instrument, conducting, or composition e.g., Advanced Private Study (Piano).
RESTRICTIONS: Requires audition.
- MUSC 662 ADVANCED PRIVATE STUDY 3-4**
Advanced instruction in voice, instrument, composition or conducting. Student adds to course title the branch of study elected: piano, organ, voice, orchestral instrument, composition or conducting e.g., Advanced Private Study (Piano).
PREREQ: MUSC661.
RESTRICTIONS: Requires permission of instructor.
- MUSC 663 ADVANCED PRIVATE STUDY 3**
Advanced instruction in voice, instrument, composition or conducting. Student adds to course title the branch of study elected: piano, organ, voice, orchestral instrument, composition, or conducting e.g., Advanced Private Study (Piano)
PREREQ: MUSC662.
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**
Study of teaching methods and literature (music scores, books and other media). Shows teaching skills needed at the university level and lower.

MUSC 684	ADVANCED RECORDING TECHNIQUES	3
Covers advanced aspects of the following parameters: history of recording and recording technology; recording techniques with hands-on experiences; and aesthetics of recording and its impact on music through the twentieth and twenty-first centuries. PREREQ: MUSC105. RESTRICTIONS: Enrollment by permission of instructor.		
MUSC 688	ADVANCED PRINCIPLES OF MUSIC INDUSTRY PRACTICE	3
Offers an advanced understanding of the fundamental workings of the music industry. Emphasis on the advanced aspects of the theory/practice of core principles, with a focus on provisions of copyright law, standard agreements, professional organization influences, and the framework for interaction among writers, artists, performers, publishers, record companies, and producers. RESTRICTIONS: Enrollment is by permission of instructor.		
MUSC 695	ADVANCED ANALYTICAL TECHNIQUES	3
Examination of structural, melodic, rhythmic, harmonic and textural aspects of selected music literature and their significance in artistic performance. RESTRICTIONS: Requires satisfactory score on music theory graduate placement exam. Offered in fall semester only.		
MUSC 697	ADVANCED JAZZ HARMONY	3
Study of advanced aspects of melody, harmony, texture, dynamics, rhythm and form in selected jazz and American popular literature; development of advanced aural-perceptual and compositional skills related to jazz and American popular music. RESTRICTIONS: Enrollment by permission of instructor.		
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 competencies required of dietitians and nutritional scientists. Introduces opportunities for undergraduate research. Introduction to concepts of profession and relevant professional organizations. RESTRICTIONS: Open to freshmen and sophomores.		
NTDT 168	FRESHMAN SPECIAL TOPICS	1-6
Freshman level independent study.		
NTDT 200	NUTRITION CONCEPTS	3
Functions and sources of nutrients, dietary adequacy, energy balance and metabolism with emphasis on health promotion. Includes weight control, evaluation of popular diets, vegetarianism, eating disorders, alcohol, other current issues and concerns in nutrition.		
NTDT 201	FOOD CONCEPTS	3
Food selection and preparation as related to chemical and physical properties of food. Includes composition and structure of foods, functions of ingredients and methods to achieve desirable sensory and nutritional attributes of foods. RESTRICTIONS: Open to APN, DIET, and NS majors and minors only.		
NTDT 222	NUTRITION CONTROVERSIES	1
Explores topical issues in nutrition via discussion format. COREQ: NTDT200.		
NTDT 250	INTRODUCTION TO THE NUTRITION CARE PROCESS	3
Introduction to skills and competencies of clinical dietitian based on Nutrition Care Process (assessment, diagnosis, intervention, monitoring, and evaluation). Evidence-based practice promoted with emphasis on state-of-the-science and state-of-the-art of dietetics practice. PREREQ: NTDT200. RESTRICTIONS: Not available for credit to students who have taken NTDT450. Open only to APN, DIET and NS majors.		
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 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 268	SOPHOMORE SPECIAL TOPICS	1-6
Sophomore level independent study.		
NTDT 305	NUTRITION IN THE LIFESPAN	3
Nutrition and health during different stages of life: pregnancy, lactation, infancy, preschool years, middle childhood, adolescence, adulthood and later maturity. PREREQ: NTDT200 and a course in biology.		
NTDT 310	NUTRITION AND ACTIVITY	3
Energy and nutrient needs for activity with emphasis on particular physical and athletic activities; common myths and fallacies concerning diet and athletic performance; and appropriate dietary approaches for specific activities and active people. PREREQ: NTDT200 and a physiology course.		
NTDT 321	QUANTITY FOOD PRODUCTION AND SERVICE	3
Principles of quantity food production and delivery systems; menu planning and purchasing design; safety, sanitation and technical operations in food service system. PREREQ: NTDT200 and NTDT201.		
NTDT 322	MANAGEMENT OF FOOD AND NUTRITION SERVICES	3
Organization and administration of not-for-profit and entrepreneurial services. Functions and responsibilities related to these products including planning, marketing, total quality and human resource management, and food and labor cost accounting. PREREQ: NTDT200 and NTDT201.		
NTDT 326	ONSITE FOOD PRODUCTION	3
Laboratory experience in quantity food production and delivery with emphasis on equipment, production methods, quality standards and controls and environmental issues. Development of food production design considering material flow, functional areas and utility requirements. Food safety certification. COREQ: NTDT321.		
NTDT 328	FOOD SERVICE FACILITY DESIGN	1
Development of quantity food production kitchen design. Considerations include material flow, equipment requirements, functional areas, safety and sanitation, and energy and water resources. PREREQ: NTDT325. COREQ: NTDT321.		
NTDT 330	NUTRITION COUNSELING	3
Theories, skills and techniques of nutrition interviewing and counseling applied to changing food behaviors. PREREQ: NTDT200, NTDT250.		
NTDT 350	NUTRITION AND OLDER ADULTS	3
Discussion of physiology of aging on fundamental nutrition processes, food and nutrient requirements and intakes, assessment of nutritional status, and nutrition related problems of older adults. PREREQ: NTDT200, and BISC106 or BISC276.		
NTDT 366	INDEPENDENT STUDY	1-6 PF
NTDT 368	JUNIOR SPECIAL TOPICS	1-6
Junior level independent study.		
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 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 life cycle. PREREQ: NTDT400.		
NTDT 403	DIETETICS SEMINAR	1 PF
Provides direction for career decisions, including self-assessment, resume development, and interview preparation. Focuses on post-baccalaureate career pathways of employment, graduate study, and supervised practice experience. Explores registration, specialty certification and licensure for dietitians. RESTRICTIONS: Open only to senior dietetics majors.		
NTDT 410	OVERWEIGHT/OBESITY PREVENTION AND MANAGEMENT	3
Pathophysiology and therapies for overweight/obesity. Tools to assess and manage weight. Examination of diet/exercise, pharmacotherapy and surgery as treatment options. Treatment and prevention resources for client education. Review of popular weight loss regimens. Related legislative and policy issues. PREREQ: NTDT200.		
NTDT 420	MATERNAL AND INFANT NUTRITION	3
Maternal physiological adjustments in pregnancy and their relationship to nutritional needs; effect of maternal nutrition on fetal growth and development; physiology of lactation and maternal nutrient needs; and neonatal nutritional needs and current infant feeding practices. PREREQ: NTDT400 and BISC276.		

NTDT 421	NUTRITIONAL ASSESSMENT METHODS	3	Nutritional screening and assessment methods and techniques including evaluation of dietary intake, anthropometric measurements, biochemical tests and clinical assessment. Overview of methodologies involved in nutrition research. PREREQ: NTDT400 and a course in statistics.
NTDT 445	TEACHING METHODS: NUTRITION/FOODS	3	Needs assessment; writing instructional objectives; selecting appropriate methods, materials and resources for audiences varying in age, literacy and ethnicity; planning, implementing and evaluating education programs related to food and nutrition. PREREQ: NTDT200. RESTRICTIONS: Open only to juniors and seniors.
NTDT 450	MEDICAL NUTRITION THERAPY I	3	Roles and responsibilities of clinical dietitians. Healthcare team concepts, regulations and computer applications. Skills required for patients' nutritional management. Diet progressions, dysphasia, adaptive feeding. Pathophysiology, diet/disease relationships and diet therapy for gastrointestinal conditions, obesity, diabetes and cardiovascular disease. PREREQ: NTDT250, NTDT400, BISC276.
NTDT 451	MEDICAL NUTRITION THERAPY II	3	Continuation of Medical Nutrition Therapy I. Pathophysiology, diet and disease relationships and diet therapy for diseases: liver, renal, cancer, AIDS, inborn errors of metabolism. Critical care nutrition, nutritional management of physiological stress and trauma. PREREQ: NTDT250, NTDT400, BISC276.
NTDT 452	TOPICS IN NUTRITION AND DIETETICS	1-3	In-depth analysis of specific topic in area of nutrition and dietetics. RESTRICTIONS: Junior-level NTDT course(s) relating to specific topic required.
NTDT 460	COMMUNITY NUTRITION	3	Nutritional care as part of health maintenance and health care delivery; relationship of community resources, structure and dynamics to 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 nutritional management of clients in community nutrition program. PREREQ: NTDT322. COREQ: NTDT460.
NTDT 466	INDEPENDENT STUDY	1-6 PF	
NTDT 468	SENIOR SPECIAL TOPICS	1-6	Senior level independent study.
NTDT 475	TRANSCULTURAL FOODS AND CUISINE	3-5	Travel study of transcultural food habits: attitudes, beliefs, customs and taboos. Visits to major food industries and health organizations and interaction with indigenous population. PREREQ: NTDT200.
NTDT 550	DIETETICS PRACTICUM I	1-4 PF	Introduces supervised practice experiences for incorporation and application of skills, knowledge, and attitudes with special emphasis on current dietetic issues facing health professional in public health nutrition. COREQ: NTDT650. RESTRICTIONS: Open to dietetic internship students only.
NTDT 551	DIETETICS PRACTICUM II	1-4 PF	Continued supervised practice experiences for incorporation and application of skills, knowledge, and attitudes, focusing on entry-level competence with special emphasis on current dietetic issues facing health professional. PREREQ: NTDT550. COREQ: NTDT651. RESTRICTIONS: Open to dietetic internship students only.
NTDT 611	ADVANCED NUTRITION	3	Metabolism and its relation to human nutrition; current literature; methods and techniques of nutrition research. PREREQ: NTDT400 or NTDT610.
NTDT 615	ADVANCED NUTRITION AND PHYSICAL ACTIVITY	3	Critical analysis of current research on effects of nutrition, food and diet on physical activity and optimal athletic performance. Develops specific topics and interests through independent projects. PREREQ: Undergraduate nutrition and physiology courses.
NTDT 620	MATERNAL AND INFANT NUTRITION	3	Maternal physiological adjustments in pregnancy and their relationship to nutritional needs; effect of maternal nutrition on fetal growth and development; physiology of lactation and maternal nutrient needs; neonatal nutritional needs and current infant feeding practices. PREREQ: NTDT400 and BISC106 or BISC406.
NTDT 621	NUTRITIONAL ASSESSMENT METHODS	3	Nutritional screening and assessment methods and techniques including evaluation of dietary intake, anthropometric measurements, biochemical tests and clinical assessment. Overview of methodologies involved in nutrition research. PREREQ: Upper-division course work in nutrition, biochemistry and physiology.
NTDT 630	TRACE MINERALS AND VITAMINS	3	Recent advances in knowledge of 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 effects of aging on fundamental nutrition processes, food and nutrient requirements, nutrition screening and assessment of nutritional status, nutrition intervention and food assistance programs and nutrition related disorders of older adults. PREREQ: NTDT310 or NTDT400 or NTDT401.
NTDT 645	TEACHING METHODS: NUTRITION/FOODS	3	Needs assessment; writing instructional objectives; selecting appropriate methods, materials and resources for audiences varying in age, literacy and ethnicity; planning, implementing and evaluating education programs related to food and nutrition. PREREQ: NTDT200. RESTRICTIONS: Nonmajors require permission of instructor.
NTDT 650	CURRENT PERSPECTIVES IN DIETETICS I	2	Introduces exploration of roles and responsibilities of today's dietitian in food service management, clinical and community dietetics. Emphasis on concepts relevant to evolving therapies and technologies in profession and issues influencing ethical, legal and professional responsibilities of dietitians.
NTDT 651	CURRENT PERSPECTIVES IN DIETETICS II	2	Continued exploration of roles and responsibilities of today's dietitian in clinical, community and food service management dietetics. Emphasis on concepts relevant to evolving therapies and technologies in profession and issues that influence ethical, legal and professional responsibilities of dietitians.
NTDT 652	TOPICS IN NUTRITION AND DIETETICS	1-3	Analysis of specific topic in area of nutrition and dietetics. RESTRICTIONS: Requires permission of instructor.
NTDT 654	ADVANCED RUMINANT NUTRITION	3	See ANSC654 for course description.
NTDT 660	COMMUNITY NUTRITION	3	Nutritional care as part of health maintenance and health care delivery; relationship of community resources, structure and dynamics to individual's ability to be well fed. Nutritional needs and programs. Nutrition program planning and evaluation; community assessment techniques. RESTRICTIONS: Advanced nutrition course required. Non-majors require instructor permission.
NTDT 665	SEMINAR	1-3 PF	
NTDT 668	RESEARCH	1-6	
NTDT 669	FIELD PROJECT OR THEORETICAL PAPER	1-6	Development, preparation and defense of written report of field project observations or theoretical analysis. RESTRICTIONS: Requires permission of instructor.
NTDT 675	TRANSCULTURAL FOOD HABITS	5	Travel study of transcultural food habits: attitudes, beliefs, customs and taboos. Visits to major food industries and health organizations and interaction with indigenous population. PREREQ: NTDT200. RESTRICTIONS: Only three credit hours may count toward graduation for majors.

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

NTDT 868 RESEARCH 1-6

NTDT 869 MASTER'S THESIS 1-6

NURSING

NURS 100 NEW STUDENT CONNECTIONS 1
 Provides first semester College of Health Sciences students opportunities to explore and become familiar with the college and university. Students acquire information on campus resources and gain practical skills helpful for successful transition to college.
 RESTRICTIONS: Open to nursing majors only.

NURS 101 HUMAN ANATOMY 2
 Introduction to study of human anatomy which provides foundation for future study of human physiology and other related courses. Includes clinically relevant, fundamental overview of human body using a "systems" approach.
 RESTRICTIONS: Open to nursing and health studies majors only.

NURS 110 NURSING CONNECTIONS 1
 Introduction to profession of nursing and basic clinical nursing skills. Includes roles of nursing, historical development and nursing philosophy.
 RESTRICTIONS: Open to nursing majors only.

NURS 200 CLINICAL DECISION MAKING 2
 Introduces and explores nurses' decision making processes including nursing process. Builds upon basic clinical skills with psychomotor, cognitive, and affective skills used by nurses.
 PREREQ: NURS110, ENG110.
 RESTRICTIONS: Open to nursing majors only.

NURS 220 CONCEPTS OF NURSING PRACTICE 3
 Introduction to nursing profession which includes psychomotor, cognitive and affective skills integral to basic nursing practice. Nursing process, professional ethics and basic clinical skills covered.
 PREREQ: Accelerated students: BISC207, NURS101, BISC276, BISC300, CHEM105, CHEM106, IFST201, NTDT200, STAT200 ENGL110, PSYC100.
 COREQ: NURS230, NURS250.
 RESTRICTIONS: Open to accelerated nursing majors only.

NURS 222 PHARMACOLOGY 3
 Focuses on therapeutic and adverse biological, psychological and social reactions to pharmacological agents. Drug use and medication abuse, client teaching, lab data and current research discussed. Nursing responsibilities and clinical applications emphasized.
 PREREQ: Accelerated students: NURS 220, NURS230, NURS250. Traditional students: NURS200.
 COREQ: Traditional students: NURS241 or 242.
 RESTRICTIONS: Open to nursing majors only.

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

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

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

NURS 241 SCIENTIFIC BASIS OF NURSING 3
 Examines pathophysiological concepts as scientific basis of disease processes. Focuses on major body systems, including immune, endocrine, neurological and psychological. Emphasizes concepts of cancer, pain and infection.
 PREREQ: BISC207, CHEM105, CHEM106, NURS101, NURS110.
 COREQ: BISC276 or BISC300.
 RESTRICTIONS: Open to nursing majors only.

NURS 242 SCIENTIFIC BASIS OF NURSING 3
 Examines pathophysiological concepts as scientific basis of disease processes. Focuses on major body systems, including cardiovascular, respiratory, gastrointestinal and renal. Emphasizes concepts of fluids and electrolytes.
 PREREQ: BISC207, CHEM105, CHEM106, NURS101, NURS110.
 COREQ: BISC276 or BISC300.
 RESTRICTIONS: Open to nursing majors only.

NURS 250 HEALTH ASSESSMENT ACROSS THE LIFESPAN 2
 Introduces and develops clinical skills of physical health assessment across lifespan. Field experiences develop physical assessment skills.
 PREREQ: Accelerated students: NURS362, NURS312, BISC207, NURS101, BISC276, BISC300, CHEM105, CHEM106, IFST201, NTDT200, STAT200.
 Traditional students: NURS110, NURS200, PSYC100.
 COREQ: Accelerated students: NURS220, NURS230. Traditional students: BISC276, BISC300 (pre- or co-requisite).
 RESTRICTIONS: Open to nursing majors only.

NURS 312 PATHOPHYSIOLOGY 4
 Focuses on biological processes leading to alterations of body structure and functions. Emphasis on identification of etiology and pathogenesis of selected diseases.
 PREREQ: BISC276, BISC300, IFST201, NTDT200, PSYC100 and STAT200.
 RESTRICTIONS: Open to nursing majors only.

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

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

NURS 350 WELLNESS AND HEALTH ASSESSMENT 3
 Explores selected concepts, theories and skills utilized in health promotion and disease prevention of individuals from socioculturally diverse populations within context of family, community and healthcare systems. Key elements include health history, physical, and psychosocial assessment.
 PREREQ: NURS335, NUR345.
 RESTRICTIONS: Open to BRN majors only. Course sequence alteration requires permission of instructor.

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

NURS 354 PSYCHOSOCIAL NURSING 3
 Presents and examines selected concepts and theories related to restoring and maintaining optimal health of patients experiencing psychopathology. Selected laboratory and field experiences included to enhance concepts.
 PREREQ: All 200 level required nursing courses, BISC276, and BISC300.
 RESTRICTIONS: Open to nursing majors only.

NURS 356 CARE OF CHILDREN AND FAMILIES 3
 Selected concepts and theories related to nursing care of infants, children and adolescents and their families. Selected laboratory and field experiences included to enhance concepts.
 PREREQ: All 200 level required nursing courses, BISC276, and BISC300.
 RESTRICTIONS: Open to nursing majors only.

- NURS 358 WOMEN'S HEALTH NURSING 3**
Selected concepts and theories related to nursing care of childbearing family and major women's health issues. Selected laboratory and field experiences included to enhance concepts.
PREREQ: All 200 level required nursing courses, BISC276, and BISC300.
RESTRICTIONS: Open to nursing majors only.
- NURS 362 RESEARCH CONCEPTS IN HEALTHCARE 3**
Application of research process and research utilization process to healthcare practice.
PREREQ: NURS200 (for traditional students only), STAT200.
COREQ: NURS312 (for accelerated students only).
RESTRICTIONS: Open to nursing and health studies majors only.
- NURS 366 INDEPENDENT STUDY 1-6**
- NURS 372 ADULT HEALTH NURSING 3**
Examines selected concepts and theories related to restoring and maintaining optimal health in adult populations. Focuses on major body systems, including cardiovascular, respiratory, and neurological.
PREREQ: All 200 level required nursing courses, BISC276 and BISC300.
RESTRICTIONS: Open to nursing majors only.
- NURS 382 COMMUNITIES AND HEALTH POLICY 2**
Examines nurse's role in community health and health policy. Major issues affecting healthcare and current political issues examined. Issues of bioterrorism, environment, and occupational health included.
PREREQ: All 200 level required nursing courses, BISC276 and BISC300.
RESTRICTIONS: Open to nursing majors only.
- NURS 390 CLINICAL WORK EXPERIENCES 1-2 PF**
Students receive credit for approved healthcare-related work/volunteer experience. Must work/volunteer in appropriate healthcare-related position and credit given based on hours worked.
PREREQ: NURS200.
RESTRICTIONS: Open to nursing majors only.
- NURS 411 TOPICS IN HEALTHCARE DELIVERY 3**
Consideration of selected issues and problems of nursing practice within healthcare delivery system. Exploration of some topics may include laboratory or clinical component. Variable topics.
RESTRICTIONS: Open to nursing and health studies majors, or by permission of professor. May be repeated for up to six credit hours.
- NURS 412 MULTICULTURAL TOPICS IN HEALTHCARE DELIVERY 3**
Presents cultural consideration of selected issues and problems of nursing practice within global healthcare delivery system. Exploration of some topics may include laboratory or clinical component. Variable topics.
COREQ: NURS362 or permission of instructor.
RESTRICTIONS: Open to nursing and health studies majors, or by permission of professor. May be repeated for up to six credit hours.
- NURS 435 LEADERSHIP AND MANAGEMENT IN HEALTH ORGANIZATIONS 3**
Introduces principles of leadership and management and their application in health systems where nursing care delivered. Focuses on roles of nurse leaders and managers across practice settings.
PREREQ: All 300-level BRN nursing courses.
RESTRICTIONS: Open to BRN majors only. Course sequence alteration requires permission of instructor.
- NURS 442 COMMUNITY HEALTH NURSING 3**
Focuses on conceptual foundations for community health nursing practice with community, family and individual as clients. Diversity in nursing roles and practice related to community health promotion and community health problems.
PREREQ: All 300-level BRN nursing courses.
- NURS 443 BRN ROLE PRACTICUM 3**
Preceptored clinical experience focused upon integration of concepts learned in baccalaureate nursing education.
PREREQ: NURS442.
- NURS 450 SYNTHESIS OF PROFESSIONAL NURSING PRACTICE 1 PF**
Provides opportunities to bring key aspects of professional nursing practice together utilizing a systems framework. Includes student presentation of projects related to NURS443.
PREREQ: All other courses in BRN program.
RESTRICTIONS: Open to BRN majors only. Course sequence alteration requires permission of instructor.
- NURS 453 CLINICAL APPLICATIONS ADULT HEALTH NURSING I 3 PF**
Clinical application of science and nursing theories of care for adult clients in hospitals.
PREREQ: All 300-level required nursing courses.
RESTRICTIONS: Open to nursing majors only.
- NURS 457 CLINICAL APPLICATIONS: MATERNAL CHILD NURSING 3 PF**
Clinical application of science and nursing theories of care for infants, children, adolescents and childbearing families.
PREREQ: All 300-level required nursing courses.
RESTRICTIONS: Open to nursing majors only.
- NURS 459 CLINICAL APPLICATIONS: PSYCHOSOCIAL NURSING 3 PF**
Clinical application of science and nursing theories of care for clients with acute and chronic psychiatric healthcare needs.
PREREQ: All 300-level required nursing courses.
RESTRICTIONS: Open to nursing majors only.
- NURS 460 CLINICAL INTEGRATION SEMINAR I 2**
Using seminar format, students discuss major issues identified in clinical nursing care. Assists in integrating scientific and theoretical knowledge into clinical practice. Focuses on legal and ethical issues, nursing roles, leadership, and nursing licensure issues that arise from clinical experiences.
PREREQ: All 300 level required nursing courses.
COREQ: NURS453, NURS457, NURS459.
RESTRICTIONS: Open to nursing majors only.
- NURS 464 TEACHING ASSISTANTSHIP IN NURSING 1-2 PF**
Allows junior and senior nursing students to develop professional teaching, peer leadership, and communication skills while enhancing their knowledge base in course content.
RESTRICTIONS: Must have a 3.0 GPA, have completed the course for which they TA in good standing, and be available the entire semester. Students must work at least 28 hours throughout semester to receive 1 credit or 56 hours to receive 2 credits.
- NURS 466 INDEPENDENT STUDY 1-6**
- NURS 473 CLINICAL APPLICATIONS: ADULT HEALTH NURSING II 3 PF**
Advanced clinical application of science and nursing theories in acute care health settings. Builds upon clinical practice skills of NURS453.
PREREQ: NURS453.
COREQ: NURS477, NURS479 and NURS480.
RESTRICTIONS: Open to nursing majors only.
- NURS 477 CLINICAL APPLICATIONS: CARE OF POPULATIONS 3 PF**
Clinical application of science and nursing theories in community health settings. Local, national, and global issues are addressed.
PREREQ: NURS453, NURS457, NURS459, NURS460.
COREQ: NURS479, NURS480.
RESTRICTIONS: Open to nursing majors only.
- NURS 479 CLINICAL PRECEPTORSHIP 3 PF**
Clinical application of science and nursing theories in student-selected clinical settings. Provides transition from student-faculty relationships to mentor-new graduate relationships. Students mentored by nurse preceptor.
PREREQ: NURS453, NURS459, NURS460. For accelerated students, NURS473 must precede NURS479.
COREQ: NURS473, NURS477, NURS480.
RESTRICTIONS: Open to nursing majors only.
- NURS 480 CLINICAL INTEGRATION SEMINAR II 2**
Discussion of major issues identified in clinical nursing care. Assists students in integrating scientific and theoretical knowledge into clinical practice. Focuses on legal and ethical issues, nursing roles, leadership, and nursing licensure issues that arise from clinical experiences. Provides transition to new graduate nurse experiences.
PREREQ: NURS460.
COREQ: NURS473, NURS477, NURS479.
RESTRICTIONS: Open to nursing majors only.
- NURS 600 ISSUES IN SCHOOL HEALTH NURSING 3**
Focuses on roles of new school nurse and healthcare needs of school-age children and adolescents. Includes testing/screening, guidance/counseling, health teaching, and skills in school health setting.
PREREQ: Registered nurse.
- NURS 604 ADVANCED PRACTICE ROLES FOR HEALTHCARE PROVIDERS 3**
See HSAD604 for course description.
RESTRICTIONS: Permission required from department.
- NURS 609 NURSING SCIENCE: THEORY AND RESEARCH 4**
Examines science of nursing from theoretical and research perspectives and emphasizes theory as foundation for research and practice.
RESTRICTIONS: Open to majors only. Permission required from department. First clinical course and EDUC655 required as prerequisites or corequisites.

- NURS 610 CROSSCULTURAL HEALTHCARE 3**
In-depth study of cultural diversity, delineating ethnocultural congruent healthcare practices in pluralistic society. Assessment, planning and interventions for health promotion, illness and disease prevention, health restoration and health policy legislation explored.
RESTRICTIONS: Open to only to graduate students or by permission of instructor.
- NURS 612 NURSING INFORMATICS 3**
Addresses current utilization of evolving technologies in nursing/client education, practice, administration and research.
RESTRICTIONS: BSN or bachelor's degree in another discipline, or by permission of instructor.
- NURS 613 DEATH EDUCATION 3**
Focuses on field of death education, its relevance to everyday life and most specifically to professional practice of practitioners providing support to dying and bereaved.
RESTRICTIONS: Admission to BRN major or BSN degree or bachelor's degree in another discipline.
- NURS 616 PRIMARY CARE IN COMMUNITY HEALTH 3**
Focuses on community based primary care issues in relation to individual, family, and community health. Clinical component includes health promotion and disease prevention activities.
RESTRICTIONS: Open to majors only. Permission required from department.
- NURS 617 PRECEPTORSHIP I 3**
Focuses on clinical topics in primary care relevant to each practitioner concentration.
PREREQ: All required clinical courses except NURS627.
RESTRICTIONS: Open to nursing majors only. Permission of department required.
- NURS 619 FINANCIAL MANAGEMENT IN HEALTH SERVICES ORGANIZATIONS 3**
See HSAD619 for course description.
RESTRICTIONS: Permission of department required.
- NURS 620 ADVANCED HEALTH ASSESSMENT 3**
Assists graduate students in acquiring advanced knowledge and proficiency in performing health assessments. Includes eliciting complete health history and performing comprehensive examination.
PREREQ: NURS604 is a pre- or co-requisite.
RESTRICTIONS: Permission of department required.
- NURS 621 ADVANCED PATHOPHYSIOLOGY 3**
Presents pathogenesis of common conditions affecting children and adults as basis for clinical management.
RESTRICTIONS: Permission of department required.
- NURS 622 ADVANCED PHARMACOLOGY 3**
Applies principles of pharmacology to therapeutic management of client. Emphasizes prescribing, monitoring drug regimens, identifying adverse reactions, and anticipating changes inherent in self medication.
RESTRICTIONS: Permission of department required.
- NURS 623 MANAGEMENT OF WOMEN'S HEALTHCARE 3**
Focuses on gynecological and reproductive primary healthcare. Emphasizes management of gynecologic health needs and normal reproductive cycle.
RESTRICTIONS: NURS604 and NURS622 required as either corequisites or prerequisites.
- NURS 624 MANAGEMENT OF CHILDREN'S HEALTH 3**
Focuses on delivery of primary healthcare to children and adolescents. Emphasizes physical and developmental variations and management of acute and episodic illness.
PREREQ: NURS620 and NURS621.
RESTRICTIONS: NURS604 and NURS622 required as prerequisites or corequisites.
- NURS 625 MANAGEMENT OF ADULT EPISODIC HEALTH NEEDS AND PROBLEMS 3**
Focuses on delivery of primary care to adults and elderly with acute episodic health problems. Emphasizes clinical decision making necessary to serve as foundation for planning primary healthcare services.
PREREQ: NURS620 and NURS621.
RESTRICTIONS: NURS604 and NURS622 required as prerequisites or corequisites.
- NURS 626 MANAGEMENT OF ADULT CHRONIC HEALTH NEEDS AND PROBLEMS 3**
Focuses on delivery of primary care to adults and elderly with chronic health problems. Emphasizes management of ongoing needs.
PREREQ: NURS620 and NURS621.
RESTRICTIONS: NURS604 and NURS622 required as prerequisites or corequisites.
- NURS 627 PRECEPTORSHIP II 3**
Emphasizes clinical decision making in interdisciplinary environment with nurse practitioner as principal provider of primary care.
RESTRICTIONS: NURS617 required as either corequisite or prerequisite.
- NURS 635 HEALTH ADMINISTRATION THEORIES 3**
See HSAD635 for course description.
RESTRICTIONS: HSAD604 required as prerequisite or corequisite.
- NURS 636 ADULT HEALTH I 4**
Provides conceptual foundation and practical knowledge base needed to develop essential characteristics of clinical nurse specialist in adult health. Core content characterized around three spheres of influence: patient, families and communities; nursing and healthcare personnel; and organizations and networks; with primary focus on patients, families and communities. Areas of emphasis include assessment skills, therapeutic interventions, education, evidence-based practice and issues and trends in healthcare.
COREQ: NURS604; NURS621.
RESTRICTIONS: Open to clinical nurse specialist students only.
- NURS 637 HEALTH PLANNING STRATEGIES 3**
See HSAD637 for course description.
RESTRICTIONS: HSAD604 required as prerequisite or corequisite.
- NURS 638 HEALTH SERVICES EVALUATION 3**
See HSAD638 for course description.
RESTRICTIONS: HSAD604 required as prerequisite or corequisite.
- NURS 646 ADULT HEALTH II 4**
Provides opportunities to develop advanced skills inherent to clinical nurse specialist role as determined by National Association of Clinical Nurse Specialists. Content organized around three spheres of influence with emphasis on nursing and healthcare personnel and builds upon CNS content in previous courses. Areas of emphasis include leadership, collaboration, citizenship, cost effective care, innovations in practice, and mentorship.
PREREQ: NURS636.
RESTRICTIONS: Open to graduate clinical nurse specialist students only.
- NURS 654 NURSING OF CHILDREN I 4**
Explores scientific basis for routine healthcare guidance required by children and their families. Focuses primarily on acutely ill child.
RESTRICTIONS: NURS604 and NURS621 required as prerequisites or corequisites.
- NURS 655 NURSING OF CHILDREN II 4**
Explores biopsychosocial needs of children with chronic conditions and their families. Emphasizes interventions of advanced practice nurse to assist these children to attain, maintain or regain health.
PREREQ: NURS654.
RESTRICTIONS: Open to matriculated graduate nursing students only.
- NURS 664 NURSING PRACTICUM 1-3**
In conjunction with faculty advisor and based on student's individualized long range goals, student selects preceptor and healthcare setting in which to apply didactic contact in real life settings. Requires 135 hours of on-site experience, which can be taken in one semester or divided over three semesters.
RESTRICTIONS: NURS635, NURS637, or NURS638 is required as a corequisite or prerequisite.
- NURS 671 PSYCHIATRIC MENTAL HEALTH NURSING I 4**
Emphasizes theory and research related to assessment, diagnosis, clinical management and psychopharmacological intervention in mental illness. Didactic and clinical components allow for development of subspecialization.
PREREQ: Graduate psychopathology course.
RESTRICTIONS: Open to matriculated students only.
- NURS 672 PSYCHIATRIC MENTAL HEALTH NURSING II 4**
Focuses on development of two modalities of psychiatric skills and treatment. Core concepts of cognitive and group therapy integrated with specific strategies for behavioral change.
PREREQ: NURS671.
RESTRICTIONS: Open to matriculated graduate nursing students only.
- NURS 686 CLINICAL NURSE SPECIALIST ROLE INTEGRATION 4**
Integration of theories and concepts related to roles of clinical nurse specialist. Emphasizes advanced practice roles within broad context of healthcare.
PREREQ: All required clinical courses.
- NURS 687 NURSING SCIENCE: RESEARCH APPLICATION 3**
Focuses on application of research to nursing practice. Includes critical analysis of research through organized critique process, examination of data, and examination of facilitators and barriers to research/research utilization, models of research utilization, and methods of quality management.
PREREQ: NURS609.
RESTRICTIONS: Open to majors only. Permission required from department.

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

NURS 868 RESEARCH: SCHOLARLY PROJECT 1-3
Investigation of problem in clinical settings related to finance, administration, personnel management, public policy or education, resulting in completion of a scholarly project.

NURS 869 MASTER'S THESIS 1-6

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

OPERATIONS RESEARCH

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

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

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

ORES 603 SIMULATION MODELING AND ANALYSIS 3
Instructors from hard sciences and social sciences introduce real-world operations research case studies based on their expertise. Students implement proposed solution methodologies using variety of available computer software packages.
PREREQ: ORES601 and permission of director/instructor.
COREQ: ORES602.

ORES 615 ADVANCED PRICES AND STATISTICS 3
See FREC615 for course description.

ORES 650 URBAN TRANSPORTATION SYSTEMS 3
See CIEG650 for course description.

ORES 664 OPERATIONS RESEARCH INTERNSHIP 1-6 PF
Supervised, on-the-job experience, performing technical work for clients including OR applications, econometrics and statistical applications.
RESTRICTIONS: Requires permission of instructor.

ORES 690 OPERATIONS RESEARCH SEMINAR 0 PF
Seminars 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 OPTIMIZATION MODELS AND METHODS 3
Models and methods of linear programming, integer programming and non-linear programming. Practical application of simplex method, branch and bound algorithms, and Kuhn-Tucker conditions. Examples from classic operations research literature.
PREREQ: ORES601.

ORES 802 OPERATIONS RESEARCH APPLICATIONS 3
Applications of models and principles of basic interest to 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

PHILOSOPHY

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

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

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

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

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

PHIL 125 TOPICS: PHILOSOPHY IN POPULAR CULTURE 1-4
Philosophical ideas expressed in popular media such as science fiction or fantasy literature, films and music. Topics are variable.
RESTRICTIONS: May be repeated for up to four credit hours.

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

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

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

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

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

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

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

- PHIL 208 INTRODUCTION TO JEWISH PHILOSOPHY 3**
Fundamental issues in philosophy of religion reflecting both general theological approaches to resolving the tension between philosophy and religion and the uniquely Jewish attempt to do so. Topics include: God, miracles, good and evil, divine commandments and free will.
May be cross-listed with JWST208.
- PHIL 209 PHILOSOPHY OF RELIGION 3**
Religious experience, proofs for God's existence, religious language and critiques of religion. Selected special topics such as mysticism, evil, atheism, miracles, immortality and myth.
- PHIL 210 WOMEN AND RELIGION 3**
See WOMS210 for course description.
- PHIL 211 BASIC DECISION THEORY 3**
Rational decision-making using only elementary logic and high-school algebra. Decisions under ignorance: max-min rules for preference orderings. Decisions under risk: probability, utility, and the expected-utility rule. Game theory: equilibrium strategies; prisoner's dilemma. Social choices: voting paradoxes and Arrow's theorem.
- PHIL 216 INTRODUCTION TO FEMINIST THEORY 3**
Concepts of love, marriage, sexuality, family, work, power and equality of women. Theories of women and their position in society, including classical Marxism, the status politics of the suffragettes, radical feminism and socialist feminism.
May be cross-listed with WOMS216.
- PHIL 226 MIND, ESP AND SURVIVAL 3**
Exploration of major philosophical conceptions of the relation of mind (soul) and brain. Implications for the nature of mind from the literature of psychic research and immortality.
- PHIL 241 ETHICAL ISSUES IN HEALTHCARE 3**
Interdisciplinary study of basic ethical thought and its application to contemporary biomedicine in such moral and ethical issues as care for the terminally ill, abortion and experimentation with human subjects.
- PHIL 244 PHILOSOPHY OF ART 3**
Introduction to main philosophic problems concerning art: the nature, evaluation and value of art.
- PHIL 246 PHILOSOPHICAL PERSPECTIVES OF MEDICINE 3**
Ethical and epistemological foundations of medicine; medicine as a way of knowing about the world compared with other ways.
- PHIL 301 ANCIENT PHILOSOPHY 3**
Beginnings of Western science and philosophy. The pre-Socratics, Sophists, Socrates, Plato, Aristotle, the Epicureans, Stoics and Skeptics.
- PHIL 303 MODERN PHILOSOPHY 3**
Skepticism and the birth of Modernity. Bacon and scientific experimentalism; Hobbes materialism, Descartes, Spinoza and Leibniz; Locke, Berkeley, Hume and Kant; and the Age of Enlightenment and its impact on philosophy, science and religion.
- PHIL 304 NINETEENTH CENTURY PHILOSOPHY 3**
Major philosophies of the nineteenth century with special emphasis on Hegel and Nietzsche.
- PHIL 305 TWENTIETH CENTURY PHILOSOPHY 3**
Major philosophical movements from twentieth century to present. Includes logical empiricism and the recent criticism of this movement.
- PHIL 306 PHILOSOPHY OF SCIENCE 3**
Survey of central topics in the philosophy of science which may include the distinction between science (astronomy) and pseudo-science (astrology), the role of values in science, scientific realism, scientific reductionism, as well as the nature of scientific theories, explanations, and confirmation.
- PHIL 307 BLACK THOUGHT AND PHILOSOPHY 3**
See BAMS307 for course description.
- PHIL 308 TOPICS IN JEWISH THEOLOGY 3**
Critical evaluation of the theological views of major branches of Judaism on such topics as: the significance of Israel, the status of Jewish law, the meaning of Jewish ritual and the mission of the Jewish people.
May be cross-listed with JWST308.
PREREQ: PHIL208 recommended.
- PHIL 309 INDIAN RELIGION AND PHILOSOPHY 3**
The Vedas, Upanishads, and Bhagavad-Gita; Sankhya, Yoga, Nyaya, Vaishesika and Mimamsa; Jainism and Indian Hinayana and Mahayana Buddhism; Vedanta and modern developments such as Aurobindo.
- PHIL 310 CHINESE RELIGION AND PHILOSOPHY 3**
Ancient China: Confucianism, Taoism and the 100 Schools. The Buddhist conquest of China: Buddhism in China and Chinese Buddhism. Medieval Syntheses: Neo-Confucianism. The Response to the West: Maoism and Modern Confucianism.
- PHIL 311 EARLY MEDIEVAL PHILOSOPHY 3**
Examines the attempt to synthesize Greek philosophy with biblical religion in the late classical and early medieval period. Covers Plotinus, Augustine, Anselm and Abelard among others, on topics including God, scepticism, evil, the happy life, universals and more.
- PHIL 312 LATE MEDIEVAL PHILOSOPHY 3**
Rediscovery of Aristotle by the Islamic philosophers (tenth-twelfth centuries) through Ockham (fourteenth century) and includes Avicenna, Algazali, Averroes, Maimonides, Aquinas, and more. Topics include science and religion, divine command theory, talking about God, among others.
- PHIL 313 KILLING AND LETTING DIE 3**
Examines the moral basis for condemning killing while allowing, or even applauding, letting die.
- PHIL 315 METAPHYSICS 3**
Examination of central issues in metaphysics. Sample topics: universals and particulars, possibility and necessity, identity over time, free will, causality, and the philosophy of time.
PREREQ: One philosophy course.
- PHIL 316 TIME TRAVEL 3**
Through philosophy applied to physics and science fiction, explores the connections of time travel to traditional philosophic issues concerning the nature of time, God, free will and personal identity.
- PHIL 317 AMERICAN PHILOSOPHY 3**
Classical American philosophers, including Emerson, Thoreau, Peirce, James and Dewey. Includes ethics, epistemology and social and political theory.
- PHIL 320 THEORY OF KNOWLEDGE 3**
Examination of some central issues in epistemology: classical and contemporary analyses of empirical knowledge; the nature of justification and rationality; implications for science, religion and metaphysics.
- PHIL 322 EXISTENTIALISM 3**
Study of the origins and development of existential philosophy. Emphasis on the fundamental insight into the nature of man that separates the existentialists from the rest of the Western philosophical tradition. Sources include Pascal, Kierkegaard, Nietzsche and Sartre.
- PHIL 327 RACE, GENDER, SCIENCE 3**
Critically examines number of metaphysical, epistemological, and ethical issues related to science of race, gender, and sexual orientation. Topics may include; evolution of sex and gender; gender and cognition; biological basis, or lack thereof, of sexual orientation/preference; evolutionary, cognitive, historical, and political origins of race thinking; relationship between everyday conceptions of race and gender as compared with scientific conceptions of race and gender; ethical issues raised by human kind classification schemes.
May be cross-listed with BAMS327, CGSC327 and/or WOMS327.
- PHIL 330 PHILOSOPHY OF MIND 3**
Coverage of central issues in the philosophy of mind including such topics as the relation between mind and body, the nature of thought, consciousness, perception, personal identity and the relation of cognitive psychology, neuroscience and computer science to the philosophy of mind.
May be cross-listed with CGSC330.
- PHIL 340 CROSS CULTURAL ENVIRONMENTAL ETHICS 3**
Critical and global study of the ethics of human-environment relations as suggested by the science of ecology, Western philosophy, physical science, the world views of Judaism, Christianity, Islam, Hinduism, Buddhism, Taoism, Native American traditions, African traditions ecofeminism and American law.
- PHIL 341 ETHICS OF ENGINEERING PROFESSION 1**
Introduction to cases involving engineers' moral responsibilities; emphasis on making reasonable ethical choices.
- PHIL 344 SCIENCE AND RELIGION 3**
Examines the relationship between science and religion and focuses on: whether our current cosmological picture of the Big Bang allows for a Creator; the rationality of miracle-reports; whether the scientific image of humanity is compatible with a religious worldview; the biological evolution/creation debate.
May be cross-listed with SCEN344.
- PHIL 345 PHILOSOPHY OF HISTORY 3**
Nature and limits of our knowledge of the past, categories of explanation used by historians and the aim of historical inquiry. Speculation about the "meaning" of history and the structure of historical process.

PHIL 366	INDEPENDENT STUDY	1-6	PHYS 139	STAR AND CONSTELLATION IDENTIFICATION	1
PHIL 389	TOPICS: WOMEN AND HEALTH ISSUES	3	Familiarity with the sky, its changing aspects, constellations, mythology, bright stars, and planets. Topics include use of sky maps and coordinates, how to estimate directions and time from knowledge of the sky, and the use of binoculars and small telescopes.		
PHIL 390	HONORS COLLOQUIUM	3	PHYS 140	GREAT CONCEPTS OF PHYSICS	3
PHIL 392	HONORS COLLOQUIUM	3	Designed for non-science majors, concentrates on understanding both the content and impact of five great concepts of physics: the Newtonian Universe, Conservation of Energy, Entropy, Relativity, and Wave-Particle Duality. The influence of these concepts in other areas of human concern, e.g., philosophy, art, history, politics, medicine, etc. will be an important feature.		
PHIL 404	ANIMAL MINDS	3	PHYS 141	LIGHT, LASERS, CAMERAS, PERCEPTION	3
See CGSC404 for course description.			Introduction to the phenomena of light, optics and perception for non-science majors. Topics include: nature of light, sources of light and shadows, rainbows, mirages and other atmospheric phenomena, cameras, telescopes, microscopes, color creation and observation, physics influences in art, the human eye and perception.		
PHIL 418	MEANING AND LANGUAGE USE	3	PHYS 143	ENERGY TECHNOLOGY AND SOCIETY	3
See LING418 for course description.			Basic principles of physics are applied to discuss forms of energy (mechanical, thermal, chemical, electrical and nuclear), and how energy is derived from sources such as coal, petroleum, solar, nuclear fission and fusion. Environmental consequences of energy use are treated. PREREQ: College algebra.		
PHIL 421	PHILOSOPHY, BIOLOGY, SOCIETY	3	PHYS 144	CONCEPTS OF THE UNIVERSE	3
See CGSC421 for course description.			Survey of astronomy emphasizing early and modern concepts. Stars, planets, galaxies, cosmic evolution and intelligent life are studied in the context of physical principles which describe the dynamics of the universe. Scientific process is used to interpret observations that shape our perceptions of the cosmos. RESTRICTIONS: Not for credit for who have taken PHYS133.		
PHIL 444	MEDICAL ETHICS	3	PHYS 145	BLACK HOLES AND COSMIC EVOLUTION	3
Seminar focuses on such topics as experimentation with human subjects, genetic engineering and the moral problems of health care. RESTRICTIONS: For students of philosophy and health professions.			Geared toward a general audience and focuses on topics such as finding black holes in space; the nature of space, time and black holes; the origin of the Universe; and the development of complex life here on Earth.		
PHIL 448	ENVIRONMENTAL ETHICS	3	PHYS 146	QUARKS, GLUONS, AND THE BIG BANG: PARTICLES AND COSMOLOGY	3
Ethical problems associated with environmental protection, local, national, and international. Relations to social and political movements. Seminar format.			Non-mathematical course focusing on the elementary particles and their influence on the early evolution of the universe. Major topics are quarks and the forces they feel, Einstein's theory of relativity, Quantum Mechanics made fairly simple, and the Inflationary Universe. RESTRICTIONS: Requires high school algebra.		
PHIL 450	RECENT TOPICS IN THE PHILOSOPHY OF MIND	3	PHYS 147	ATOMS FOR EVERYONE	3
Recent topics in the philosophy of mind such as theory of mind, naturalized semantics, animal cognition, evolution of language. May be cross-listed with CGSC450.			Elementary but earnest inquiry into the sources of our knowledge that these completely invisible building blocks of ordinary matter exist as discrete entities, and exist to the exclusion of all other possibilities. RESTRICTIONS: Requires high school algebra.		
PHIL 454	PHILOSOPHY OF SOCIAL SCIENCE	3	PHYS 169	PERSPECTIVES ON PHYSICS AND ASTRONOMY	1 PF
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.			First year seminar providing an introduction to the practice of physics and astronomy. Topics include research, education, careers, and the relation of physics to society. RESTRICTIONS: Priority given to first year students. Intended for physics and astronomy majors.		
PHIL 463	ETHICAL THEORY	3	PHYS 199	EXPLORING PHYSICS CONCEPTS I	3
Justification of ethical beliefs, alternative criteria of moral rightness and the meaning of moral concepts. PREREQ: PHIL202 or PHIL203.			Exploration of physics concepts for first year students with no prior physics background. Emphasis on physics of light, color, electrical circuits and structure of matter. RESTRICTIONS: Open to first year students only and to university studies majors.		
PHIL 465	SENIOR SEMINAR	3	PHYS 201	INTRODUCTORY PHYSICS I	4
Various authors and themes; e.g., Plato, Kant, epistemology, philosophy of mind. RESTRICTIONS: May be repeated once for credit when topics vary.			First course in a sequence with PHYS202 that provides an introduction to physics for students in the life and environmental sciences. Emphasis on topics including mechanics, fluid dynamics, optics and thermodynamics. PREREQ: MATH115. RESTRICTIONS: Requires a strong mathematics background in geometry, algebra and trigonometry. Only one course among PHYS104, PHYS201, PHYS207 and SCEN101 can count toward graduation.		
PHIL 466	INDEPENDENT STUDY	1-6	PHYS 202	INTRODUCTORY PHYSICS II	4
PHIL 604	ANIMAL MINDS	3	Final course in a sequence with PHYS201 that provides an introduction to physics for students in the life and environmental sciences. Topics include rotation and oscillatory motion, waves, electricity and magnetism, structure and properties of nuclei, atoms, molecules and solids. PREREQ: PHYS201. RESTRICTIONS: Only one course from PHYS202 and PHYS208 can count toward graduation.		
See CGSC604 for course description.					
PHIL 648	ENVIRONMENTAL ETHICS	3			
Ethical problems associated with environmental protection, local, national, and international. Relations to social and political movements. Seminar format. May be cross-listed with UAPP648.					
PHIL 650	RECENT TOPICS IN THE PHILOSOPHY OF MIND	3			
Recent topics in the philosophy of mind such as theory of mind, naturalized semantics, animal cognition, evolution of language. May be cross-listed with CGSC650.					
PHIL 868	RESEARCH	1-3			
Detailed study of certain philosophical problems with special reference to research problems under way in the department.					
<hr/> PHYSICS AND ASTRONOMY <hr/>					
PHYS 104	ELEMENTARY PHYSICS	3			
Overview of the principles of physics and their applications. Designed for beginners with no previous exposure to physics. RESTRICTIONS: Requires working knowledge of algebra and the use of scientific notation. Only one course among PHYS104, PHYS201, PHYS207 and SCEN101 can count toward graduation.					
PHYS 133	INTRODUCTION TO ASTRONOMY	4			
Objects of the universe from the earth to galaxies. How the universal laws that govern them; e.g., gravity and electromagnetic radiation, permit us to learn their nature from quantitative observations. Telescopic observations, visual and electronic, included in the laboratory. RESTRICTIONS: Not for credit for those who have taken PHYS144.					

- PHYS 207 FUNDAMENTALS OF PHYSICS I 4**
First course in a sequence with PHYS208 that provides an introduction to physics for those in the physical sciences and engineering. Emphasis is on Newton's laws of motion, force laws, and conservation principles. Integrates conceptual understanding with extensive problem solving and laboratory experience.
COREQ: MATH241.
RESTRICTIONS: One year of high school calculus is recommended. Only one course from PHYS104, PHYS207 and SCEN101 can count toward graduation.
- PHYS 208 FUNDAMENTALS OF PHYSICS II 4**
Second course in a sequence with PHYS207 that provides an introduction to physics for those in the physical sciences and engineering. The emphasis is on electricity and magnetism force laws, fields and electrical circuits.
PREREQ: PHYS207.
COREQ: MATH242.
- PHYS 245 INTRODUCTION TO ELECTRICITY AND ELECTRONICS 4**
Fundamentals of electricity and magnetism specific to DC and AC circuit analysis, transient circuit behavior and rotating machinery. Fundamentals of analog and digital electronics, with emphasis on applications in engineering, integrated circuits and operational amplifiers.
PREREQ: PHYS207.
COREQ: MATH243.
RESTRICTIONS: Not for major credit.
- PHYS 309 PHYSICS OF THE TWENTIETH AND TWENTY FIRST CENTURIES 3**
Fundamentals in physics that help form a modern understanding of science and technology. Intended for physical science and engineering majors, the emphasis is on electromagnetic radiation, quantum mechanics, nuclear reactions, Bohr atom, solid state physics and devices, and relativity.
PREREQ: PHYS208.
COREQ: MATH243.
- PHYS 310 INTRODUCTION TO THERMAL PHYSICS 3**
Basic concepts of thermodynamics including properties of substance, first and second law analysis of systems and control volumes, entropy and availability. Power and refrigeration cycles.
PREREQ: PHYS207.
- PHYS 313 PHYSICAL OPTICS 4**
Detailed treatment of optics at an intermediate level appropriate for physics, engineering and other students with a physical science background. Emphasis is on physical concepts and analysis of geometric optics, wave optics and applications of optics.
COREQ: MATH243.
- PHYS 333 FUNDAMENTALS OF ASTROPHYSICS 3**
Quantitative approach to astronomy and astrophysics. Treatment of stars, the interstellar medium, galaxies, and cosmology.
PREREQ: PHYS208, MATH243.
- PHYS 366 INDEPENDENT STUDY 1-3**
- PHYS 419 CLASSICAL MECHANICS I 3**
Emphasizes the fundamental principles of classical mechanics. Treats in detail and with mathematical rigor, particle mechanics, conservation laws, harmonic oscillation, motion under central force, rigid body dynamics, and moving coordinate systems.
COREQ: MATH302 or MATH321.
- PHYS 424 QUANTUM MECHANICS 3**
Introduces quantum mechanical concepts by reviewing experiments which cannot be explained by classical physics. The Schrodinger equation is solved for simple cases such as free-particle motion, the simple harmonic oscillator and the hydrogen atom, with a basic treatment of angular momentum.
May be cross-listed with CHEM424 and/or ELEG424.
PREREQ: PHYS309, MATH302, and MATH349 or MATH341/342.
- PHYS 431 ACOUSTICS 3**
Vibrations of particles, strings and membranes; acoustic waves; radiation of sound; room acoustics; and acoustic measurements.
PREREQ: MATH243 and PHYS207.
- PHYS 445 ELECTRONICS FOR SCIENTISTS 3**
Fundamentals of analog and digital electronics, with emphasis on applications in science. Circuit analysis, operational amplifiers, filters, gates, flip-flops, counters, analog to digital and digital to analog converters.
PREREQ: PHYS208.
- PHYS 446 INSTRUMENTATION FOR SCIENTISTS 3**
Electronic measurements and instrumentation with emphasis on applications in science. Amplification, noise, low-level signal recovery, lock-in amplifiers, digital signal averaging, frequency and time measurements, transducers, bridges, interfacing to laboratory computers and automation of experiments.
PREREQ: PHYS208.
- PHYS 449 INTRODUCTION TO RESEARCH 1-6**
Undergraduate research on an assigned problem carried out under the supervision of the staff.
- PHYS 460 COMPUTATIONAL METHODS OF PHYSICS 3**
Introduction to basic computational techniques in science with application to a number of disciplines of current research interest, such as quantum physics, biophysics, statistical mechanics and chaos.
PREREQ: MATH302 or MATH341, CISC105 or equivalent, PHYS208.
- PHYS 465 SENIOR SEMINAR 1**
Senior seminar for physics majors.
RESTRICTIONS: Requires senior status.
- PHYS 466 INDEPENDENT STUDY 1-3**
- PHYS 469 OBSERVATIONAL ASTRONOMY 3**
Hands-on experience focusing on the techniques and analysis of astronomical observation, with emphasis on CCD imaging. Topics include celestial coordinates, telescope handling, CCDs, data reduction, and data analysis.
RESTRICTIONS: Meets at Mt. Cuba Observatory in Greenville.
- PHYS 501 TOPICS IN MIDDLE SCHOOL PHYSICS EDUCATION: FORCE AND MOTION 3**
Application of scientific principles to topics related to Newton's first law, motion, force, electric circuits, magnetism, electromagnets, motors, and generators.
RESTRICTIONS: Restricted to in-service middle school teachers.
- PHYS 502 TOPICS IN MIDDLE SCHOOL PHYSICS: PLANETARY SYSTEMS 3**
Application of physics principles to topics related to the earth, moon, sun, planets, and seasons.
RESTRICTIONS: Restricted to in-service middle school science teachers.
- PHYS 503 TOPICS IN MIDDLE SCHOOL SCIENCE EDUCATION: PROPERTIES OF MATTER 3**
Application of scientific principles to topics related to the particle model and density, phase change, mixtures and solutions, and separation techniques.
RESTRICTIONS: Restricted to in-service middle school science teachers.
- PHYS 504 TOPICS IN MIDDLE SCHOOL SCIENCE EDUCATION: TRANSFORMATION OF ENERGY 3**
Application of scientific principles to topics related to energy changes, heat, light, and topics in other middle school science curricula such as ecosystems and weather systems.
RESTRICTIONS: Restricted to in-service middle school science teachers.
- PHYS 511 TOPICS IN HIGH SCHOOL PHYSICS: FORCE, MOTION AND ENERGY 3**
Application of physics principles to topics related to Newton's Three Laws, work and mechanical energy.
RESTRICTIONS: Restricted to in-service high school science teachers.
- PHYS 600 PHYSICS RESEARCH TALKS 1 PF**
Lectures by Physics and Astronomy faculty describing their current research to aid graduate students in selection of an area of thesis research.
- PHYS 601 INTRODUCTION TO TEACHING PHYSICS AND ASTRONOMY 1 PF**
Introduction to the methods and techniques of teaching and tutoring physics at a level appropriate for teaching assistants and tutors of undergraduate courses in Physics and Astronomy. Discussion and workshop formats are employed.
- PHYS 603 ELECTRICITY AND MAGNETISM I 3**
First of a two-part sequence (with PHYS604) that provides an intermediate level treatment of electrostatics and magnetostatics, as well as an introduction to electrodynamics. Topics include a discussion of different techniques used for the calculation of electrostatic and magnetostatic fields in vacuum and in matter, and effects of time varying electric and magnetic fields.
PREREQ: PHYS208; MATH302.
COREQ: MATH503 suggested.
- PHYS 604 ELECTRICITY AND MAGNETISM II 3**
Second in a two-part sequence (with PHYS603) that provides an intermediate level treatment of electrodynamics. Specific topics include a discussion of conservation laws, electromagnetic waves and radiation, and the theory of special relativity.
PREREQ: PHYS603.

- PHYS 607 METHODS OF MATHEMATICAL PHYSICS 3**
Mathematics commonly used in physics. main topics are linear algebra, vector calculus, fourier series, integral transforms, and eigenfunction methods for differential equations.
- PHYS 608 METHODS OF MATHEMATICAL PHYSICS 3**
Continuation of PHYS607. Main topics are partial differential equations, complex variables, tensors, calculus of variations, group theory and representation theory, and probability and statistics.
PREREQ: PHYS607.
- PHYS 610 QUANTUM MECHANICS 3**
Wave-particle duality. The Schrodinger equation. One-dimensional problems. Spherically symmetric potentials. Orbital angular momentum. Applications including hydrogenic atoms.
PREREQ: PHYS424.
- PHYS 616 KINETIC THEORY AND THERMODYNAMICS 3**
Postulates of equilibrium thermodynamics; review of relevant mathematics; entropy maximum principle; energy minimum principle; Legendre transformations. Entropy representation, internal energy representation, Helmholtz representation and Gibbs representation. Maxwell relations; reduction of partial derivatives; phase transitions; statistical mechanics via Boltzmann's elementary method; equipartition of energy; applications.
May be cross-listed with ELEG616.
PREREQ: MATH243 and PHYS309.
- PHYS 620 CLASSICAL MECHANICS II 3**
Topics covered are Lagrangian and Hamiltonian dynamics, dynamics of systems of particles, rigid bodies and fluids, oscillations of systems of coupled particles, oscillations and waves in continuous systems. Provides a classical introduction to techniques used extensively in quantum and statistical physics.
PREREQ: PHYS419.
- PHYS 621 FUNDAMENTALS OF MODERN PHYSICS 3**
Application of quantum mechanics and the theory of relativity to selected topics in physics, with emphasis on elementary particle physics.
PREREQ: PHYS424.
- PHYS 624 INTRODUCTION TO SOLID STATE PHYSICS 3**
X-ray diffraction, structure and properties of metals, insulators and semiconductors, and band theory of solids; includes electrical, optical, magnetic and thermal properties.
PREREQ: PHYS61.
- PHYS 626 INTRODUCTION TO ATOMIC, MOLECULAR AND OPTICAL PHYSICS 3**
Introduction to fundamental atomic and molecular systems with emphasis on modern topics including recent advances in laser physics, quantum computing, Bose-Einstein condensation, and molecular structures.
PREREQ: PHYS603 and PHYS610.
- PHYS 631 ACOUSTICS 3**
Vibrations of particles, strings and membranes; acoustic waves; radiation of sound; room acoustics; and acoustic measurements.
- 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.
- PHYS 633 INTRODUCTION TO STELLAR ASTROPHYSICS 3**
Introduction to the physics of stellar interiors and atmospheres. The evolution of stars is explored by studying the changes in internal composition due to nuclear reactions. The physical processes underlying stellar spectra are investigated. Computer simulations of stars and their atmospheres may be used.
PREREQ: PHYS632.
- PHYS 634 PHYSICS OF THE SUN 3**
Physics of processes which occur in the outer regions of the Sun. Topics include radiative transfer, convection, sound waves, magnetic fields, the chromosphere, the corona, the solar wind, and the cycle of solar activity.
PREREQ: MATH302 or MATH341 plus 14 credit hours of physics.
- PHYS 635 SPACE PHYSICS 3**
Introduction to physical processes and environments in our solar system. Topics include overview of plasma physics, magnetohydrodynamics, and turbulence theory; properties of solar wind; planetary magnetospheres; cosmic ray transport and acceleration; experimental and observational techniques; space weather and its impact on human activities.
PREREQ: PHYS603.
- PHYS 638 SELECTED TOPICS IN PHYSICS 3**
Treatment of a specialized subject taken from the following list: particle astrophysics, magnetic materials, electron microscopy, elementary particles, cosmology, solar physics and other advanced topics.
RESTRICTIONS: May be repeated for credit when topics vary.
- PHYS 641 NANOMATERIALS AND THIN FILM PROCESSES 3**
Includes physical and chemical vapor deposition processes. Topics selected from Vacuum Science and Technology, Thin-Film Evaporation Processes, Discharges, Plasmas, Ion-Surface Interactions, Chemical Vapor Deposition, Laser Ablation, Substrate Surfaces and Thin-Film Nucleation, Epitaxy, Film Structure, Characterization of Thin Films and nanostructures, etc.
May be cross-listed with MSEG641.
- PHYS 644 ELEMENTARY PARTICLES AND BIG BANG COSMOLOGY 3**
Introduction to the world of elementary particles, the fundamental building blocks of matter, and the essential role they play in the formulation of hot big bang and inflationary cosmologies.
PREREQ: Some knowledge of quantum mechanics and special relativity is recommended.
COREQ: PHYS424.
- PHYS 645 ELECTRONICS FOR SCIENTISTS 3**
Fundamentals of analog and digital electronics, with emphasis on applications in science. Circuit analysis, operational amplifiers, filters, gates, flip-flops, counters, analog to digital and digital to analog converters.
PREREQ: PHYS208.
- PHYS 646 INSTRUMENTATION FOR SCIENTISTS 3**
Electronic measurements and instrumentation with emphasis on applications in science. Amplification, noise, low-level signal recovery, lock-in amplifiers, digital signal averaging, frequency and time measurements, transducers, bridges, interfacing to laboratory computers and automation of experiments.
PREREQ: PHYS208.
- PHYS 650 QUANTUM COMPUTATION 3**
Introduction to quantum computation and quantum information. Quantum logic gates and quantum circuits. Efficient quantum algorithms: quantum Fourier transform and its applications and quantum search algorithms. Physical implementations of quantum computation. Quantum error-correction and fault-tolerant quantum computation. Quantum cryptography.
PREREQ: Prior knowledge of quantum mechanics recommended. Students should be familiar with linear algebra.
- PHYS 660 COMPUTATIONAL METHODS OF PHYSICS 3**
Introduction to basic computational techniques in science with application to a number of disciplines of current research interest, such as quantum physics, biophysics, statistical mechanics and chaos.
PREREQ: MATH302 or MATH341, CISC105 or equivalent, PHYS208.
- PHYS 669 OBSERVATIONAL ASTRONOMY 3**
Hands-on focus on techniques and analysis of astronomical observation, with emphasis on CCD imaging. Topics include celestial coordinates, telescope handling, CCDs, data reduction, and data analysis.
RESTRICTIONS: Meets at Mt. Cuba Observatory in Greenville.
- PHYS 803 SOLID STATE PHYSICS 3**
Crystal structure; mechanical, thermodynamic, electrical, optical and magnetic properties of solids; and imperfections in crystals.
PREREQ: PHYS624.
- PHYS 806 ATOMIC, MOLECULAR AND OPTICAL PHYSICS 3**
Treatment of atomic and molecular systems including experimentally observed phenomena and modern theory techniques. Topics include atomic and molecular structure, light-matter interactions, laser physics, quantum computing, Bose-Einstein condensation, and scattering phenomena.
PREREQ: PHYS811.
COREQ: PHYS809.
- PHYS 809 ELECTROMAGNETIC THEORY 3**
Review of statics; Maxwell's equations, physical optics and wave guides.
May be cross-listed with ELEG809.
PREREQ: PHYS604.
- PHYS 810 ELECTROMAGNETIC THEORY 3**
Geometric optics limit of Maxwell's equations, Lienard-Wiechert fields, radiation fields, radiation damping, Wheeler-Feynman theory.
May be cross-listed with ELEG810.
PREREQ: PHYS604 and PHYS809.

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

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

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

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

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

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

PHYS 825 INTERMEDIATE CONDENSED MATTER PHYSICS 3
 Second course in condensed matter physics sequence. Review of electrons, Phonons, Adiabatic Approximation. One Electron Approximation, Hartree-Fock. Density Functional Theory. Linear Response Theory. Scattering of Particles by Crystals. Optical properties (semiconductors). Transport Properties (electrons, phonons, semiconductors). Bose-Einstein Condensation. PREREQ: PHYS624.

PHYS 826 ADVANCED TOPICS IN CONDENSED MATTER PHYSICS 3
 Topics include Superfluidity, Superconductivity, Magnetism, Linear response theory, Bose-Einstein condensation, Electrodynamics of solids. PREREQ: PHYS825. RESTRICTIONS: May be repeated for up to six credits when topics vary.

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

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

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

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

PHYS 835 PLASMA PHYSICS I: FLUID AND MHD 3
 Introduction to properties of electrically conducting fluids and ionized gases. Topics are: particle drifts and adiabatic invariants, cold plasma waves, magnetohydrodynamics (MHD), MHD waves, equilibria, shocks, and instabilities. For each topic, applications to solar system space plasmas, astrophysical plasmas, and laboratory plasmas are presented. PREREQ: PHYS603 or equivalent. COREQ: PHYS604 or equivalent.

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

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

PHYS 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
 Ethics, licensure laws and practice of physical therapy explored. The Guide to Physical Therapy Practice introduced and importance to effective practice discussed. RESTRICTIONS: Open to physical therapy graduate students only.

PHYT 604 FUNCTIONAL ANATOMY AND BIOMECHANICS 4
 Gives description of normal and abnormal human movement. Emphasis on joint structure and function and gait using arthrokinematic and osteokinematic analysis. Evaluation procedures such as EMG, cinematography and computer simulations utilized. PREREQ: PHYT622. RESTRICTIONS: Open to physical therapy graduate students only or with permission of instructor.

PHYT 606 RESEARCH METHODS 3
 Overview of methodological issues in the conduct of physical therapy research. Topics include scientific method, experimental design, statistical procedures and technical writing. Student expected to critically analyze current physical therapy literature. RESTRICTIONS: Open to physical therapy graduate students only.

PHYT 614 SPORTS PHYSICAL THERAPY 3 PF
 Advanced orthopedics with emphasis in sports related injuries. Discuss evaluation and intervention of the athlete in the various major joints of the body, as well as other related topics in sports and orthopedics. PREREQ: PHYT608, PHYT622, PHYT604, PHYT802, AND PHYT808. RESTRICTIONS: Open to physical therapy graduate students only.

PHYT 615 ADVANCED NEUROTHERAPEUTICS 3
 Discusses an integration of the various neurodevelopmental approaches to the treatment of the neurological patient. RESTRICTIONS: Open to physical therapy graduate students only.

PHYT 620 EDUCATIONAL PROCESS IN COMMUNITY HEALTH 1
 Focuses on the learning/teaching process as defined in the Guide to Physical Therapy Practice for application to the teaching roles of the health professional. RESTRICTIONS: Open to physical therapy graduate students only.

PHYT 622 CLINICAL GROSS ANATOMY 6
 Emphasis on structural and functional aspects of regions of body under study by means of human cadaver, bones, surface anatomy, lectures, computer technology and demonstrations. Clinical significance of anatomical structures is stressed. RESTRICTIONS: Open to physical therapy graduate only.

- PHYT 623 CLINICAL NEUROSCIENCES 4**
Study of structure and function of human nervous system with major emphasis on cause-effect relationships between lesions and their symptoms. Emphasis on neural mechanisms controlling movement.
PREREQ: PHYT622.
RESTRICTIONS: Open to physical therapy graduate students only or by permission of instructor.
- PHYT 624 BASIC EVALUATION TECHNIQUES 2**
Provides understanding of philosophy and practice of patient evaluation and physical therapy diagnosis. Muscle performance testing and measurement of joint motion of extremities emphasized.
RESTRICTIONS: Open to physical therapy graduate students only.
- PHYT 626 ADVANCED REGIONAL ANATOMY 3 PF**
Structural and functional aspects of regions of the body under study emphasized by means of dissection of specific region of the human body.
PREREQ: PHYT622.
- PHYT 630 HUMAN MOVEMENT CONTROL 3**
Examines theoretical, methodological and empirical issues required for understanding of control and coordination of human movement. Readings and group discussion of implication of issues raised in the literature. Development of proposal to study aspect of motor behavior.
May be cross-listed with BMSC630.
RESTRICTIONS: Requires permission of instructor.
- PHYT 631 PHYSICAL THERAPY IN THE ACUTE CARE ENVIRONMENT 4**
Presents diagnoses commonly seen in the acute care environment. The pathological, anatomical, evaluation, documentation and treatment considerations in managing these diagnoses are discussed.
RESTRICTIONS: Open to physical therapy graduate students only.
- PHYT 632 APPLIED PHYSIOLOGY I 3**
In-depth analysis of the physiological mechanisms of the cardio-pulmonary system. Lectures in normal and abnormal function of this system. Emphasis on cardiopulmonary testing and rehabilitation techniques including stress tests and pulmonary function tests.
PREREQ: PHYT622.
RESTRICTIONS: Open to physical therapy graduate students only.
- PHYT 633 APPLIED PHYSIOLOGY II 3**
Discusses the research on the effects of exercise on the various patient populations (not including cardiopulmonary). Emphasis placed on the musculoskeletal system and on exercise prescription and progression.
PREREQ: PHYT632.
RESTRICTIONS: Open to physical therapy graduate students only.
- PHYT 634 ELECTROTHERAPY 4**
Provides an understanding of the physiological basis for the use of physical agents and electrotherapy. Emphasis placed on patient evaluation and clinical applications of modalities used in physical therapy clinics.
PREREQ: All prior physical therapy graduate courses.
RESTRICTIONS: Open to physical therapy graduate students only.
- PHYT 635 THERMAL AGENTS AND SOFT TISSUE TECHNIQUES 2**
Introduction to thermal modalities and soft tissue mobilization techniques commonly used in current physical therapy practice.
PREREQ: PHYT622.
RESTRICTIONS: Open to physical therapy graduate students only.
- PHYT 641 ROUNDS I 1 PF**
Weekly clinical cases presented by faculty, clinical faculty, doctoral students and residents in Grand Rounds format for discussion by all students in the physical therapy graduate program.
RESTRICTIONS: Open to physical therapy graduate students only.
- PHYT 642 ROUNDS II 1 PF**
Weekly clinical cases presented by faculty, clinical faculty, doctoral students and residents in Grand Rounds format for discussion by all students in the physical therapy graduate program.
RESTRICTIONS: Open to physical therapy graduate students only.
- PHYT 643 ROUNDS III 1 PF**
Weekly clinical cases presented by faculty, clinical faculty, doctoral students and residents in Grand Rounds format for discussion by all students in the physical therapy graduate program.
RESTRICTIONS: Open to physical therapy graduate students only.
- PHYT 644 ROUNDS IV 1 PF**
Weekly clinical cases presented by faculty, clinical faculty, doctoral students and residents in Grand Rounds format for discussion by all students in the physical therapy graduate program.
RESTRICTIONS: Open to physical therapy graduate students only.
- PHYT 801 MEDICAL SCIENCE I: GENERAL MEDICINE 3**
Lectures in pathology, clinical medicine, cardiology and pharmacology across the lifespan. Implications for physical therapy are emphasized.
RESTRICTIONS: Open to physical therapy graduate students only.
- PHYT 802 MEDICAL SCIENCE II: ORTHOPEDICS 3**
Orthopedic pathology, medical and surgical management of musculoskeletal conditions across the lifespan with implications for physical therapy intervention. Includes radiology.
PREREQ: All prior physical therapy graduate courses.
RESTRICTIONS: Open to physical therapy graduate students only.
- PHYT 803 MEDICAL SCIENCE III: NEUROLOGY 3**
Lectures of basic principles of neurology throughout the lifespan. Emphasis placed on medical principles related to diseases most frequently encountered in physical therapy practice.
PREREQ: PHYT623.
RESTRICTIONS: Open to physical therapy graduate students only.
- PHYT 804 NEUROPHYSIOLOGIC EVALUATION AND TREATMENT 4**
Basic evaluation and treatment methods for managing patients with neurological dysfunctions. Analysis of these methods in light of current issues and theories of motor control, motor learning and neurobehavioral plasticity. Emphasis on learning strategies for treatment rather than through details of specific approaches.
PREREQ: PHYT623.
RESTRICTIONS: Open to physical therapy graduate students only.
- PHYT 805 REHABILITATION 4**
Advanced instruction in the theory, research and clinical skills necessary for the comprehensive management of clients in a rehabilitation setting with an emphasis on building evidence-based program plans.
PREREQ: PHYT623, PHYT631.
RESTRICTIONS: Open to physical therapy graduate students only.
- PHYT 806 GERIATRICS 3**
Personal-social, biological, socioeconomic and physiological factors accompanying the aging process are examined and their impact on physical therapy intervention explored.
PREREQ: All prior physical therapy graduate courses.
RESTRICTIONS: Open to physical therapy graduate students only.
- PHYT 807 EMERGENCY RESPONDER AND ADVANCED SEMINAR 5**
Lectures pursue various topics in greater depth and develop advanced clinical skills. Topics include emergency response, wound care, hand therapy, women's health issues, vestibular rehabilitation and aquatic therapy.
PREREQ: All prior physical therapy graduate courses.
RESTRICTIONS: Open to physical therapy graduate students only.
- PHYT 808 SPINE MANAGEMENT 4**
Discusses biomechanics, pathophysiology and disability associated with spine pain and dysfunction. Includes understanding of role of physical therapy evaluation in determination and implementation of physical therapy interventions.
PREREQ: PHYT604, PHYT608, PHYT622 AND PHYT624.
RESTRICTIONS: Open to physical therapy graduate students only.
- PHYT 809 PSYCHOSOCIAL ASPECTS OF HEALTH AND DISEASE 3**
Discusses psychosocial characteristics of patient populations and therapists that impact on the rehabilitation process. Death and dying, social implications of illness diagnosis and other topics discussed.
PREREQ: All prior physical therapy graduate courses.
RESTRICTIONS: Open to physical therapy graduate students only.
- PHYT 810 CLINICAL MANAGEMENT 2**
Discusses concepts of administration and issues in the management of hospital clinics, private practice and consultative ventures. Students introduced to current trends in billing and reimbursement strategies used by clinicians.
PREREQ: All prior physical therapy graduate courses.
RESTRICTIONS: Open to physical therapy graduate students only.
- PHYT 811 PEDIATRICS 4**
Instruction in theory, research and clinical skills necessary for comprehensive management of pediatric clients and their families. Emphasis on incorporation of modern developmental science into evidenced-based program plans.
PREREQ: All prior physical therapy graduate courses.
RESTRICTIONS: Open to physical therapy graduate students only.
- PHYT 812 PEDIATRIC INTEGRATED CLINICAL EXPERIENCE 1 PF**
Mentored clinical experience in pediatric healthcare facilities.
PREREQ: All prior physical therapy graduate courses.
RESTRICTIONS: Open to physical therapy graduate students only.

PHYT 821 ORTHOPEDIC INTEGRATED CLINICAL EXPERIENCE 3
 Mentored clinical experience in University of Delaware Physical Therapy Clinic. Emphasis is orthopedic with some exposure to outpatients with other diagnoses. All students participate in this experience for one semester.
 PREREQ: All prior physical therapy graduate courses.
 RESTRICTIONS: Open to physical therapy graduate students only.

PHYT 822 NEUROLOGIC AND OLDER ADULT INTEGRATED CLINICAL EXPERIENCE 3
 Mentored clinical experience in either University of Delaware Neurologic and Older Adult Physical Therapy Clinic or local clinical facility. Emphasis on evaluating and treating mixed caseload of older clients and/or those with neurologic diagnoses. All students participate in the experience for one semester.
 PREREQ: All prior physical therapy graduate courses.
 RESTRICTIONS: Open to physical therapy graduate students only.

PHYT 830 INTRODUCTION TO CLINICAL EDUCATION 1 PF
 Prepares students for academic progression into their clinical affiliations. Provides the knowledge and skills necessary to prevent, recognize, and provide care for sudden cardiac or respiratory distress. Reviews current federal laws to protect an individual's privacy in the medical setting. Other topics include how to handle infectious and hazardous materials, and the process of state required background checks to protect the public in positions of sensitivity.
 RESTRICTIONS: Open to physical therapy graduate students only.

PHYT 831 CLINICAL INTERNSHIP I: ACUTE CARE 3 PF
 Six-week, full-time clinical experience in an acute care hospital setting. Students directly participate in all aspects of patient care under the supervision of a licensed physical therapist. Students involved in all aspects of patient care including, but not limited to, evaluation, treatment, patient and family education, charting, billing, and discharge planning.
 PREREQ: All prior physical therapy graduate courses.
 RESTRICTIONS: Open to physical therapy graduate students only.

PHYT 832 CLINICAL INTERNSHIP II: REHABILITATION 3 PF
 Eight-week, full-time clinical experience in a rehabilitation setting. Students participate in direct patient care under the supervision of a licensed physical therapist. Students involved in all aspects of patient care including, but not limited to, evaluation, treatment, patient and family education, charting, billing, team conferences with related disciplines, and discharge planning.
 PREREQ: All prior physical therapy graduate courses.
 RESTRICTIONS: Open to physical therapy graduate students only.

PHYT 833 CLINICAL INTERNSHIP III: ELECTIVE 3 PF
 Eight-week, full-time clinical experience under the supervision of a licensed physical therapist. Students may choose the type of experience they desire. Types available include acute care, orthopedics, rehabilitation or a specialty area.
 PREREQ: All prior physical therapy graduate courses.
 RESTRICTIONS: Open to physical therapy graduate students only.

PHYT 834 CLINICAL INTERNSHIP IV 3 PF
 Six week, full-time clinical experience in an outpatient physical therapy setting. Direct participation in all aspects of patient care under the supervision of a licensed physical therapist. Students involved in all aspects of patient care including, but not limited to, evaluation, treatment, patient and family education, charting billing and discharge planning.
 PREREQ: All prior physical therapy graduate courses.
 RESTRICTIONS: Open to physical therapy graduate students only.

PHYT 868 RESEARCH 1-9
 RESTRICTIONS: Requires permission of instructor.

PLANT AND SOIL SCIENCES

PLSC 100 PLANTS AND HUMAN CULTURE 3
 Current survey of interrelationships between plants and diverse human cultures. Different cultural lenses, such as socio-economic status, cultural heritage and residential environment used to explore landscapes. Issues, including invasive species, water management and garden benefits provide opportunities for discussion and problem solving.

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.

PLSC 133 ORNAMENTAL HORTICULTURE 3
 Use of ornamental plants. Emphasis on basic knowledge of plant materials useful in maintaining aesthetically and functionally pleasing environment in and around the home.

PLSC 140 PEOPLE AND PLANTS: FEAST OR FAMINE 3
 Exploration of plant pathology as biological science with its important ties to human welfare. Topics include food production systems, famine caused by plant diseases and their impact on human culture.

PLSC 151 INTRODUCTION TO CROP SCIENCE 3
 Plant structure and plant processes with practical application to 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 areas of turf and ornamental horticulture.
 RESTRICTIONS: Not for major credit except as elective.

PLSC 170 SOILS AND ENVIRONMENTAL QUALITY 3
 Role of soils in contemporary environmental problems, including nature and causes of soil, air and water pollution; soil management practices to minimize environmental impacts of nutrients, pesticides, agricultural and industrial wastes, and contaminated soils; risk management strategies needed to develop environmental management programs.
 RESTRICTIONS: Not open to students who have taken PLSC204.

PLSC 171 NEW STUDENT COLLOQUIUM 1 PF
 Focuses on academics, careers and resources as important components in achieving success in plant and soil sciences. Practical skills helpful in mastering first year in plant and soil sciences majors.
 RESTRICTIONS: Open to first year majors only.

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

PLSC 204 INTRODUCTION TO SOIL SCIENCE 3
 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 205 INTRODUCTION TO SOIL SCIENCE LABORATORY 1
 Laboratory exercises in soil science.
 COREQ: PLSC204.

PLSC 211 HERBACEOUS LANDSCAPE PLANTS 3
 Survey of herbaceous plants including annuals, perennials and bulbs; plant identification, culture, selection, design and maintenance in the landscape.

PLSC 212 WOODY LANDSCAPE PLANTS 4
 Study of woody plants for landscape use in mid-Atlantic coastal region, including plant identification, selection and culture.

PLSC 214 BROAD-LEAF EVERGREENS AND SHRUBS 4
 Focus on Eastern native United States and exotic broad-leaf plants and shrubs used in the landscape. Topics include cultural requirements, ornamental features, potential pest problems and identification using cut samples as well as landscape specimens.

PLSC 270 BIOTECHNOLOGY: SCIENCE AND SOCIOECONOMIC ISSUES 3
 See ANSC270 for course description.

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

PLSC 300 PRINCIPLES OF ANIMAL AND PLANT GENETICS 3
 See ANSC300 for course description.

PLSC 302 VEGETABLE SCIENCE 4
 Basic factors affecting productivity and marketability of vegetable crops.

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

PLSC 305	SOIL FERTILITY AND PLANT NUTRITION	4	Practical application of basic principles of soil chemistry, physics and microbiology to modern land use programs. Covers basic principles of nutrient management (availability and cycling in soils, roles in plant nutrition), soil acidity and liming, soil testing, environmental fate of non-essential elements and organic chemicals, and role of risk assessment in soil management. PREREQ: CHEM102 and PLSC204.	
PLSC 306	INTRODUCTION TO PLANT MOLECULAR BIOLOGY	3	Molecular biology of higher plants, including organization of plant genes, genomes, gene expression, gene transfer and genetic engineering. PREREQ: BISC207.	
PLSC 308	FRUIT SCIENCE	3	Major temperate zone fruit crops, climatic requirements, growth and fruiting habits, and principles involved in production, harvesting and marketing.	
PLSC 310	ANIMAL AND PLANT GENETICS LABORATORY	1	See ANSC310 for course description.	
PLSC 313	TURF ESTABLISHMENT AND MAINTENANCE	4	Factors affecting establishment and maintenance of fine and utility turf; emphasis on management of golf courses, athletic fields and sod farms.	
PLSC 319	ENVIRONMENTAL SOIL MICROBIOLOGY	4	Introduction to soil microbiology and biochemistry as related to environmental issues: microbial diversity and ecology in soil-plant systems, transformations of natural and synthetic organic compounds, biocycling of nutrients and metals, bioremediation. Introduction to laboratory methods for studying soil microorganisms and associated processes. PREREQ: PLSC204 and CHEM102.	
PLSC 325	NURSERY PRODUCTION I	2	Planning, production, management and marketing of field grown nursery stock. Student selects crops, propagates them and is responsible for all aspects of production, including cost accounting.	
PLSC 326	NURSERY PRODUCTION II	2	Planning, production, management and marketing of container-grown nursery stock. Student selects crops, propagates them and is responsible for all aspects of production, including cost accounting.	
PLSC 330	LANDSCAPE CONSTRUCTION DETAILS	4	Introduction to principles involved in design and installation of landscape elements: stone, brick, concrete, wood and metal.	
PLSC 331	LANDSCAPE CONSTRUCTION SYSTEMS	4	Introduction to principles involved in contour grading, site drainage, lighting and irrigation design related to landscaping.	
PLSC 332	BASIC LANDSCAPE DESIGN	4	Application of design principles to actual field problems, drafting and presenting techniques. PREREQ: PLSC212.	
PLSC 340	PLANTS OF ECUADOR	3	Plants of major forest types in Ecuador, including native and introduced species as well as plants of medicinal, industrial and agricultural use. Field trips demonstrate techniques and provide field experience in plant identification. May be cross-listed with ENWC340.	
PLSC 341	TROPICAL FOREST ECOLOGY	3	See ENWC341 for course description. PREREQ: BISC207 and BISC208. COREQ: PLSC340. RESTRICTIONS: Taught in Ecuador in Winter Session.	
PLSC 344	FOREST ECOLOGY	2	See ENWC344 for course description. PREREQ: BISC208.	
PLSC 364	LANDSCAPE HORTICULTURE INTERNSHIP	1-6	Supervised, faculty-monitored, career-related experience in one or more aspects of ornamental horticulture industry. PREREQ: PLSC133.	
PLSC 366	INDEPENDENT STUDY	1-6		
PLSC 390	HONORS COLLOQUIUM: CHOCOLATE	3	Use of chocolate and its origin, horticulture, chemistry, nutrition and sensory evaluation.	
PLSC 399	TEACHING EXPERIENCE	1-2 PF	Practical teaching experience assisting in instruction of an undergraduate course. RESTRICTIONS: Requires overall gpa of 2.75 and 3.0 in major. Must have taken the course in which assisting or have equivalent experience.	
PLSC 401	AGRONOMIC CROP SCIENCE	3	Production and management of major grain and forage crops, with emphasis on diagnosis of production problems and decision making. PREREQ: PLSC151.	
PLSC 403	NURSERY AND GARDEN CENTER MANAGEMENT	4	Production, maintenance and marketing of plants relative to establishment and management of nursery or garden center. PREREQ: PLSC101 or PLSC151.	
PLSC 404	PLANT TAXONOMY	3	Identification, classification and nomenclature of vascular plants, including sight recognition as well as use of alternative-statement keys. Emphasis on economic plant families of eastern United States. PREREQ: PLSC201.	
PLSC 410	INTRODUCTION TO PLANT PHYSIOLOGY	3	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 fundamental level of operation. PREREQ: PLSC201 or BISC208, and CHEM213 or CHEM321.	
PLSC 411	DIAGNOSTIC PLANT PATHOLOGY	3	Consideration of major pathogenic causes of economic losses of plants. Emphasis on principles of etiology, epiphytology, symptoms and control. PREREQ: PLSC303.	
PLSC 413	PRINCIPLES OF PLANT DISEASE CONTROL	3	Principles of plant disease control by exclusion, eradication and resistance. Plant protection with emphasis on fungicides, bacteriocides, and nematocides and their use. PREREQ: PLSC303.	
PLSC 415	VASCULAR PLANT ANATOMY	3	Developmental and comparative study of cells, tissues and organs of vascular plants. Readings in current anatomical literature.	
PLSC 416	PLANT VIROLOGY	4	Epidemiology, detection, identification and control of plant viruses and virus-like agents. PREREQ: PLSC303.	
PLSC 417	GREENHOUSE MANAGEMENT	4	Greenhouse structures, environmental control, cultural techniques and general management practices in greenhouse operations. Laboratory exercises supplement lecture material.	
PLSC 419	SOIL MICROBIOLOGY	4	Characterization of microorganisms and microbial habitats in soil environments. Processes and interactions involving soil microorganisms with respect to agricultural productivity and environmental quality. Introduction to laboratory techniques for observation, enumeration and isolation of soil microorganisms and measurement of associated activities.	
PLSC 420	PLANT PHYSIOLOGY LABORATORY	2	Extraction from higher plants of enzymes and other macromolecules, and assay by chemical tests. Pigment extraction, organelle separation, ion uptake, protein manipulation using centrifuge, spectrophotometer, chromatography and electrophoresis. COREQ: PLSC410.	
PLSC 422	PLANT PROPAGATION	3	Practical and physiological aspects of propagation of economic plants including both sexual and asexual methods.	
PLSC 429	INTRODUCTION TO THE FUNGI	4	Introduction to terminology, structures, and classification of fungi, through study of representative cultures and specimens. Fungi, mushrooms and molds as food, in industry, plant pathology, and in human health and wellness. Practical laboratory experience emphasized.	
PLSC 435	PLANT DEVELOPMENTAL BIOLOGY	3	Anatomical and molecular analysis of plant growth and development with focus on how genes regulate pattern formation and cellular differentiation. PREREQ: PLSC300.	

PLSC 438	FATE/TRANSPORT SOIL CONTAMINANTS	3	Fundamental concepts and mechanisms of contaminant fate and transport in porous media. Includes overview of soil and groundwater as resources; types of soil and groundwater contaminants; transformation and attenuation of contaminants; solute transport in saturated and unsaturated systems. PREREQ: MATH221.	PLSC 605	PLANT BREEDING	3	Improvement of crops through application of genetic principles to breeding methods. PREREQ: ANSC300 or PLSC300 or ENWC300. RESTRICTIONS: Includes at least two mandatory Saturday field trips.
PLSC 440	INTEGRATED PEST AND DISEASE MANAGEMENT	3	See ENWC440 for course description.	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 444	PHYSIOLOGY OF PLANT STRESS	3	Angiosperms' response to biotic and abiotic environmental stresses; mineral nutrients, salt, drought, cold, heat, light, pathogens and herbivores at physiological and molecular levels. PREREQ: PLSC410.	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.
PLSC 446	PLANT CELL BIOLOGY	3	See BISC446 for course description. PREREQ: Introductory organic chemistry.	PLSC 608	ENVIRONMENTAL SOIL CHEMISTRY	3	Principles of soil chemical reactions and their application to environment including: inorganic and organic soil components, soil solution-solid phase equilibria, sorption phenomena, ion exchange reactions, kinetics of soil chemical processes, redox chemistry, soil acidity and salinity. May be cross-listed with CHEM608. PREREQ: CHEM102 or CHEM104.
PLSC 450	PLANTING DESIGN	3	Comprehensive solution of landscape problems. Field application of principles of construction and design. PREREQ: PLSC211, PLSC212 and PLSC332.	PLSC 609	PLANT MICROTECHNIQUE	4	Introduction to techniques useful in microscopically examining diseased and nondiseased plant structures. Emphasis on fixation, embedding, sectioning, staining and interpretation of prepared materials.
PLSC 454	MANAGEMENT OF LANDSCAPE ENTERPRISES	4	How to establish and finance 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 611	DIAGNOSTIC PLANT PATHOLOGY	3	Consideration of major pathogenic causes of economic losses of plants. Emphasis on principles of etiology, epiphytology, symptoms and control. PREREQ: PLSC303.
PLSC 455	ISSUES IN PLANT AND SOIL SCIENCES	3	Introduction to current and emerging issues facing plant and soil sciences professions. Ethics, professionalism, environment, politics, technology and practices foci of discussion groups, student oral and written presentations, case studies, guest lecturers and field trips. RESTRICTIONS: Open to junior and senior majors only.	PLSC 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 461	SOILS AND WETLAND DELINEATION	4	Soil taxonomy, use of a soil survey, properties of hydric soils and wetland delineation using soil characteristics, hydrology and plant ecological principles. PREREQ: PLSC101, PLSC204 and PLSC205.	PLSC 615	VASCULAR PLANT ANATOMY	3	Developmental and comparative study of cells, tissues and organs of vascular plants. Readings in current anatomical literature.
PLSC 465	SEMINAR	1	Oral and written reports in one of the fields of plant science.	PLSC 616	PLANT VIROLOGY	4	Epidemiology, detection, identification and control of plant viruses and virus-like agents. PREREQ: PLSC303.
PLSC 466	INDEPENDENT STUDY	1-6		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 observation, enumeration and isolation of soil microorganisms, and measurement of associated activities.
PLSC 470	WEED BIOLOGY AND CONTROL	4	Introduction to weed science: weed biology and identification, survival strategies, competition, and impact of weeds. Weed management principles and practices including cultural, biological, and chemical control methods. PREREQ: PLSC101 or PLSC151 or PLSC204.	PLSC 620	PLANT PHYSIOLOGY LABORATORY	2	Extraction from higher plants of enzymes and other macromolecules, and assay by chemical tests. Pigment extraction, organelle separation, ion uptake, protein manipulation using centrifuge, spectrophotometer, chromatography and electrophoresis. COREQ: PLSC410.
PLSC 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 629	INTRODUCTION TO THE FUNGI	4	Introduction to terminology, structures, and classification of fungi, through study of representative cultures and specimens. Fungi, mushrooms and molds as food, in industry, plant pathology, and in human health and wellness. Practical laboratory experience emphasized.
PLSC 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 630	COLLECTIONS MANAGEMENT AND CURATION	3	Organization and maintenance of curatorial records including; plant records and labeling, organization of seed plants (phylogeny), nomenclature, policy statements and management concerns. COREQ: PLSC402.
PLSC 603	SOIL PHYSICS	3	Examines importance of soil physics in relation to other disciplines of soil and environmental sciences. Topics include status of water in soil, fundamental principles of water flow, differences between saturated and unsaturated water flow, water balance in the field, infiltration, evapotranspiration, heat, gas and solute (contaminant) transport in soil. May be cross-listed with BREG603. PREREQ: PLSC204.	PLSC 635	PLANT DEVELOPMENTAL BIOLOGY	3	Anatomical and molecular analysis of plant growth and development with focus on how genes regulate pattern formation and cellular differentiation. PREREQ: PLSC300.
PLSC 604	PLANT TAXONOMY	3	Identification, classification and nomenclature of vascular plants, including sight recognition as well as use of alternative-statement keys. Emphasis on economic plant families of eastern United States. PREREQ: PLSC201.				

PLSC 636	ADVANCED PLANT GENETICS	3	Advanced survey of genetics in higher plants, including molecular methods of plant biotechnology. Topics include genome composition and evolution, disease resistance, transposable elements and retrotransposons, DNA methylation and epigenetics, quantitative traits, chromosome structure and gene expression. PREREQ: PLSC300 and PLSC306.	PLSC 823	SEMINAR: PRINCIPLES OF PLANT INFECTION	2	Basic factors governing development of plant infection by phytopathogenic organisms: invasion, parasitism, colonization, dissemination, epidemiology and host-parasite relationships. RESTRICTIONS: Requires permission of instructor.
PLSC 640	INTEGRATED PEST AND DISEASE MANAGEMENT	3	See ENWC640 for course description.	PLSC 831	TAXONOMY OF ORNAMENTAL PLANTS	3	Identification, considering plant families that include majority of ornamental plants grown in botanic gardens, arboreta and horticultural institutions.
PLSC 644	PHYSIOLOGY OF PLANT STRESS	3	Angiosperms' response to biotic and abiotic environmental stresses; mineral nutrients, salt, drought, cold, heat, light, pathogens and herbivores at physiological and molecular levels. PREREQ: PLSC410.	PLSC 832	BOTANIC GARDEN MANAGEMENT	1-10	Lecture and laboratory format conducted at Longwood Gardens to familiarize Longwood Fellows with operations and purposes of all areas of Longwood Gardens and other botanic gardens. RESTRICTIONS: May be repeated for up to ten credits.
PLSC 646	PLANT CELL BIOLOGY	3	See BISC646 for course description. PREREQ: Introductory organic chemistry.	PLSC 833	SEMINAR: SOIL SCIENCE	1	Current topics in soil science discussed from literature.
PLSC 655	POLLUTION MICROBIOLOGY	3	Integration of basic chemical, physical and biological processes that affect biotransformation of organic and inorganic pollutants in soils and subsurface sediments. Organization based on progression from molecular to field scale processes. PREREQ: PLSC204, CHEM213, PLSC101 or BISC207.	PLSC 834	CURRENT TOPICS IN AGRONOMY	1	Seminars to review current agronomic literature.
PLSC 660	PESTICIDES IN THE ENVIRONMENT	3	Roll of pesticides in agriculture and public health. Classification and environmental fate in soil, water and atmosphere. Management practices, non-target effect, detoxification of pesticide waste, risk assessment, regulation, impact of pesticide alternatives. PREREQ: CHEM102.	PLSC 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 670	WEED BIOLOGY AND CONTROL	4	Introduction to weed science: weed biology and identification, survival strategies, competition, and impact of weeds. Weed management principles and practices including cultural, biological, and chemical control methods. PREREQ: PLSC101 or PLSC151 or PLSC204.	PLSC 864	SEMINAR PLANNING AND DEVELOPMENT	1 PF	Planning, developing and hosting major seminar series: topic and speaker selection, format and schedule development, marketing, local arrangements and hosting.
PLSC 675	CURRENT TOPICS: PLANT BIOLOGY	1 PF	Journal club for students interested in discussing hot issues of plant biology.	PLSC 865	SEMINAR	1	
PLSC 800	CURRENT TOPICS IN PLANT SCIENCE	1-3	Discussion of selected topics and recent literature in plant science.	PLSC 868	RESEARCH	1-9	
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 869	MASTER'S THESIS	1-6	
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 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 803	ADVANCED SOIL FERTILITY AND PLANT NUTRITION	3	Analysis of chemical and biochemical factors involved in nutrient availability and transport in soil. Evaluation of current theories of ion uptake, translocation and assimilation. PREREQ: PLSC305 and PLSC410.	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 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 969	DOCTORAL DISSERTATION	1-12 PF	
PLSC 805	INSECT-PLANT CHEMICAL ECOLOGY	2	See ENWC805 for course description.	<hr/> <hr/> PORTUGUESE <hr/> <hr/>			
PLSC 810	KINETICS AND SURFACE CHEMISTRY OF SOILS	3	Kinetics and mechanisms of soil chemical reactions, including application of chemical kinetics to natural systems, rates of sorption/desorption, redox, precipitation/dissolution, and ion exchange processes and application of surface spectroscopic and microscopic techniques to elucidate reactions at soil mineral/water interface. May be cross-listed with CHEM810. PREREQ: PLSC608, and either CHEM418 or CHEM443.	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.
PLSC 819	ECOLOGICAL SOIL MICROBIOLOGY	3	Ecological principles of microbial activities and processes in soil-plant systems: dynamics of soil and rhizosphere populations, symbiotic interactions with plants, and selected topics in environmental quality. PREREQ: PLSC619.	PORT 106	BRAZILIAN PORTUGUESE II - ELEMENTARY/INTERMEDIATE	4	Completion of basic Brazilian Portuguese. Increasing mastery of the basic skills of speaking, listening, reading and writing. PREREQ: PORT105. RESTRICTIONS: Two or three years of high school Brazilian Portuguese acceptable in lieu of prerequisite.
				PORT 207	BRAZIL: PAST AND PRESENT	3	Introduction to Brazil, its people, and the issues confronting them, with emphasis on understanding historical developments that have shaped contemporary Brazilian society. RESTRICTIONS: Taught abroad in English. Does not satisfy the Arts and Sciences language requirement.
				PORT 315	INTENSIVE PORTUGUESE FOR SPANISH SPEAKERS I	3	Basic structures and vocabulary of Portuguese in a concentrated covering of material in PORT105 and PORT106. PREREQ: Any 300-level Spanish course, or graduate status in Spanish, or being a Heritage speaker of Spanish.
				PORT 316	INTENSIVE PORTUGUESE FOR SPANISH SPEAKERS II	3	Continuation of PORT 315. Continued refinement of Portuguese grammar and further development of listening and speaking skills. Includes reading and writing component. PREREQ: PORT315 or equivalent. RESTRICTIONS: Not open to native speakers of Portuguese.

POLITICAL SCIENCE

POSC 100 INTRODUCTION TO POLITICAL SCIENCE	3		POSC 303 PUBLIC ADMINISTRATION	3
Introduction to the study of central concepts of the discipline, such as political power, authority, decision making, conflict management, representation and institutions of government.			Introduction to management in the public sector; personnel, budgeting, leadership, ethics, and the role of civil service in government.	
POSC 102 CIVICS AND ECONOMICS FOR TEACHERS	3		POSC 306 ECONOMIC THEORY OF POLITICS	3
Provides teacher candidates with understanding of fundamental content and concepts embedded within core social studies subjects of civics and economics as they relate to K-8 standards-based instruction. Focuses on developing understanding of content in the two subject areas and how that content might be taught effectively. May be cross-listed with ECON102.			See ECON306 for course description.	
RESTRICTIONS: Elementary teacher education majors only.			POSC 309 POLITICAL CULTURE BY COUNTRY	3
POSC 150 AMERICAN POLITICAL SYSTEM	3		Introduction to the political and civic cultures underpinning and supporting different political systems. Topics may vary depending on host country. May be cross-listed with FLLT309.	
Constitutional principles, structure and functions of the political process in the United States.			RESTRICTIONS: Offered only in conjunction with travel abroad programs. May be repeated for credit when topics vary.	
POSC 151 EXPLORING AMERICAN POLITICS	1		POSC 310 EUROPEAN GOVERNMENTS	3
Analysis of an array of problems in American government and politics. Individual and group participation expected.			Structure and process of British, French, West German and Russian governments.	
COREQ: POSC150.			POSC 311 POLITICS OF DEVELOPING NATIONS	3
RESTRICTIONS: Open only to freshmen and sophomore political science and political science education majors.			Forces determining public policy among the emerging nations. Cross-national comparative analysis.	
POSC 201 INTRODUCTION TO GLOBAL ISLAM	3		RESTRICTIONS: Only one of either POSC211 or POSC311 can count for degree credit.	
Introduction to theology, philosophy and history of Islam. Provides basic introduction to Quran, Traditions of Prophet Muhammad, and fundamentals of Islam law and jurisprudence. Explores different interpretations and manifestations of Islam, both historically and contemporaneously. Surveys rapid globalization of Islam and Muslim communities.			POSC 312 POLITICS OF EAST ASIAN DEVELOPMENT	3
May be cross-listed with HIST201.			Examines contemporary issues and questions of political legitimacy and economic development in East and Southeast Asia. Traditional patterns of authority, impact of Western colonialism, emergence of new Southeast Asian states and the political and economic development of selected countries are covered.	
POSC 202 INTRODUCTION TO SCIENTIFIC INQUIRY	3		POSC 313 AMERICAN FOREIGN POLICY	3
Introduces students to the foundations of scientific social research, with emphasis on political phenomena. Prepares students in the skills needed to conduct scientific research.			Theory, policies and administration of United States foreign policy.	
RESTRICTIONS: Students cannot take both POSC202 and POSC300 for credit.			POSC 315 THIRD WORLD WOMEN IN POLITICS	3
POSC 211 INTRODUCTION TO POLITICS IN DEVELOPING COUNTRIES	3		Introduction to the role of women in politics and society in Africa, Asia, Latin America and the Middle East.	
Forces affecting politics in emerging nations. Impact of colonialism, economic development, military rule, instability and environment. Discussion of how developing nations affect the world political system.			May be cross-listed with WOMS315.	
RESTRICTIONS: Only one of either POSC211 or POSC311 can count for degree credit.			POSC 316 INTERNATIONAL POLITICAL ECONOMY	3
POSC 220 INTRODUCTION TO PUBLIC POLICY	3		Interaction of international political and economic phenomena. Considers history and development of political economy, and the political underpinnings and effects of global monetary, trade, financial and investment systems. Both relations among advanced countries, and between the advanced and poor countries considered.	
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 318 PUBLIC OPINION, POLITICS AND SOCIETY	3
POSC 240 INTRODUCTION TO INTERNATIONAL RELATIONS	3		Examines acquisition and change of political beliefs, attitudes, and opinions, and relationship between political considerations and political behavior. Applied emphasis on survey methods and problems of measuring public opinion.	
Development of international systems, their structure and political economic dynamics. Fundamental analytical concepts and approaches.			POSC 319 TOPICS IN POLITICS AND BROADCAST JOURNALISM	3
POSC 241 EXPLORING INTERNATIONAL RELATIONS	1		See COMM319 for course description.	
Analysis of an array of problems facing the global community. Individual and group participation expected.			POSC 320 PARTIES AND INTEREST GROUPS	3
COREQ: POSC240.			Organization and behavior of political parties and interest groups, including structure, leadership, recruitment and decision making.	
RESTRICTIONS: Open only to freshmen and sophomore international relations majors.			POSC 321 CLASS, ETHNICITY AND POLITICS	3
POSC 266 SPECIAL PROBLEM	1-3		Examines the history, strategic positions and political tactics of cultural and ethnic minorities in the United States. Where appropriate, the politics of cultural and ethnic minorities are compared to that of racial minorities. Attention also given to social class as a factor influencing politics in the United States.	
POSC 270 COMPARATIVE POLITICS	3		POSC 322 RACE AND POLITICS	3
Introduction to comparison of politics "within nations." Covers Europe, Africa, Asia and Latin America.			Provides an insight and understanding of race as an intricate part of the political process in the United States. The role of race in United States politics is explored primarily through the political experiences of black Americans and how the political system has responded.	
POSC 285 CURRENTS IN POLITICAL THEORY	3		May be cross-listed with BAMS322.	
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 323 INTRODUCTION TO WOMEN AND POLITICS	3
POSC 300 DATA ANALYSIS FOR POLITICAL SCIENCE	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.	
Applied statistical analysis, including regression, analysis of variance, descriptive statistics and exploratory data analysis, statistical inference, and measurement.			POSC 324 VOTING AND ELECTIONS	3
POSC 301 STATE AND LOCAL GOVERNMENT	3		Examines various aspects of political behavior including political socialization, the formation of political attitudes and opinion, electoral behavior and political participation. Attention also given to the relationship of political behavior and public policy.	
American federalism with emphasis on government and politics, with special attention to Delaware.			POSC 329 INTERNATIONAL MIGRATION	3
			Interdisciplinary introduction to alternative/complementary disciplinary approaches to the study of human movement between states. Offered on a rotational basis by faculty involved in the University of Delaware migration group. May be cross-listed with GEOG329, HIST329 and/or SOCI329.	

POSC 330 POLITICAL TERRORISM	3	POSC 390 HONORS COLLOQUIUM	3
Selectively examines cases, trends and organizations which have made the violence termed terrorism so salient. Also examines whether governments, including the United States, are responding appropriately to the challenge. RESTRICTIONS: Not open to freshmen except with consent of instructor.		POSC 400 PRACTICUM IN TEACHING POLITICAL SCIENCE	3 PF
POSC 333 CONTEMPORARY POLITICAL IDEOLOGIES	3	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.	
Considers the theoretical development of liberal democracy and significant theoretical and ideological challenges to its dominance including Marxist, Islamist, postcolonial and postmodernist political theories. Students read the original sources of these positions while considering their historical development and application to contemporary politics.		POSC 401 TOPICS IN CONSTITUTIONAL LAW	3
POSC 334 LIBERALISM AND CONSERVATISM	3	Critical topics of constitutional law. Topics vary by instructor. May be cross-listed with WOMS402. RESTRICTIONS: May be repeated for credit when topics vary.	
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 402 CIVIL LIBERTIES: INDIVIDUAL FREEDOMS	3
POSC 339 BRITAIN AND EUROPE	3	Constitutional issues of freedom of speech, press, religion, and separation of church and state.	
Examines Britain's role in an integrated Europe, with focus on contemporary problems and prospects of closer British ties to the European Union and related bodies.		POSC 403 CIVIL LIBERTIES: EQUAL PROTECTION CLAUSE	3
POSC 340 POLITICS AND THE MEDIA	3	Focuses on fundamental rights and the constitutional guarantee of equal protection of the laws.	
Political roles of the media in socialization, political competence, agenda setting, the electoral process and political crises. Emphasis on media-political system interaction and its import in a democratic society. May be cross-listed with COMM340.		POSC 404 THE JUDICIAL PROCESS	3
POSC 341 ENVIRONMENT OF MULTINATIONAL CORPORATIONS	3	Structure, process and personnel of American courts; factors influencing decisions and judicial policy making.	
See BUAD341 for course description.		POSC 405 CONSTITUTIONAL LAW OF THE UNITED STATES	3
POSC 343 SOCIETY, POLITICS AND HEALTHCARE	3	Constitutional principles regulating organization and function of federal government. United States Supreme Court decisions placed in a socio-political context.	
Interdisciplinary study of the political, social, economic and humanistic issues of healthcare and health policy. Students will develop the capacity to understand the political process and its relationship to the healthcare delivery system. May be cross-listed with SOCI343.		POSC 407 AMERICAN PRESIDENCY	3
POSC 350 POLITICS AND THE ENVIRONMENT	3	Modern American presidency with emphasis on presidential recruitment, organization and staffing. The nature and exercise of presidential power in the decision making process.	
Political context of environmental issues; air and water pollution, population control, and conservation.		POSC 408 INTERNATIONAL ORGANIZATION	3
POSC 355 URBAN POLITICS AND COMMUNITY DEVELOPMENT	3	Analysis of the organization of the international system, its structure, operating principles, formal and informal components.	
Examines the decision making processes and the exercise of political power in urban communities. Special focus placed on urban politics and government and the impact of social and economic problems on the development of urban society. Explores the concepts and practices of community development in urban communities.		POSC 409 CONTEMPORARY PROBLEMS OF WORLD POLITICS	3
POSC 362 DIPLOMACY	3	Critical areas of international politics. Topics vary by instructor. May be cross-listed with JWST409. RESTRICTIONS: May be repeated once when topics vary.	
Diplomacy is the art of formal representation and policy implementation. Diplomats need to understand complex material and represent positions in an effective manner. These skills are applicable in a variety of contexts. Readings, discussions, cases and simulations are used to introduce diplomatic skills.		POSC 410 ISLAM IN GLOBAL AFFAIRS	3
POSC 363 INTERNATIONAL LAW AND ORGANIZATION	3	Explores three main elements of political Islam - epistemological, reformative and militant, and examines how the struggle to construct Islam is reconstructing the international system.	
Introduction to the development of international law and international organization.		POSC 411 POLITICS AND POVERTY	3
POSC 366 INDEPENDENT STUDY	1-6	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 372 EAST CENTRAL EUROPEAN POLITICS	3	POSC 412 FOREIGN POLICY OF THE POST-SOVIET UNION	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) are emphasized.		Principles, foreign policies and administration of the former Soviet government and its most important successor states.	
POSC 377 ARAB-ISRAELI POLITICS	3	POSC 413 PROBLEMS IN AMERICAN GOVERNMENT	3
Development of the Arab-Israeli conflict analyzed from the Dreyfus Affair and the Balfour Declaration to current events. May be cross-listed with JWST377.		Contemporary problems in American government and politics. May be cross-listed with WOMS413. RESTRICTIONS: May be repeated for credit once when topics vary.	
POSC 380 INTRODUCTION TO LAW	3	POSC 414 PROBLEMS IN AMERICAN FOREIGN POLICY	3
Broad overview of the nature, functions and limits of law. Emphasis on law as the political instrument used to regulate, control and promote behavior and deal with social problems. May be cross-listed with LEST380.		Contemporary problems in American foreign policy and policy making. RESTRICTIONS: May be repeated for credit once when topics vary.	
POSC 387 AMERICAN POLITICAL THOUGHT	3	POSC 415 FORCE AND WORLD POLITICS	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.		Interrelationship of military and foreign policy; military strategies, arms control and disarmament; and the American experience.	
		POSC 418 CONSTITUTIONAL ISSUES IN AMERICAN PUBLIC SCHOOLS	3
		Case studies are used to explore how controversial issues have arisen in public education over the years, what laws and legal precedents presently govern them, how policies have evolved over time and what questions remain unsolved.	
		POSC 420 INTRODUCTION TO POLITICAL ECONOMY	3
		Recent political and economic history, contemporary economic policy disputes and an analysis of how the Democratic-Republican balance of power affects, and is affected by, changing economic conditions and the results of policies put into effect.	

- POSC 422 POLITICAL LEADERSHIP 3**
Study of the theories and practices of effective political leadership in both contemporary and historical contexts. Includes case materials and may include non-United States cases for study.
- POSC 423 CONGRESS AND PUBLIC POLICY 3**
Democratic functions of a modern legislature; legislative structures and processes; coalitions and cleavages; parties, ideological factions and interest groups; the Federal budget, national priorities and Congressional intervention in the economy; central policy issues before Congress; Congressional oversight of the bureaucracy; Congress and the Presidency; and election of the Congress.
- POSC 424 ENERGY POLICY AND ADMINISTRATION 3**
World and United States energy policies with emphasis on nuclear power, solar energy and fossil fuels. Analyzes progress and design of United States science and technology policy in energy domain.
- POSC 425 ADVANCED TOPICS IN POLITICS AND BROADCAST JOURNALISM 3**
See COMM425 for course description.
- POSC 426 LATIN AMERICAN POLITICAL SYSTEMS 3**
Impact of social and economic change on the political processes.
- POSC 427 POLITICS IN CHINA 3**
General introduction to politics of the People's Republic of China, including examination of politics and modernization efforts under Mao Zedong and Deng Xiaoping and legacies left by both. Significance of Tiananmen, dilemmas of economic and political liberalization, regionalization, and future of Communist Party also discussed.
- POSC 428 POLITICS IN JAPAN 3**
An in-depth study of who governs Japan and how these relations have evolved since the end of World War II.
- POSC 429 SOUTHEAST ASIA AND THE WORLD 3**
Examines patterns of international relations within Southeast Asia and between the region and greater powers, Southeast Asia's insecurity and patterns of relations at the domestic, regional and global levels. Discussion of contemporary issues including the emergence of economic blocs, the rise of China and the future of the Association of Southeast Asian Nations.
- POSC 430 INTERMESTIC RELATIONS OF ISLAM AND AMERICA 3**
Explores intermestic (international and domestic) relations between Islam and United States. Integrates and applies prior learning about American domestic politics, America's foreign relations, world politics and existing global crisis between United States and Muslim World in wake of attacks of September 11, 2001 and subsequent United States invasion and occupation of Iraq.
- POSC 431 LATIN AMERICAN POLITICS: COUNTRIES 3**
Contemporary political events in three Latin American nations. Comparisons of the actions and influence of the military, church, bureaucracies, political parties and guerrilla groups in three different Latin American settings: modern, transitional and traditional.
- POSC 432 POLITICAL SYSTEM OF THE POST-SOVIET UNION 3**
Structure and process of the political system of the USSR and its most important successor states (Russia, Ukraine, Byelarus, Kazakhstan and others).
- POSC 433 AFRICAN POLITICS 3**
Overview of politics and society in sub-Saharan Africa including: colonialism, the rise of nationalism, decolonization, single-party and military rule, the role of social movements and religious, class, gender and ethnic identities and the move toward economic and political liberalization.
- POSC 434 POLITICAL THOUGHT I 3**
From Plato to Machiavelli.
- POSC 435 POLITICAL THOUGHT II 3**
From Machiavelli to present.
- POSC 436 POLITICS AND LITERATURE 3**
Class, civil rights, feminism, revolution and other political issues examined through novels, film and other literary works.
May be cross-listed with FLLT436 and/or WOMS436.
- POSC 437 WHO GOVERNS: PERSPECTIVES ON POLITICAL POWER 3**
Raises the question "Who Governs?" and attempts to answer it by critically examining various schools of thought about who actually has and who should have political power in capitalist countries.
- POSC 439 PROBLEMS IN AFRICAN POLITICS 3**
Examination of selected topics in contemporary African politics. Focuses in-depth on aspects of politics and society in a specific region of Africa or investigates in greater detail issues confronting Africa today such as economic structural adjustment, democratization and state-society relations.
May be cross-listed with BAMS439.
- POSC 441 PROBLEMS OF WESTERN EUROPEAN POLITICS BY COUNTRY 3**
Intensive examination of European politics from the perspective of a specific country, e.g., Spain, England and France.
RESTRICTIONS: Offered only in conjunction with travel abroad programs. May be repeated for credit when topics vary.
- POSC 442 PROBLEMS OF WESTERN EUROPEAN POLITICS 3**
Examination of current political trends in Western European politics, including changes in party systems and problems of European integration.
- POSC 443 CHINA AND THE WORLD 3**
Historical and theoretical examination of Chinese foreign policy since 1949, including discussion of China's relations with larger and developing powers, China's historical conception of itself in the world, significance of China's interdependence with the world and China's participation in international and regional organizations.
- POSC 444 GLOBAL AGENDA 3**
Seminar survey of current geopolitical problems facing the United States government and global news media. Guest lecturers and practitioners in diplomacy and the international media explore the problems, United States foreign policy and media influence upon both.
May be cross-listed with COMM444.
RESTRICTIONS: May be repeated for credit when topics vary.
- 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 United States foreign policies also examined and evaluated.
- POSC 446 INTERNATIONAL HUMAN RIGHTS ON FILM 3**
Study of history, evolution and current status of universal human rights using film as a primary medium. Content covers origins of the international human rights movement during and after WWII. A series of feature films and documentaries also highlight recent and current human rights violations in foreign nations.
- POSC 448 THEORIES OF INTERNATIONAL RELATIONS 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 451 PROBLEMS IN POLICY AND ADMINISTRATION 3**
Examination of select topics related to contemporary public administration or the study of public policy and issues and controversies in a select policy area.
- POSC 452 URBAN POLITICS AND POLICY 3**
Examines the exercise of political power, the policy making process, and contemporary policy issues in urban areas. Special emphasis on the study of contemporary political relationships and the social, political, and economic problems and dilemmas within urban communities.
- POSC 453 PUBLIC SECTOR HUMAN RESOURCE MANAGEMENT 3**
Recruitment, selection, training, performance assessment and pay issues in public personnel administration.
- POSC 454 ORGANIZATIONAL BEHAVIOR AND THEORY IN THE PUBLIC SECTOR 3**
Examines major administrative and organizational theories ranging from Weberian bureaucracy to organizational humanism as applied to public organizations. Explores various aspects of behavior in the public organizational settings through analysis of individuals, groups and the organizations as a whole.
- POSC 455 PUBLIC BUDGETING AND FINANCIAL MANAGEMENT 3**
Revenue and expenditure systems, alternative budget formats, basic principles of accounting and capital financing in the public sector.
- POSC 456 DISASTER AND POLITICS 3**
United States emergency management and disaster policy examined through books, articles and video tapes dealing with governmental preparedness for, and response to, natural and human-caused disasters and emergency incidents.

POSC 458 COMMUNITY SERVICE FIELDWORK	3	POSC 633 AFRICAN POLITICS	3
Fieldwork experiences in public or private community service agencies. Students share and analyze experiences in a seminar setting with academic requirements. RESTRICTIONS: May be repeated for credit once when topics vary.		Overview of politics and society in sub-Saharan Africa including colonialism, the rise of nationalism, decolonization, single-party and military rule, the role of social movements and religious, class, gender and ethnic identities and the move toward economic and political liberalization.	
POSC 463 THE UNITED NATIONS AND WORLD AFFAIRS	3	POSC 634 POLITICAL THOUGHT I	3
Examines the development, institutional structure, and prospects of the United Nations and UN system.		In-depth study of major political philosophers of the Western tradition from Plato to Machiavelli.	
POSC 464 INTERNSHIP IN POLITICAL SCIENCE	1-6	POSC 635 POLITICAL THOUGHT II	3
Internship in a political science or international relations-related field. Includes preparation of a journal of activities and a final project. RESTRICTIONS: Requires permission of instructor.		In-depth study of major political philosophers of the Western tradition from Machiavelli to the present.	
POSC 465 MODEL ORGANIZATION OF AMERICAN STATES	3	POSC 639 PROBLEMS IN AFRICAN POLITICS	3
Theoretical and practical preparation for participation in the Model Organization of American States conference held in Washington, D.C. each year. Participation as delegates to the week-long simulation. RESTRICTIONS: May be repeated once for credit when topics vary. May only count toward political science or international relations major one time.		Examination of selected topics in contemporary African politics. Focus in-depth on aspects of politics and society in a specific region of Africa or investigate in greater detail issues confronting Africa today such as economic structural adjustment, democratization and state-society relations.	
POSC 466 INDEPENDENT STUDY	1-6	POSC 640 INTERNATIONAL DEVELOPMENT POLICY AND ADMINISTRATION	3
		Poverty and inequality in developing countries and the economic development policies employed to alleviate them. Emphasis on policy reform, trade strategies, sustainable development, and the role of the state. The approaches used by the World Bank, the IMF and USAID. May be cross-listed with UAPP640.	
POSC 468 UNDERGRADUATE RESEARCH	1-6	POSC 642 PROBLEMS OF WESTERN EUROPEAN POLITICS	3
Research conducted under the direction of or in conjunction with a faculty member. May result in a major research paper or be incorporated into a faculty project.		Examination of current political trends in Western European politics, including changes in party systems and problems of European integration.	
POSC 470 SENIOR HONORS SEMINAR	3	POSC 650 PROBLEMS OF LATIN AMERICAN POLITICS	3
		Current political issues in selected Latin American countries.	
POSC 475 MODEL UNITED NATIONS	3	POSC 651 PROBLEMS IN POLICY AND ADMINISTRATION	3
Intensive preparation for effective participation in the National Model United Nations held in New York City each spring. RESTRICTIONS: May be repeated once for credit when topics vary. May only count toward political science or international relations major one time.		Examination of select topics related to contemporary public administration or the study of public policy and issues and controversies in a select policy area.	
POSC 604 INTERNATIONAL LAW	3	POSC 652 TOPICS IN POLITICAL THEORY	3
See MAST673 for course description.		Focuses on selected topics in political theory, including Marxism, Liberalism and Contemporary Political Theory.	
POSC 605 TOPICS IN LAW AND COURTS	3	POSC 653 POLITICS AND HEALTHCARE	3
Content varies from year to year. Possible topics may be comparative public law, jurisprudence, constitutionalism. A major research paper is required.		Prepares students to understand and assess the American healthcare delivery system. Examines the political dynamics involved in developing healthcare policies in both the public and private sectors. May be cross-listed with UAPP653.	
POSC 610 ISLAM IN GLOBAL AFFAIRS	3	POSC 656 POLITICS AND DISASTER	3
Explores three main elements of political Islam - epistemological, reformative and militant, and examines how the struggle to construct Islam is reconstructing the international system.		Politics and public administration of governmental preparedness for, and response to, natural and human-caused disasters and emergency incidents. May be cross-listed with UAPP656.	
POSC 612 FOREIGN POLICY OF THE POST-SOVIET UNION	3	POSC 659 TOPICS IN PUBLIC ADMINISTRATION	1-3
Principles, foreign policies and administration of the former Soviet government and its most important successor states.		See UAPP659 for course description.	
POSC 614 JUDICIAL PROCESS	3	POSC 663 DECISION TOOLS FOR POLICY ANALYSIS	3
Examines the structure, personnel, and process of the American judiciary, including factors that influence judicial decisions and the scope and nature of judicial policy making.		See MAST663 for course description.	
POSC 615 FORCE AND WORLD POLITICS	3	POSC 678 ADMIRALTY AND MARITIME LAW	3
Interrelationship of military and foreign policy; military strategies, arms control and disarmament; and the American experience.		See MAST678 for course description.	
POSC 624 ENERGY POLICY AND ADMINISTRATION	3	POSC 679 SHIPPING AND PORT MANAGEMENT	3
World and United States energy policies with emphasis on nuclear power, solar energy and fossil fuels. Analyzes progress and design of United States science and technology policy in energy domain. May be cross-listed with MAST620 and/or UAPP625.		See MAST679 for course description.	
POSC 626 CONSERVATION AND RENEWABLE ENERGY POLICY	3	POSC 681 METROPOLITAN INFRASTRUCTURE AND TRANSPORTATION	3
See UAPP626 for course description.		See UAPP681 for course description.	
POSC 627 LATIN AMERICAN POLITICAL SYSTEMS	3	POSC 683 REGIONAL POLICY ANALYSIS	3
Impact of social and economic change on the political processes.		See UAPP683 for course description.	
POSC 628 COMPARATIVE ENVIRONMENTAL POLITICS	3	POSC 685 PERSONNEL AND HUMAN RESOURCE ISSUES: CURRENT TOPICS	3
See UAPP627 for course description.		See UAPP685 for course description.	
POSC 629 SOUTHEAST ASIA AND THE WORLD	3	POSC 686 STATE AND LOCAL GOVERNMENT	3
Examines patterns of international relations within Southeast Asia and between the region and greater powers, Southeast Asia's insecurity and patterns of relations at the domestic, regional and global levels. Discussion of contemporary issues including the emergence of economic blocs, the rise of China and the future of the Association of Southeast Asian Nations.		See UAPP686 for course description.	
POSC 632 POLITICAL SYSTEM OF THE POST-SOVIET UNION	3	POSC 687 STATE GOVERNMENT MANAGEMENT AND POLICY	3
Structure and process of the political system of the USSR and its most important successor states (Russia, Ukraine, Byelarus, Kazakhstan and others).		See UAPP687 for course description.	
		POSC 688 TOPICS IN STATE AND LOCAL MANAGEMENT	3
		See UAPP688 for course description.	

- POSC 800 SEMINAR: THEORIES OF POLITICAL INQUIRY 3**
Introduces basic topics of political inquiry including philosophies of science, epistemologies and theory building, and research design. Conceptual and normative issues are explored.
- POSC 801 RESEARCH DESIGN FOR POLITICAL SCIENCE 3**
Seminar helps students understand and evaluate alternative research methods and research design. Each participant has an opportunity to write a research proposal that is then critiqued by members of the class and the instructor.
- POSC 802 SEMINAR: DEVELOPING AND TRANSITIONAL SYSTEMS 3**
Issues, concepts, and scholarship regarding the politics of the developing and transitional countries of Africa, Asia, Eastern Europe and Latin America in a global governance context. Topics may include democratic transition and consolidation, comparative democracy, political economy of liberal economic reform, religion and political culture, new nationalisms and ethnic conflict, and international systemic influences on all the above.
- POSC 803 SEMINAR: PUBLIC ADMINISTRATION 3**
See UAPP803 for course description.
- POSC 804 SEMINAR: POST-INDUSTRIAL SYSTEMS 3**
Issues, concepts, and scholarship regarding the politics of advanced industrial nations of Europe, North America and East Asia in a global governance context. Topics may include state theory and the new institutionalism, political culture and nationalism, the welfare state and reform, party systems, civil society and new social movements, regional integration and transnational dimensions of policy processes.
- POSC 805 SEMINAR: PUBLIC LAW 3**
Core seminar for the field of law and courts. Provides a broad overview of the range, depth and variety of approaches of current research within this field. RESTRICTIONS: Graduate students only.
- POSC 806 NORMATIVE ISSUES IN GLOBAL GOVERNANCE 3**
Examines normative issues in contemporary global governance from perspective of diverse ethical traditions and/or political philosophy.
- POSC 807 UNITED STATES IN THE GLOBAL SYSTEM 3**
Graduate-level introduction to the institutions, politics and social forces that shape United States conduct in the global system. Topics include democratic theory, constitutional foundations, political culture and development, and the historical and institutional dynamics of United States politics.
- POSC 808 AMERICAN POLITICAL INSTITUTIONS 3**
Explores major themes, viewpoints, issues and topics pertaining to the American political system. Themes include stability, change, conflict, American exceptionalism, American political thought, alternative perspectives on democracy, analysis of political parties, interest groups, Congress, the presidency and the courts.
- POSC 810 SEMINAR: COMPARATIVE GOVERNMENT 3**
Focuses on the evolution of the study of politics within national states, the principal theoretical approaches in studying politics cross-nationally and major scholarly controversies. Students review a broad spectrum of comparative research and writing.
- POSC 811 TOPICS IN COMPARATIVE GOVERNMENT 3**
Focuses on selected topics in comparative government and politics.
- POSC 813 SEMINAR: AMERICAN FOREIGN POLICY 3**
Overview of contemporary American foreign policy and policy making, as well as the analytical, conceptual and methodological problems associated with foreign policy analysis.
- POSC 814 POLITICAL ECONOMY OF THE ENVIRONMENT 3**
See UAPP810 for course description.
- POSC 815 INTRODUCTION TO STATISTICAL ANALYSIS FOR POLITICAL SCIENCE 3**
Training in the basics of statistical analysis and quantitative approaches to politics and society. Topics include elementary statistics, probability theory, hypothesis testing and regression analysis. Provides foundation for further quantitative methods.
- POSC 816 ADVANCED SOCIAL RESEARCH FOR POLITICAL SCIENCE 3**
Provides advanced training in applied social research methods. Topics may include econometrics, qualitative methods, game theory, and agent-based modeling. Includes lectures and discussion supplemented by laboratory work involving computer statistical packages and simulations.
- POSC 817 FINANCING ALTERNATIVES IN THE PUBLIC SECTOR 3**
See UAPP817 for course description.
- POSC 818 ENVIRONMENTAL POLICY AND ADMINISTRATION 3**
United States and international environmental politics, policies, laws, and agreements regarding air, water, and natural resource protection. Examines environmental governance regimes, politics and science, theories of environmental policy, public and private interaction, and epistemic communities in global warming, ozone layer protection, environmental public health, etc. May be cross-listed with MAST871 and/or UAPP818.
- POSC 819 MANAGEMENT DECISION MAKING IN PUBLIC AND NONPROFIT SECTORS 3**
See UAPP819 for course description.
- POSC 820 INTERNATIONAL PERSPECTIVES ON ENERGY AND ENVIRONMENT 3**
Policy analysis and political economy at international energy and environmental issues and problems. Encompasses international and multi-national government and private sector organizations, as well as non-governmental, non-profit organizations. May be cross-listed with UAPP820.
- POSC 821 PROSEMINAR: TECHNOLOGY, ENVIRONMENT AND SOCIETY 3**
See UAPP821 for course description.
- POSC 825 COMPARATIVE PUBLIC ADMINISTRATION 3**
Reading and discussion seminar concentrating on the development of administration and bureaucratic elites in developed and developing countries. Attention given to French, British and German bureaucracies and the problems of ethics, decentralization, planning, political influences and external controls. May be cross-listed with UAPP825.
- POSC 829 TAXATION AND FISCAL POLICIES 3**
See UAPP829 for course description.
- POSC 830 SEMINAR: INTERNATIONAL RELATIONS 3**
Surveys broad range of international relations theory including realism, neo-realism, interdependence, unit-level analysis, regime theory, world system theories, post-structuralism, feminism and normative theory. Epistemological and conceptual problems associated with international relations research are explored.
- POSC 833 SEMINAR: NORMATIVE POLITICAL THEORY 3**
Department's core seminar in political philosophy which attempts to acquaint Student with major themes in political thought from "Plato to the present." Within that framework there is normally emphasis placed on the thought of one or two individuals.
- POSC 835 ORGANIZATION AND MANAGEMENT IN PUBLIC AND NONPROFIT SECTORS 3**
See UAPP835 for course description.
- POSC 837 HUMAN RESOURCES MANAGEMENT IN PUBLIC AND NONPROFIT SECTORS 3**
See UAPP837 for course description.
- POSC 838 PUBLIC POLICY ANALYSIS 3**
Seminar covers an overview of the policy process and considers all topics central to an understanding of policy making in the United States. May be cross-listed with MAST838 and/or UAPP838.
- POSC 839 FINANCIAL MANAGEMENT IN PUBLIC AND NONPROFIT SECTORS 3**
See UAPP833 for course description.
- POSC 840 INTERNATIONAL POLITICAL ECONOMY 3**
Considers the political underpinnings and effects of the interaction of political and economic processes at the global level. Reviews schools of thought and various topics including long cycles, foreign investment, monetary and trade regimes, and the political dilemmas of growth and stagnation.
- POSC 842 INTERNATIONAL ORGANIZATION 3**
Introduction to theories of international organization. Focuses on the organization and governance of the international system. Areas of inquiry include the role of norms in structuring interactions in world politics, international regimes, formal international organization and international law.
- POSC 843 GLOBAL GOVERNANCE: THEORY AND CASES 3**
Exploration of international organization, regime and global governance theory. Analysis of global governance arrangements in various issue areas such as the environment, ocean issues, human rights, development, world health, telecommunications, trade and finance. May be cross-listed with MAST843 and/or UAPP843.
- POSC 844 INTERNATIONAL SECURITY 3**
Introduction to the theoretical, empirical and policy-relevant literatures connected with international security affairs, defined as issues connected with the use or threat of force in international affairs. Topics include nuclear deterrence and proliferation, grand strategy, ethnic violence, peacekeeping, and terrorism and counterterrorism.

POSC 845 HUMAN RIGHTS AND GLOBAL GOVERNANCE	3
Seminar that surveys international human rights issues with a special focus on those dimensions of rights most relevant to global governance. Topics include (but are not limited to) cosmopolitan ethics, just war theory, cultural relativism, and human rights regimes.	
POSC 850 COLLOQUIUM ON GLOBAL GOVERNANCE AND SOCIETY	1-3
Departmental speaker series. RESTRICTIONS: First and second year students enroll for one credit and attend the speaker series. Third year Ph.D. students enroll for three credits and the speaker series accompanies a research colloquium.	
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 899 RESEARCH PAPER FOR MASTER OF ARTS	0 PF
Independent study, where the M.A. student works with a supervising faculty member to complete the master of arts research paper.	
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 100 GENERAL PSYCHOLOGY	3
Provides foundation in the application of the scientific method to problems of human behavior and experience.	
PSYC 207 RESEARCH METHODS	3
Reviews the major issues involved in the design of psychological experiments. Includes measurement issues, internal and external validity of experiments, research with single subjects, and research ethics. Discusses both laboratory PREREQ: Grade of C- or better in PSYC100. RESTRICTIONS: Majors and minors only.	
PSYC 209 MEASUREMENT AND STATISTICS	3
Theory and the application of statistical techniques to psychological data. PREREQ: Grade of C- or better in PSYC100 and one course in basic college mathematics. RESTRICTIONS: Majors and minors only.	
PSYC 270 FAMILIES AND DEVELOPMENTAL DISABILITIES	3
See IFST270 for course description.	
PSYC 301 PERSONALITY	3
Survey of data and theories of human personality and affect. PREREQ: PSYC100.	
PSYC 303 INTRODUCTION TO SOCIAL PSYCHOLOGY	3
Analysis of interpersonal behavior with special emphasis on problems of conformity and influence; the organization and dynamics of social groups; and the development of opinions and attitudes. PREREQ: PSYC100.	
PSYC 310 SENSATION AND PERCEPTION	3
Theories and experimental study of sensation and perception. PREREQ: Grades of C- or better in PSYC207 and PSYC209.	
PSYC 312 LEARNING AND MOTIVATION	3
Experimental study of contemporary theories of learning and motivation. PREREQ: PSYC207 and PSYC209.	
PSYC 314 BRAIN AND BEHAVIOR	3
Study of the brain mechanisms underlying hunger, sex, aggression, learning, memory, perception, sleep and waking. May be cross-listed with CGSC314. PREREQ: Grades of C- or better in PSYC207 and PSYC209.	
PSYC 316 BIOLOGICAL BASES OF BEHAVIOR	3
Evolutionary approach towards depression, aging, immunity, eating and sleep disorders, emotions, temperament, development, and aging, and how problems in these areas are made worse by stress. PREREQ: Grades of C- or better in PSYC207 and PSYC209.	

PSYC 318 PHYSIOLOGICAL PSYCHOLOGY	3
Introduction to neural substrates underlying brain/behavior relations. Focuses on neuroanatomy, neurophysiology, neurochemistry, and neuropharmacology. PREREQ: Grades of C- or better in PSYC207 and PSYC209. RESTRICTIONS: Open to majors and minors only.	
PSYC 320 INTRODUCTION TO NEUROSCIENCE	3
Survey of the basic sciences of the brain (neuroanatomy, neurophysiology, neuropharmacology), building on these principles to examine the neurobiological bases of a variety of phenomena, including perception and cognition, memory and amnesia, fear and aggression, and the pharmacokinetics of several mental disorders. PREREQ: Grades of C- or better in PSYC207 and PSYC209.	
PSYC 325 CHILD PSYCHOLOGY	3
Survey of the interactions of physiological, psychological, and environmental factors determining psychological development. Consideration of major theories of child development. PREREQ: PSYC100.	
PSYC 333 PSYCHOLOGY OF WOMEN	3
Psychological analysis of the meaning and implications of being a woman and cause and consequences of the female experience. Biological sex vs. psychological sex-role identity, stereotyping, discrimination, self-concept and the feminist perspective. May be cross-listed with WOMS333. PREREQ: PSYC100.	
PSYC 334 ABNORMAL PSYCHOLOGY	3
Disorders of behavior and consciousness including the various psychoses, psychoneuroses, mental deficiency, and other conditions. PREREQ: PSYC100.	
PSYC 336 PSYCHOLOGY OF HUMAN SEXUALITY	3
Examination of human sexuality using the theoretical perspectives and empirical methods of psychology. Topics include sexuality development, sexual behavior and communication, and sexual disorders and dysfunctions. Emphasis is placed on the influence that social factors have on individual sexual expression. PREREQ: PSYC100.	
PSYC 340 COGNITION	3
Survey of major themes in human thought processes, concept formation, problem solving, creativity, language use and cognitive development. May be cross-listed with CGSC340. PREREQ: Grades of C- or better in PSYC207 and PSYC209.	
PSYC 344 PSYCHOLOGY OF LANGUAGE	3
Describes the nature of human language, how it is used to speak and comprehend, and how it is learned. Subtopics include language and thought, animal communication, and language in special populations, such as children born deaf or blind. PREREQ: Grades of C- or better in PSYC207 and PSYC209.	
PSYC 346 PSYCHOLOGY AND THE LAW	3
See CRJU346 for course description.	
PSYC 350 DEVELOPMENTAL PSYCHOLOGY	3
Analysis of theory and research in developmental psychology including the topics of developmental processes, developmental risk, systems theory and contemporary social issues. PREREQ: Grades of C- or better in PSYC207 and PSYC209. RESTRICTIONS: If both PSYC325 and PSYC350 are taken, only PSYC325 will count for major credit. Open to psychology majors and minors only.	
PSYC 365 PSYCHOLOGY FIELD PLACEMENT	3
Student contracts with any psychology instructor. Requirements include a minimum of four hours per week working in an agency, institution or business, reading assignments and writing a term paper. Placement will be made with assistance from Career Planning and Placement. Inquiries should be made several months in advance. PREREQ: Grades of C- or better in PSYC207 and PSYC209.	
PSYC 366 INDEPENDENT STUDY	1-6
PSYC 370 RESEARCH IN PERSONALITY	3
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: Grades of C- or better in PSYC207 and PSYC209. RESTRICTIONS: If both PSYC301 and PSYC370 are taken, only PSYC301 will count for major credit. Open to psychology majors and minors only.	

- PSYC 380 PSYCHOPATHOLOGY 3**
 Exploration of research on diagnosis, etiology and treatment of major pathological disorders. Emphasis on original research articles, class discussion and assessment instruments, in addition to analysis of video-taped interviews with patients used to illustrate the disorders.
 PREREQ: Grades of C- or better in PSYC207 and PSYC209.
 RESTRICTIONS: If both PSYC334 and PSYC380 are taken, only PSYC334 will count for major credit. Open to psychology majors and minors only.
- PSYC 385 APPLIED SOCIAL PSYCHOLOGY 3**
 Application of basic principles of interpersonal behavior to everyday life. Topics include persuasion, reciprocation, liking, authority, organizations, criminal justice, and health.
 PREREQ: Grades of C- or better in PSYC207 and PSYC209.
 RESTRICTIONS: Open to majors and minors only.
- PSYC 390 SOCIAL PSYCHOLOGY 3**
 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: Grades of C- or better in PSYC207 and PSYC209.
 RESTRICTIONS: If both PSYC303 and PSYC390 are taken, only PSYC303 will count for major credit. Open to psychology majors and minors only.
- PSYC 394 CULTURAL PSYCHOLOGY 3**
 Introduction to the study of how culture shapes psychological experience, including social behavior, cognition, motivation, and the experience of the self. Covers psychological theory and research on human cultural variation and focuses on different national populations (especially North Americans and East Asians), with some attention to the psychological experience of multicultural populations within the United States.
 PREREQ: Grades of C- or better in PSYC207 and PSYC209.
- PSYC 403 PSYCHOLOGY OF NONVERBAL BEHAVIOR 3**
 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: Grades of C- or better in PSYC207 and PSYC209.
 RESTRICTIONS: Open to junior and senior psychology majors and minors only.
- PSYC 406 REDUCTION OF INTERGROUP CONFLICT 3**
 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: Grades of C- or better in PSYC207 and PSYC209.
 RESTRICTIONS: Open to junior and senior psychology majors and minors only.
- PSYC 407 EMOTIONS AND PREVENTIVE INTERVENTION 3**
 Emotions: their neural, expressive, and experiential components and their relation to adaptive and maladaptive behavior. Translating emotion theory and research into therapeutic and preventive interventions. Requirements include doing emotion tutoring with child.
 PREREQ: Grades of C- or better in PSYC207 and PSYC209.
 RESTRICTIONS: Requires permission of instructor. Open to junior and senior psychology majors and minors only.
- PSYC 409 ETHICS IN PSYCHOLOGY 3**
 Focuses on ethical issues, codes, principles, and dilemmas relevant to experimental and applied fields of Psychology.
 PREREQ: Grades of C- or better in PSYC207 and PSYC209.
 RESTRICTIONS: Open to psychology majors and minors only.
- PSYC 410 BIOLOGICAL BASIS OF MOTIVATION AND EMOTION 3**
 Evolutionary approach towards three major modern theories of motivation: ethologists' instinct theory, Freud's psychoanalytic theory and psychologists' drive theory. Covers current work on circadian rhythms, obesity and anorexia, sleep, fever, phobias, learned helplessness, voodoo death, fear, love and aggression.
 PREREQ: Grades of C- or better in PSYC207 and PSYC209.
 RESTRICTIONS: Open to junior and senior psychology majors and minors only.
- PSYC 411 IDEAS IN BIOPSYCHOLOGY 3**
 Focuses on important ideas in biopsychology as communicated in seminal books. Examines at least six influential books in psychology, biology, or philosophy. Students lead the discussions, which will be "problem-based" and focused on the personal and social context, theoretical importance, and social impact of the book. Reading list includes books by Darwin, Dawkins, Sacks, Goleman, Gould, and Lorenz.
 PREREQ: Grades of C- or better in PSYC207 and PSYC209.
 RESTRICTIONS: Open to junior and senior psychology majors and minors only.
- PSYC 412 HORMONES AND BEHAVIOR 3**
 Focuses on description of the physiology of human hormones and the relations of hormones to behavior.
 PREREQ: Grades of C- or better in PSYC207 and PSYC209.
 RESTRICTIONS: Open to psychology majors and minors only and students in the neuroscience program.
- PSYC 414 DRUGS AND THE BRAIN 3**
 Topics include drug treatment of mental illness, and drug abuse/addiction.
 PREREQ: Grades of C- or better in PSYC207 and PSYC209.
 RESTRICTIONS: Open to junior and senior psychology majors and minors only.
- PSYC 415 HISTORY AND SYSTEMS OF PSYCHOLOGY 3**
 Psychology from the early Greeks through the more important "schools" of the twentieth century.
 PREREQ: Grades of C- or better in PSYC207 and PSYC209.
 RESTRICTIONS: Open to junior and senior psychology majors and minors only.
- PSYC 416 PSYCHOLOGICAL PERSPECTIVES ON THE BLACK AMERICAN 3**
 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: Grades of C- or better in PSYC207 and PSYC209.
 RESTRICTIONS: Open to junior and senior psychology majors and minors only.
- PSYC 420 MENTAL ILLNESS: HISTORICAL AND CRITICAL PERSPECTIVES 3**
 Explores historical and current issues in understanding mental illness from biomedical and social constructionist perspectives. Focuses on recent advances and problems in conceptions of cause, diagnosis, and intervention.
 PREREQ: Grades of C- or better in PSYC207 and PSYC209.
 RESTRICTIONS: Open to junior and senior psychology majors and minors only.
- PSYC 421 BIOLOGY AND BEHAVIOR: GENDER, INTELLIGENCE AND PSYCHOPATHOLOGY 3**
 Critically examines psychological claims about the relations between biology and behavior. Organized around the topics of gender, intelligence, and psychopathology and addresses issues raised by evolutionary psychology, behavioral genetics, and biological and brain reductionism.
 PREREQ: Grades of C- or better in PSYC207 and PSYC209.
 RESTRICTIONS: Restricted to junior and senior psychology majors and minors.
- PSYC 424 APPLIED SOCIAL PSYCHOLOGY 3**
 Application of basic principles of interpersonal behavior to everyday life. Topics include persuasion, reciprocation, employee motivation, organizational development, liking and authority.
 PREREQ: Grades of C- or better in PSYC207 and PSYC209.
 RESTRICTIONS: Open to junior and senior psychology majors and minors only.
- PSYC 425 FAMILY CONFLICT AND THE CHILD 3**
 Analysis of specific topic areas in child psychology, such as infancy and cognitive and social development. Topics may vary from year to year.
 PREREQ: Grades of C- or better in PSYC207 and PSYC209.
 RESTRICTIONS: Open to junior and senior psychology majors and minors only.
- PSYC 433 COGNITIVE NEUROSCIENCE 3**
 Examines the brain mechanisms responsible for cognitive functions such as perception, memory, and language. Surveys the neural mechanisms underlying cognition and the current methods for relating mind and brain, including studies of brain-damaged patients and brain imaging techniques.
 PREREQ: Grades of C- or better in PSYC207 and PSYC209.
 RESTRICTIONS: Open to junior and senior psychology majors and minors only.
- PSYC 440 TOPICS IN PSYCHOLINGUISTICS 3**
 Advanced study in the psychology of language. Topics may include linguistic and conceptual development, language and space, the acquisition of the lexicon, biology and environment in language learning, and language comprehension.
 PREREQ: Grades of C- or better in PSYC207 and PSYC209.
- PSYC 442 PERCEPTION, MEMORY AND IMAGINATION 3**
 Addresses controversial issues about what it means to perceive, remember, and imagine our world. Examines research from cognitive psychology, cognitive science, and neuropsychology and includes in-class demonstrations of perceptual illusions, memory distortions, and imagery.
 PREREQ: Grades of C- or better in PSYC207 and PSYC209.
- PSYC 443 TOPICS IN ORGANIZATIONAL COMMUNICATION 3**
 See COMM442 for course description.
- PSYC 445 TOPICS IN ADOLESCENT PSYCHOLOGY 3**
 Analysis of the physiological, psychological and social factors influencing psychological development from late childhood through adolescence.
 PREREQ: Grades of C- or better in PSYC207 and PSYC209.
 RESTRICTIONS: Open to junior and senior psychology majors and minors only.

PSYC 460	ASSESSMENT OF YOUNG CHILDREN	3	
	See IFST452 for course description.		
PSYC 462	LANGUAGE ACQUISITION	4	
	See EDUC462 for course description.		
PSYC 466	INDEPENDENT STUDY	1-6	
	PREREQ: PSYC207 and PSYC209.		
PSYC 468	RESEARCH	3-6	
	Independent research. PREREQ: Grades of C- or better in PSYC207 and PSYC209.		
PSYC 481	CLINICAL PSYCHOLOGY	3	
	Introduction to clinical theories, research and practices. Diagnosis, classification and treatment of behavior disorders. PREREQ: Grades of C- or better in PSYC207 and PSYC209. RESTRICTIONS: Open to junior and senior psychology majors and minors only.		
PSYC 484	SOCIAL MOTIVATION	3	
	Analysis of theory and research in the social psychology of motivation. Students may choose to study either leisure behavior or work motivation. PREREQ: Grades of C- or better in PSYC207 and PSYC209. RESTRICTIONS: Open to junior and senior psychology majors and minors only.		
PSYC 490	SOCIAL INTERDEPENDENCE	3	
	Presents theoretical and empirical approaches of social psychology to the study of conflict versus cooperation between mutually dependent people. Cooperation/conflict is analyzed in terms of the effects of environmental influence, the reward structure of the relationship, and the interpersonal values of participants. PREREQ: Grades of C- or better in PSYC207 and PSYC209. RESTRICTIONS: Open to junior and senior psychology majors and minors only.		
PSYC 491	PSYCHOLOGY OF TEMPORAL ORIENTATION	3	
	Scientific study of how temporal frames of reference regarding the past, present and future affect a variety of basic human processes, especially human behavior. PREREQ: Grades of C- or better in PSYC207 and PSYC209. RESTRICTIONS: Open to junior and senior psychology majors and minors only.		
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. RESTRICTIONS: Requires permission of instructor.		
PSYC 614	PSYCHOPHARMACOLOGY	3	
	Addresses the actions and neurobiology of psychoactive drugs. Emphasis on therapeutic drugs used for major classes of mental and neurological disorders. Drugs of abuse and mechanisms of drug addiction also are discussed.		
PSYC 626	NEUROSCIENCE I	4	
	Structure and function of the sense organs, nervous system and motor systems in relation to integrated behavior. May be cross-listed with BISC626. PREREQ: BISC306, PSYC314, and PSYC310 or PSYC312.		
PSYC 627	NEUROSCIENCE II	3	
	See BISC627 for course description.		
PSYC 630	NEURONS AND NETWORKS	3	
	Introduction to computational neuroscience: computing by real and artificial neurons and networks, and modeling of brain function. Covers theoretical background and involves hands-on projects to explore processing of sensory information, pattern discrimination, learning, memory and behavior. May be cross-listed with CGSC630 and/or CPEG630. RESTRICTIONS: Requires permission of instructor.		
PSYC 642	MENTAL REPRESENTATION AND MEMORY	3	
	Human memory can be conceptualized in terms of representation and information storage within various interrelated mental systems. Critically evaluates research on human memory and representation within the context of major cognitive models. May be cross-listed with CGSC642. RESTRICTIONS: Requires permission of instructor.		
PSYC 668	RESEARCH	1-6	
PSYC 675	LANGUAGE ACQUISITION	4	
	See EDUC675 for course description.		
PSYC 692	SOCIAL SKILLS TRAINING FOR CHILDREN	3	
	See EDUC692 for course description.		
PSYC 806	SOCIAL COGNITION	3	
	Focuses on the major research topics in social cognition, including their theoretical and historical roots. Topics include implicit and explicit attitudes, dual-process models of cognition and their behavioral consequences, and systematic biases in social perception. 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	PERSONALITY IN SOCIAL CONTEXTS	3	
	Examines temporally stable individual differences ("traits") from a variety of perspectives including their origins, assessment, and relationships to behavior in social settings. Special attention is given to the interaction of trait and environmental influences on social behavior. RESTRICTIONS: Requires permission of instructor.		
PSYC 809	RESEARCH DESIGN	3	
	Overview of methodological issues in the conduct of psychological research, including correlational, experimental, and quasi-experimental studies. Special emphasis on clinical and personality research. RESTRICTIONS: Requires permission of instructor.		
PSYC 812	SEMINAR IN SOCIAL INTERDEPENDENCE	3	
	Examines theory and research on the conflict between self interest and collective welfare. Special attention is given to the interaction between intrapersonal motivation and features of the interdependent environment as a model for understanding the resolution of this conflict. RESTRICTIONS: Requires permission of instructor		
PSYC 813	SEMINAR IN INTERGROUP RELATIONS	3	
	Cognitive, motivational and cultural factors involved in the creation of and reduction of intergroup bias and conflict. Emphasis on theoretical and applied perspectives. RESTRICTIONS: Requires permission of instructor.		
PSYC 814	SEMINAR IN EMPLOYEE MOTIVATION	3	
	Examines current research on the motivation of people at work. Special emphasis is given to the application of social psychological theory and empirical findings. Examples of topics are organizational commitment, perceived organizational support, self-efficacy, goal setting, and creativity. RESTRICTIONS: Requires permission of instructor.		
PSYC 817	INDIVIDUAL INTELLIGENCE TESTING	3	
	See EDUC817 for course description.		
PSYC 819	CHILD PSYCHOTHERAPY: ETHICS, DIVERSITY, TREATMENTS	3	
	Survey of theories, schools and techniques of child psychotherapy with a focus on ethics and diversity issues. RESTRICTIONS: Requires permission of instructor.		
PSYC 820	PSYCHODIAGNOSTICS: OBJECTIVE TRAIT AND BEHAVIORAL ASSESSMENT	3	
	Theory and techniques of psychological classification, structured personality assessment, and behavioral assessment. Administration, scoring and interpretation of the MMPI and other self-report inventories. Behavior observation in clinical settings. Clinical vs. statistical prediction. RESTRICTIONS: Requires permission of instructor.		
PSYC 823	LEARNING AND DEVELOPMENT	3	
	See EDUC823 for course description.		
PSYC 827	ADULT PSYCHOTHERAPY: EMPIRICALLY SUPPORTED TREATMENTS	3	
	Schools, theories and techniques focusing on empirically-supported treatments in adult psychotherapy. PREREQ: PSYC819. RESTRICTIONS: Requires permission of instructor.		
PSYC 829	ADVANCED PSYCHOPATHOLOGY	3	
	Nosology and etiology of the behavior disorders of non-organic origin. Theories of psychopathology, including various modes of conceptualizing psychopathology, i.e., medical vs. behavioral and psychosocial models. Reliability and validity of psychodiagnosis; and relevant research and problems of experimental clinical research with institutionalized populations. RESTRICTIONS: Requires permission of instructor.		
PSYC 834	SUPERVISED PRACTICE IN CLINICAL PSYCHOLOGY I	1-3 PF	
	Limited diagnostic and therapeutic practice in clinical setting under professional supervision. RESTRICTIONS: Requires permission of instructor.		

PSYC 835	SUPERVISED PRACTICE IN CLINICAL PSYCHOLOGY II	1-3 PF
Continuation of PSYC834. RESTRICTIONS: Requires permission of instructor.		
PSYC 836	SUPERVISED PRACTICE IN CLINICAL PSYCHOLOGY III	1-3 PF
Continuation of PSYC834 and PSYC835. PREREQ: PSYC834 and PSYC835. RESTRICTIONS: Requires permission of instructor.		
PSYC 837	SUPERVISED PRACTICE IN CLINICAL PSYCHOLOGY IV	1-3 PF
Continuation of PSYC834, PSYC835 and PSYC836. PREREQ: PSYC836. RESTRICTIONS: Requires permission of instructor.		
PSYC 845	CHILDHOOD PSYCHOPATHOLOGY	3
See EDUC813 for course description.		
PSYC 860	PSYCHOLOGICAL STATISTICS	3
Applications to behavior measurement of probability, regression and analysis of variance and covariance; psychometrics and scaling techniques; and design of experiments. RESTRICTIONS: Requires permission of instructor.		
PSYC 861	PSYCHOLOGICAL STATISTICS	3
Further applications to behavior measurement of probability, regression and analysis of variance and covariance; psychometrics and scaling techniques; and design of experiments. RESTRICTIONS: Requires permission of instructor.		
PSYC 864	TEACHING PRACTICUM IN PSYCHOLOGY	3
Prepares graduate students in psychology to teach undergraduate courses. Topics include course design, active learning techniques, effective lecturing, teaching writing, student assessment, campus resources, and teaching philosophies and portfolios. RESTRICTIONS: Requires permission of instructor.		
PSYC 868	RESEARCH	1-6
PSYC 869	MASTER'S THESIS	1-6
RESTRICTIONS: Requires department permission.		
PSYC 964	PRE-CANDIDACY STUDY	3-12 PF
Research and readings in preparation of dissertation and/or qualifying examinations for doctoral students before admission to candidacy but after completion of all required course work. RESTRICTIONS: Not open to students who have been admitted to candidacy.		
PSYC 969	DOCTORAL DISSERTATION	1-12 PF

RUSSIAN

RUSS 105	RUSSIAN I - ELEMENTARY	4
Introduction to the Russian language and development of speaking, listening, reading and writing skills through the use of basic texts.		
RUSS 106	RUSSIAN II - ELEMENTARY/INTERMEDIATE	4
Completion of basic Russian. Increasing mastery of the basic skills of speaking, listening, reading and writing. PREREQ: RUSS105. RESTRICTIONS: Two to three years of high school Russian acceptable in lieu of prerequisite.		
RUSS 107	RUSSIAN III - INTERMEDIATE	4
Review of grammar, continued practice in speaking and writing, and reading texts of average difficulty. PREREQ: RUSS106. RESTRICTIONS: Four years of high school Russian acceptable in lieu of prerequisite. Satisfies College of Arts and Sciences 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 twentieth century Russian short stories and novellas. Several short compositions. Grammar review where appropriate. PREREQ: RUSS107.		

RUSS 305	RUSSIAN CONVERSATION AND COMPOSITION	3
Discussion of current cultural, social and political topics in Russia and the former republics. Vocabulary building, grammar exercises and frequent compositions. PREREQ: Any 200-level course conducted in Russian.		
RUSS 310	INTRODUCTION TO RUSSIAN LITERATURE I	3
Masterpieces of poetry, narrative prose and drama from the nineteenth century. PREREQ: RUSS211 or RUSS305.		
RUSS 312	INTRODUCTION TO RUSSIAN LITERATURE II	3
Masterpieces of poetry, narrative prose and drama from the 20th century. PREREQ: RUSS211 or RUSS305.		
RUSS 325	RUSSIAN CIVILIZATION AND CULTURE	3
Survey of the major cultural, social and political developments in Russia from its inception to the present. PREREQ: RUSS211 or RUSS305.		
RUSS 366	INDEPENDENT STUDY	1-3
RUSS 401	ADVANCED RUSSIAN GRAMMAR AND COMPOSITION	3
Selected topics in advanced Russian grammar, with special attention to participial constructions, verbs of motion, aspect and problems of syntax and word order. Exercises in writing correct and idiomatic Russian. PREREQ: One 300-level Russian course.		
RUSS 440	SPECIAL TOPICS: RUSSIAN DRAMA, PROSE OR POETRY	3
Explores one of the three major genres by examining a specific theme. Subject matter varies and will be announced in registration booklet. PREREQ: Any two 300-level Russian courses. RESTRICTIONS: May be repeated for credit when topics vary.		
RUSS 455	SELECTED AUTHORS, WORKS AND THEMES	3
Works of one or more outstanding authors or on a special theme. PREREQ: Two 300-level Russian literature courses. RESTRICTIONS: May be repeated for credit when topics vary.		
RUSS 465	SEMINAR	3
Various authors and themes. PREREQ: One 400-level Russian literature course. RESTRICTIONS: May be repeated for credit when topics vary.		
RUSS 466	INDEPENDENT STUDY	1-3
RUSS 665	SEMINAR	3
Various authors and themes. RESTRICTIONS: May be repeated for credit when topics vary.		

SCIENCE

SCEN 101	PHYSICAL SCIENCE	4
Structure, processes and concepts of the physical world. RESTRICTIONS: Requires high school algebra. For non-science students with no physics or chemistry background. Not for physics or chemistry major credit. Only one course from among SCEN101, PHYS104, PHYS201 or PHYS207 can count toward graduation.		
SCEN 102	PHYSICAL SCIENCE	4
Structure, processes and concepts of the physical world. RESTRICTIONS: Requires high school algebra. For non-science students with no physics or chemistry background. Not for physics or chemistry major credit. Only one course from among SCEN102, PHYS202 or PHYS208 can count toward graduation.		
SCEN 103	CONCEPTS OF SCIENCE AND TECHNOLOGY	3
Introduction to some of the fundamental science concepts underpinning high technology, emphasizing everyday devices and practical experience, for the development of scientific and computer literacy of non-science majors. RESTRICTIONS: Requires high school algebra.		
SCEN 210	SCIENCE OF COLOR PHENOMENA	4
See ARTC210 for course description.		
SCEN 340	ADVANCED SCIENCE FOR TEACHERS	4
Provides advanced background study for students in the Elementary Teacher Education Milford Program. Topics are drawn from physical, earth and biological sciences and build on science courses previously taken in the program. The areas of science outlined in the State Science Performance Indicators are covered. Along with lecture/discussion, students have hands-on laboratories (including the Smithsonian kits used by the District). RESTRICTIONS: Offered to students in the Milford ETE program.		

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

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

SCEN 492 STUDENT TEACHING SEMINAR: SECONDARY SCIENCE 3 PF
Methods, techniques and problems in student teaching in secondary schools and their solutions. Assertiveness, authority, management, strategies and teaching for understanding.
COREQ: EDUC400.

SCEN 540 ENERGY ACROSS SYSTEMS FOR SECONDARY EDUCATORS 3
Standards-based format challenges and extends the content knowledge of practicing science teachers, grades 6-10, and examines critical topics in significant depth in a problem-based setting. Themes include solar energy, heat, light, electrical power generation, energy transformation, photosynthesis, and energy conservation.
RESTRICTIONS: Intended for practicing teachers.

SCEN 541 THE NATURE OF MATTER FOR SECONDARY EDUCATORS 3
Standards-based format challenges and extends the content knowledge of practicing science teachers, grades 6-10, and examines critical topics in significant depth in a problem-based setting. Themes include the particle model, atomic structure, chemical reactions, and energy transformations including photosynthesis.
RESTRICTIONS: Limited to practicing teachers.

SCEN 545 QUANTITATIVE LITERACY/SCIENTIFIC INQUIRY FOR SECONDARY EDUCATORS 3
Standards-based format challenges and extends the content knowledge of practicing science teachers, grades 6-10, and examines critical topics in significant depth in a problem-based setting. Themes include the relationship between evidence and inference, measurement errors, data representations, from the viewpoint of mathematics and science.
RESTRICTIONS: Limited to practicing teachers.

SCEN 569 DELAWARE'S ECOSYSTEMS 3
Presents the basics of ecosystem structure and function while comparing Delaware's major ecosystems. Integration with ecosystem and wetland kits, science standards and performance indicators; use of field technology; associated environmental issues. Lecture and discussion supplement outdoor studies in meadow, forest, stream, and estuary ecosystems.

SEXUALITIES AND GENDER STUDIES

SGST 200 CULTURAL INTRODUCTION TO SEXUALITIES AND GENDER STUDIES 3
Exploration of the variations in the social construction of lesbian, gay, bisexual, heterosexual, transsexual, transgender and queer identities and communities in contemporary American society by study of gay literature, history, theory, religious and legal issues and the arts including film, music, television and visual arts.
May be cross-listed with WOMS200.

SGST 208 CURRENT ISSUES IN SEXUALITY AND GENDER LECTURE SERIES 1-3
Lecture series in which faculty and guest speakers discuss their research on contemporary and historical perspectives on sexuality and gender. Research presented from several disciplines including sociology, history, literature, art, music, anthropology and psychology, among others.
May be cross-listed with WOMS208.
RESTRICTIONS: May be repeated for credit when topics vary.

SGST 301 GAY AND LESBIAN FILM 3
Explores gay and lesbian issues represented in film and an academic analysis of these issues. Through film, students study the social constructs of sexuality and gender, analyze the role of homosexuality, examine the development of gay and lesbian characterization, and explore the differences between sex and sexuality.
May be cross-listed with WOMS301.

SOCIOLOGY

SOCI 201 INTRODUCTION TO SOCIOLOGY 3
Overview of the sociological perspective of the study of society, social organization and social institutions with special emphasis on the social causes and consequences of human behavior.

SOCI 203 INDIVIDUAL AND SOCIETY 3
Analysis of the social formation of the individual. Particular emphasis on socialization and personality development. The contribution of individual patterns of behavior to the functioning of social systems.

SOCI 204 URBAN COMMUNITIES 3
Urbanization, rural-urban social differences and the organization of urban communities by race, class, ethnicity and stage in the life cycle.
May be cross-listed with BAMS204.

SOCI 206 WOMEN AND WORK 3
See WOMS206 for course description.

SOCI 209 SOCIAL PROBLEMS 3
Topics may include poverty, intergroup conflicts, war, mental illness, aging, adolescence and environmental pollution.

SOCI 211 MEN, CONFLICT AND SOCIAL CHANGE 3
See WOMS211 for course description.

SOCI 213 MEN AND WOMEN IN AMERICAN SOCIETY 3
Provides a sociological framework for analyzing sex and gender relations in contemporary American society. Topics include the social construction of gender, patterns of sex-role socialization, gender stratification in the paid work force, gender relations in the family and other social institutions.
May be cross-listed with WOMS213.

SOCI 215 RACE IN SOCIETY 3
Social definitions of race, how race is incorporated into social institutions and how race structures relationships among diverse groups in society. Includes analysis of rights and privileges denied or extended to groups and how disadvantaged groups work towards racial equality.
May be cross-listed with BAMS215.

SOCI 266 SPECIAL PROBLEM 1-3

SOCI 270 FAMILIES AND DEVELOPMENTAL DISABILITIES 3
See IFST270 for course description.

SOCI 301 INTRODUCTION TO SOCIOLOGICAL RESEARCH 4
Survey of research methods and data analysis employed in sociology.
PREREQ: SOCI201 and completion of the College of Arts and Sciences math requirement.
RESTRICTIONS: Junior status and completion of 12 social science credits strongly recommended.

SOCI 302 SOCIAL DEVIANCE 3
Defining deviance, research on deviance and explaining deviance.
May be cross-listed with CRJU302.

SOCI 303 JUVENILE DELINQUENCY 3
Historical definition of delinquency, abuse and neglect, research in delinquency, causes and treatment of delinquents.
May be cross-listed with CRJU303.
PREREQ: SOCI201 or SOCI209.

SOCI 304 CRIMINOLOGY 3
Nature, kinds and causes of crime. Criminal liability, criminal careers and organized racketeering.
May be cross-listed with CRJU304.
PREREQ: SOCI201 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 PSYC100.

SOCI 308 THE FAMILY 3
Comparative study of the family in various societies provides a background for the analysis of family organization in modern America.
PREREQ: SOCI201 or SOCI203 or SOCI209.

SOCI 311 SOCIOLOGY OF HEALTHCARE 3
Professionalization of health occupations, hospitals as social systems, medical education and practice organizations, healthcare organizations and their interrelationships (politics of health), and health service patterns.

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 319 SOCIOLOGY OF LATIN AMERICA	3	Survey of sociology of Latin American, with sections on geography, population, urbanization, history, politics, family, religion, economy, and education and on race, class, and gender relations.
SOCI 320 PERSONALITY AND POLITICS	3	Role of personality in political behavior. Considerations include the social and psychological motivations for political activity and the differential relationship of personality to variations in political systems, roles, ideologies and dynamics, such as political consensus and cleavage. Attention given to particular methods of research in this specific area of social behavior. PREREQ: SOCI201 or SOCI203 or PSYC100 or POSC150.
SOCI 322 CROWDS, CULTS AND REVOLUTIONS	3	Analysis of forms of behavior in relatively unstructured situations such as crowds, panics, riots and demonstrations; and processes of interaction: susceptibility, contagion, polarization and communication. May be cross-listed with CRJU322. PREREQ: SOCI201.
SOCI 323 SOCIOLOGY OF RISK	3	Focuses on how individuals, organizations, and government agencies assess various types of risk and act with respect to those assessments. Topics include risk perception, risk assessment, risk management under conditions of scientific uncertainty, and public debates about safety. PREREQ: SOCI201.
SOCI 324 ISSUES IN EMERGENCY MANAGEMENT	3	Overview of the development of emergency management as a profession in the United States. Issues associated with emergency management are also discussed with reference to the disaster research literature. PREREQ: SOCI325.
SOCI 325 DISASTERS AND SOCIETY	3	Sociological introduction to the field of disaster studies, including the ways in which societies attempt to prepare for, respond to, and recover from their impacts. PREREQ: SOCI201.
SOCI 326 EMERGENCY AND ENVIRONMENTAL MANAGEMENT PRACTICUM AND SEMINAR	4 PF	Internship in an organization or agency responsible for emergency or environmental management. With approval of the area coordinator, student is assigned to an organization to become familiar with issues, policies and practices pertaining to disasters. Student under direct supervision of agency personnel while in the placement position. In addition to the internship, students are expected to meet weekly in a seminar with the area coordinator and other students to discuss issues and experiences. PREREQ: SOCI321 or SOCI327, and SOCI470. RESTRICTIONS: Approval of the area coordinator
SOCI 327 SOCIOLOGY OF ORGANIZATIONS	3	Business enterprises, the military, governmental bureaus and other large-scale organizations. Bureaucratic structure, internal systems of status and authority, division of labor, social control, and the individual in the organization. PREREQ: SOCI201.
SOCI 328 WORK IN A GLOBAL ECONOMY	3	Role of work in contemporary society. Social, institutional and cultural influences on work. Special emphasis on problem areas such as job satisfaction, professionalism, career patterns, leisure and occupational choice.
SOCI 329 INTERNATIONAL MIGRATION	3	See POSC329 for course description.
SOCI 330 POPULATION, LAW AND SOCIETY	3	Interrelationships among population, law and social structure with an emphasis on analyzing strategies of adaptation to change. Introduction to demographic techniques; contemporary issues such as family planning, population policies, migration, marriage and divorce.
SOCI 331 WORLD POPULATION: PROFILES AND TRENDS	3	Study of the size, composition and distribution of world populations. An examination of the structure and dynamics of selected countries and the specific problems-causes, consequences and possible solutions. Population problems are examined in relationship to social organization, environment and technology.
SOCI 336 THE DETECTIVE IN FILM AND FICTION	3	See CRJU336 for course description.
SOCI 341 WELFARE AND SOCIETY	3	Institutional apparatus created to deal with the welfare problems of an industrial society, development of welfare institutions, their structure and functioning. PREREQ: 18 credit hours in sociology, psychology, political science or economics.
SOCI 343 SOCIETY, POLITICS AND HEALTHCARE	3	See POSC343 for course description.
SOCI 345 SOCIOLOGY OF LAW	3	Analysis of law as a social process in both historical and comparative perspective. Focuses on various theories of law and society and relevant empirical research. May be cross-listed with CRJU345.
SOCI 346 GENDER AND AGING	3	Empirical and theoretical investigation of the aging process. PREREQ: SOCI201 or SOCI203 or PSYC100.
SOCI 348 THEORIES OF SOCIAL WORK PRACTICE	3	Methods of social work practice; casework, group work, community organization; sociological and psychological foundations underlying social services. PREREQ: SOCI201.
SOCI 350 SOCIAL INEQUALITY AND FILM	3	Using a sociological framework for understanding equality, major films are used to explore the depictions and representations of race, gender, sexuality and social class issues. Examines the ideologies presented in films, the contexts that create them and how they contrast with social realities. PREREQ: SOCI201.
SOCI 356 INEQUALITY, CRIME AND JUSTICE	3	See CRJU355 for course description.
SOCI 360 SOCIOLOGY OF RELIGION	3	Sociological analysis of major religions and the societies with which they have been associated; social settings of particular systems of belief; the relation of status; religious affiliation and personal behavior in modern societies. May be cross-listed with JWST360.
SOCI 361 RACIAL INEQUALITY	3	Detailed examination of racial inequality, including the social construction of race, the nature of oppression and advantage, government policies and resistance strategies. There will be attention to the status of men and women and social class diversity within racial-ethnic communities. May be cross-listed with BAMS361. PREREQ: SOCI201.
SOCI 366 INDEPENDENT STUDY	1-3	
SOCI 368 INDEPENDENT RESEARCH	1-6	Independent research under the supervision of a faculty member. Requirements include preparation of a research report consistent with the professional literature in the field. Student and faculty member will file a learning contract describing the research and a report with the department chair. RESTRICTIONS: Requires permission of instructor.
SOCI 369 ALCOHOL, DRUGS AND CRIME	3	See CRJU369 for course description. PREREQ: CRJU110 or SOCI201.
SOCI 399 PRACTICUM: TEACHING SOCIOLOGY	3 PF	Practical experience in undergraduate education is gained by serving as a discussion leader in a course taught by a regular member of the faculty. RESTRICTIONS: Requires permission of instructor. Not for major credit.
SOCI 401 ADVANCED SOCIOLOGICAL METHODS	3	Conceptualization, design, data collection and data analysis in sociological research.
SOCI 402 URBAN STUDIES PRACTICUM AND SEMINAR	4 PF	Field experience and related seminar. Placement in urban planning and service agencies where students work for approximately 160 hours under professionally trained supervisors. Students meet in a weekly seminar with coordinator. PREREQ: SOCI204.
SOCI 407 SOCIOLOGY OF SEX AND GENDER	3	Seminar on sex and gender relations from a sociological perspective. Surveys current research on gender stratification in the paid work force, the feminization of poverty, gender relations in the family, sexual violence, and feminism as a social movement. Special attention given to current theoretical debates on the origins and persistence of sexual inequality and the intersection of gender with race and class in patterns of social stratification. May be cross-listed with WOMS407. PREREQ: SOCI201, and either SOCI213 or WOMS201. RESTRICTIONS: Restricted to junior and senior sociology and women's studies majors.

SOCI 410	HEALTH SERVICES PRACTICUM AND SEMINAR	4 PF	Field experience and related seminar. Placement in health service settings where student works for about 160 hours under supervision of health service administrators. Students meet in a weekly seminar with coordinator. RESTRICTIONS: Requires permission of instructor.	SOCI 444	APPROACHES TO QUALITATIVE INQUIRY	3	Explores such approaches to research as conducting interviews, observing social behavior, content analysis of such material items as films, newspapers, and historical documents, and conducting focus groups. Given opportunity to choose a project and conduct research using these qualitative methods.
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 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 412	RESEARCH PRACTICUM	4 PF	Field experience and related seminar. Placement in research, planning and service agencies where students work for approximately 160 hours under professionally trained supervisors. Students meet in a weekly seminar with coordinator. PREREQ: SOCI301. RESTRICTIONS: Requires permission of instructor.	SOCI 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 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 452	DRUGS AND THE CRIMINAL JUSTICE SYSTEM	3	See CRJU452 for course description. RESTRICTIONS: Requires permission of the instructor.
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 456	LAWYERS AND SOCIETY	3	Seminar focusing upon the social organization and dynamics of the legal profession. Topics include professional association, law school socialization, professional ethics and law practice. May be cross-listed with CRJU456. PREREQ: SOCI201 and three additional sociology courses.
SOCI 418	RACE, GENDER AND POVERTY	3	Examination of contemporary American poverty with attention to race and gender as fundamental dimensions of inequality. Social policy, employment and family composition are key topics. May be cross-listed with BAMS418 and/or WOMS418. PREREQ: SOCI201.	SOCI 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 422	FADS AND FASHIONS	3	Examination of the dynamics of short-term enthusiasms. Emphasis will be on fads and fashions in education, science, medicine, and other institutions, rather than on fashions in clothing.	SOCI 464	INTERNSHIP	1-4 PF	Provides an opportunity to apply sociological theory and research while working in an agency or other organizational setting under supervision of department faculty. Must complete an internship agreement and secure approval from faculty member to sponsor internship.
SOCI 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 466	INDEPENDENT STUDY	1-3	
SOCI 430	COMPARATIVE SOCIOLOGY	3	Exposes sociological similarities and differences between the United States and a selected country on a number of critical sociological topics. Topics include ethnic and religious diversity, culture, demographic structure, social institutions, social stratification and urbanization. May be cross-listed with JWST430. RESTRICTIONS: Requires permission of instructor. Only three credits may apply toward departmental requirement of six 400-level credits. Offered only in the study abroad program and subject to acceptance by the Office of International Programs.	SOCI 470	ENVIRONMENTAL SOCIOLOGY	3	Substantive and theoretical introduction to the major issues in environmental sociology: the emergence and development of the environmental movement; the development of environmental issues; and how environmental issues are related to structural, contextual and perceptual factors. PREREQ: SOCI201 and SOCI312. RESTRICTIONS: Requires upper division status.
SOCI 435	SOCIOLOGY OF AMERICAN JEWRY	3	Examines the demographic, socioeconomic, cultural and institutional dimensions of the United States Jewish population in the context of models of social integration and in comparison to other immigrant groups in the population. These dimensions are used to discuss current issues facing this population sub-group. May be cross-listed with JWST435. PREREQ: SOCI201.	SOCI 495	FIELD EXPERIENCE IN CRIMINAL JUSTICE	4 PF	See CRJU495 for course description.
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 496	PRACTICUM IN TEACHING	1-3 PF	Practical exposure to undergraduate education gained by assisting a member of the faculty in carefully supervised experiences such as discussion leader, crafting questions, consulting with students. Students may not be involved in the grading of student work or the assignment of grades. May be repeated for up to three credit hours. RESTRICTIONS: Requires permission of instructor. Not for major credit.
SOCI 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 605	DATA COLLECTION AND ANALYSIS	3	Survey of methods and techniques for defining research problems and for gathering and analyzing data in sociological research. RESTRICTIONS: Requires permission of instructor.
				SOCI 606	QUALITATIVE METHODOLOGY	3	Focuses on research design, the logic of inquiry and an elaboration of selected issues introduced in SOCI605. Special emphasis on epistemological issues, methodological concerns central to the social sciences and non-positivistic research strategies and techniques.
				SOCI 607	SOCIOLOGY OF GENDER	3	Reviews current research and theory in the sociology of gender with particular attention to issues arising from the gender division of labor, feminism and social change, gender and the structure of social institutions, and the interaction of gender, race, class and sexuality. Introduces sociological theory and methodology as used and revised by scholars working on gender issues.

SOCI 608 GENDER, WORK AND FAMILIES 3
 Brings together studies of the workplace and studies of the family with special focus on areas of overlap. Analysis of gender roles and the work/family overlap as well as focused discussion on issues of family policy.
 RESTRICTIONS: Requires permission of instructor.

SOCI 611 TECHNIQUES OF DEMOGRAPHIC ANALYSIS 3
 Study of demographic equation (fertility, mortality and migration), population processes (composition and distribution) and the use of computers to analyze demographic data.

SOCI 612 DEVELOPMENT OF SOCIOLOGICAL THEORY 3
 Historical survey of the development of sociology and sociological theory beginning with the period of the Social Contract theorists through the classic European theorists of the nineteenth century.

SOCI 614 ADVANCED DATA ANALYSIS 3
 Methods of analyzing data in sociological research focusing on multivariate approaches.
 PREREQ: SOCI605.

SOCI 615 RACE, CLASS AND GENDER 3
 Examines how race, class, and gender structure United States' social institutions and shape contemporary social issues.

SOCI 621 THEORIES AND APPROACHES IN SOCIAL DEVIANCE 3
 General and specific theoretical orientations in the analysis of social deviance.

SOCI 622 COLLECTIVE BEHAVIOR 3
 Process and mechanisms operating in panics, riots, demonstrations and other disruptions of social order.

SOCI 628 CORPORATE AND GOVERNMENTAL DEVIANCE 3
 Analyses and cases of internal organizational behavior when external efforts are made to have these behaviors treated as deviant. Also defenses used by the accused organizations, and consequences of, successfully labeling and sanctioning an organization as deviant.

SOCI 637 LAW AND SOCIETY IN HISTORICAL PERSPECTIVE 3
 Examination of the social history of law, crime and legal institutions in the United States from colonial times to present. Focus is on the role that law has historically played in allocating resources, structuring social relationships, and distributing political power.
 May be cross-listed with HIST637.

SOCI 655 LAW AND SOCIETY 3
 Historical and structural development of legal systems. Emphasis on comparing legal systems in various cultures from Roman and Oriental law to Anglo-American legal systems.

SOCI 658 SOCIAL SCIENCE, LAW AND THE LEGAL PROCESS 3
 Examines the relationship between social science and law. Reviews the use of social science research to understand the operation and impact of law and the legal system. Critically examines the growing use of social science testimony by the courts.

SOCI 661 RACIAL STRATIFICATION 3
 Reviews the concept of race as a social historical category and examines the relationship of racial stratification to other systems of inequality. Also evaluates sociological theories of racial discrimination and institutionalized racism.

SOCI 666 SPECIAL PROBLEM 1-12

SOCI 813 CURRENT ISSUES IN SOCIAL THEORY 3
 Deals with current controversies in social theory such as the public/private distinction, the development of symbolic interactionism and Neo-Marxism.
 RESTRICTIONS: Must have completed one graduate-level course.

SOCI 815 MICROTHEORIES IN SOCIOLOGY 3
 Advanced graduate seminar focusing on microtheoretical approaches in Sociology-symbolic interactionism, social constructionism, and sociological social psychology.
 PREREQ: SOCI612 and SOCI813.
 RESTRICTIONS: Graduate students only. Strongly advised for students taking the doctoral exam in Social Theory.

SOCI 835 THEORETICAL CRIMINOLOGY I 3
 Examines classical and contemporary theories of crime and crime control by focusing on various explanations for why select types of conduct are categorized and treated as criminal, as well as why people engage in criminal behavior. Specific deviant and criminal activities are described and explained using established theoretical frameworks. Provides a comprehensive background in the disciplinary development of criminology.

SOCI 836 APPLICATION OF CRIMINOLOGICAL THEORY AND EMPIRICAL TESTS 3
 Examines issues and strategies involved in the collection and analysis of criminological data. Analyzes major theoretical, empirical, and policy-oriented research related to the design, implementation, and analysis of criminological data. Prepares students for continued study and application of contemporary research in criminology.

SOCI 837 CRIMINOLOGY AND SYSTEMS OF CRIMINAL JUSTICE 3
 Focuses on basic policy issues in the administration of the criminal justice system, whose key elements are law enforcement, courts, and corrections. Prepares students for continued study of these organizations.

SOCI 866 SPECIAL PROBLEM 1-12

SOCI 868 RESEARCH 1-6

SOCI 869 MASTER'S THESIS 1-6

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

SOCI 969 DOCTORAL DISSERTATION 1-12 PF

SPANISH

SPAN 101 ELEMENTARY SPANISH I 3
 Introduction to the Spanish language and a development of speaking, listening, reading and writing skills through the use of basic texts.

SPAN 102 ELEMENTARY SPANISH II 3
 Completion of basic Spanish.
 PREREQ: SPAN101 or SPAN105.

SPAN 105 SPANISH I - ELEMENTARY 4
 Introduction to the Spanish language and a development of speaking, listening, reading and writing skills through the use of basic texts.

SPAN 106 SPANISH II - ELEMENTARY/INTERMEDIATE 4
 Completion of basic Spanish. Increasing mastery of the basic skills of speaking, listening, reading and writing.
 PREREQ: SPAN105.
 RESTRICTIONS: Two to three years of high school Spanish acceptable in lieu of prerequisite.

SPAN 107 SPANISH III - INTERMEDIATE 4
 Review of grammar, continued practice in speaking and writing, and reading texts of average difficulty.
 PREREQ: SPAN106.
 RESTRICTIONS: Four years of high school Spanish acceptable in lieu of prerequisite. Satisfies College of Arts and Sciences language requirement.

SPAN 111 INTERMEDIATE SPANISH I 3
 Review of grammar. Increasing mastery of the basic skills of speaking, listening, reading and writing.
 PREREQ: SPAN102 or SPAN106.
 RESTRICTIONS: Three years of high school Spanish acceptable in lieu of prerequisite.

SPAN 112 INTERMEDIATE SPANISH II 3
 Continued practice in speaking and writing, reading texts of average difficulty, grammar review as needed.
 PREREQ: SPAN111.
 RESTRICTIONS: Four years of high school Spanish acceptable in lieu of prerequisite. Satisfies College of Arts and Sciences language requirement.

SPAN 200 SPANISH COMPOSITION AND GRAMMAR 3
 First part of a thorough grammar review and intensive practice, targeting structure, essential vocabulary, speaking, listening and extensive writing.
 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.
RESTRICTIONS: Prerequisites require a minimum grade of B. Not intended for native speakers.
- SPAN 206 CULTURE THROUGH CONVERSATION 3**
Discussion of topics drawn from contemporary Spanish or Latin American life. For students who wish to broaden their knowledge of Hispanic culture while improving their oral and aural language skills.
PREREQ: SPAN107 or SPAN112.
RESTRICTIONS: Taught abroad only.
- SPAN 207 CONTEMPORARY LATIN AMERICA I 3**
Introduction to contemporary Latin America, its culture, its people, their way of life and the issues confronting them.
RESTRICTIONS: Taught abroad, in both English and Spanish. Not for major credit. Does not satisfy College of Arts and Sciences language requirement. May be repeated for credit when taken on different study abroad programs.
- SPAN 208 CONTEMPORARY SPAIN I 3**
Introduction to contemporary Spain, its culture, its people, their way of life and the issues confronting them.
RESTRICTIONS: Taught abroad, in both English and Spanish. Not for major credit. Does not satisfy College of Arts and Sciences language requirement.
- SPAN 254 LATIN AMERICA IN THE NEWS 3**
Explores topics in contemporary Latin American society, culture and politics as expressed in the news media. Emphasis on current events and issues of Latin America. Focus of study is the Latin American press: newspapers and magazines printed in the Spanish language.
PREREQ: SPAN107 or SPAN112. SPAN200 highly recommended.
- SPAN 255 SPAIN IN THE NEWS 3**
Explores topics in contemporary Spanish society, culture and politics as expressed in the news media. Emphasis on current events and issues of Spain. Focus of study is the Spanish press: newspapers and magazines printed in the Spanish language.
PREREQ: SPAN107 or SPAN112. SPAN200 highly recommended.
- SPAN 300 ADVANCED SPANISH COMPOSITION AND GRAMMAR I 3**
Second part of a thorough review and intensive practice, targeting structure, essential vocabulary, speaking, listening and extensive writing.
PREREQ: SPAN200.
- SPAN 301 SURVEY OF SPANISH LITERATURE 3**
Development of Spanish literature from its origins through the seventeenth century. Study of representative works, discussions and collateral readings.
PREREQ: SPAN201.
- SPAN 302 SURVEY OF SPANISH LITERATURE 3**
Spanish literature from the eighteenth 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 twentieth century.
PREREQ: SPAN201.
- SPAN 305 ORAL COMMUNICATION 3**
For individuals with a comprehensive knowledge of Spanish grammar and vocabulary. Emphasis on refinement of expression of abstract ideas as well as mastery of practical communication.
PREREQ: SPAN200.
RESTRICTIONS: Not intended for native speakers.
- SPAN 306 PRACTICAL ORAL/Written EXPRESSION 3**
Strengthens skills in grammar and vocabulary in preparation for advanced courses. Includes oral exposes, discussion of articles and videos, textual analysis and compositions.
PREREQ: SPAN200.
RESTRICTIONS: Taught abroad only.
- SPAN 307 CONTEMPORARY LATIN AMERICA II 3**
Discussion and study of issues related to contemporary cultural, political and social developments in Latin America.
PREREQ: SPAN200.
- 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 352 INTRODUCTION TO BUSINESS SPANISH 3**
Introduction of essential business/commercial terminology in common business context, reinforcing strategies for understanding, interpreting, and responding to new information, and providing opportunities for interactive practice. Familiarizes student with basic policies and practices of the Hispanic business community. Includes writing, conversation, grammar and culture.
PREREQ: SPAN200 and SPAN201.
- SPAN 355 SPECIAL TOPICS 3**
Explores an area of special interest in Spanish literature or culture studies. Subject matter varies and will be announced in the registration booklet.
PREREQ: SPAN201.
RESTRICTIONS: May be repeated for credit when topics vary.
- SPAN 366 INDEPENDENT STUDY 1-3**
- SPAN 370 STUDIES IN SPANISH LITERATURE TAUGHT IN SPAIN 3**
Presents a historical overview of an area of special interest in Spanish literature or culture studies with emphasis on its cultural and/or cross-cultural context. Topics may include a general survey of Spanish literature from its medieval roots in Latin, Arabic, and Hebrew texts to the multiple influences impacting Spanish literature of the twentieth century.
PREREQ: SPAN201.
RESTRICTIONS: May be repeated for credit when topics vary.
- SPAN 401 ADVANCED SPANISH GRAMMAR II 3**
Study and practice of selected problems of written and oral Spanish syntax and vocabulary as well as textual analysis.
PREREQ: SPAN300.
- SPAN 403 HISTORY OF THE SPANISH LANGUAGE 3**
History of the language from Latin to the present. Historical phonology and morphology.
PREREQ: Any 300-level Spanish course.
- SPAN 406 ADVANCED SPANISH LANGUAGE 3**
Advanced grammatical structure and stylistics with special attention given to technical vocabulary and discourse (e.g., business, law, science, agriculture).
PREREQ: Any 300-level Spanish course.
RESTRICTIONS: Taught abroad only.
- SPAN 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**
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, Mistral, Jimenez, Asturias, Aleixandre, Neruda, Garcia Marquez, Paz and Cela - in relation to their cultural milieux 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 fifteenth to the seventeenth centuries. Authors studied include Santillana, Diego de San Pedro, Luis de Leon, Zayas and others. PREREQ: One SPAN300-level survey of literature.
- SPAN 420 TOPICS: MEDIEVAL LITERATURE 3**
Works of one or more authors or of a special theme or genre within Spanish medieval literature. Example: Love and Passion in the Middle Ages on the Iberian Peninsula. PREREQ: One SPAN 300-level survey of literature.
- SPAN 421 SPANISH MEDIEVAL LITERATURE 3**
Survey of the major authors and genres of Spanish medieval literature from the early lyric poetry through narrative poetry, short story, drama, novel to the fifteenth century. PREREQ: One SPAN 300-level survey of literature course.
- SPAN 430 LATIN AMERICAN NOVEL AND CINEMA 3**
Study of a selection of novels of the twentieth century which brought international recognition to Latin American writers. These novelists depict the social, economic, political and cultural traits of their respective countries. Film versions of some of the novels illustrate artistic interpretations of the subject matter. PREREQ: One SPAN300-level survey of literature.
- SPAN 436 TOPICS: LITERATURE OF THE SPANISH GOLDEN AGE 3**
Works of one or more authors or of a special theme or genre within Spanish literature of the Golden Age (sixteenth and seventeenth centuries). PREREQ: One SPAN 300-level survey of literature course.
- SPAN 439 POSTWAR SPANISH NARRATIVE 3**
The Spanish novel from 1962 to present. Focuses on novels by leading authors such as Luis Martin-Santos, Juan Goytisolo, Juan Benet, Carmen Martin Gaité, Ana Maria Moix and Esther Tusquets. Analysis of these works grounded in international literary theory and criticism. PREREQ: One SPAN300-level survey of literature.
- SPAN 440 TOPICS: EIGHTEENTH AND NINETEENTH CENTURY HISPANIC LITERATURE 3**
Works of one or more authors or of a special theme or genre within Hispanic literature of the eighteenth and nineteenth centuries. PREREQ: One SPAN 300-level survey of literature course.
- SPAN 447 CONTEMPORARY HISPANIC FICTION BY WOMEN 3**
Explores current fiction by women in Spain and Spanish America. Analyzes selected works as individual literary creations, and also situates them in their cultural, historical and aesthetic contexts, using appropriate critical methodologies. PREREQ: One 300-level survey of Spanish literature course.
- SPAN 450 TOPICS: MODERN HISPANIC LITERATURE 1898-1936 3**
Works of one or more authors or of a special theme, genre, or topic within Hispanic literature from 1898 to 1936. PREREQ: One SPAN 300-level survey of literature course.
- SPAN 451 CONTEMPORARY SPANISH POETRY 3**
Analysis of Spanish poetry from Becquer to the present day. PREREQ: One SPAN300-level survey of literature.
- SPAN 452 ADVANCED BUSINESS SPANISH 3**
Refines basic knowledge of Spanish business/commercial terminology by helping students realize the importance of cultural awareness in doing business in Hispanic countries or with Hispanics in the United States. PREREQ: SPAN200 and SPAN201. SPAN300 and SPAN352 highly recommended.
- SPAN 454 INTRODUCTION TO SPANISH CINEMA 3**
Study of modern Spanish cultural history through the films of such masters as Bardem, Saura, Bunuel, Almodovar, Berlanga, Miro, Amenabar, Medem, Paris, Fejerman, etc. Relation of these films to Spanish culture, politics, history, and to European film theory and analysis. PREREQ: Any 300-level survey of Spanish literature. SPAN325 is strongly recommended.
- SPAN 455 SELECTED AUTHORS, WORKS AND THEMES 3**
Works of one or more outstanding authors or on a special theme. PREREQ: One 300-level Spanish literature course. RESTRICTIONS: May be repeated for credit when topics vary.
- SPAN 460 TOPICS: CONTEMPORARY HISPANIC LITERATURE 1936-PRESENT 3**
Works of one or more authors or of a special theme, genre, or topic within Hispanic literature from 1936 to the present. PREREQ: One SPAN 300-level survey of literature course.
- SPAN 462 TOPICS: HISPANIC SHORT FICTION 3**
Explores short stories and novellas by major writers of the Hispanic world. Each narrative is analyzed as an individual work of literature and is situated in its literary, historical and critical contexts. PREREQ: One SPAN 300-level survey of literature course.
- SPAN 464 CONTEMPORARY SPANISH AMERICAN LITERATURE BY WOMEN 3**
Explores twentieth-century fiction by women authors from diverse regions of Spanish America. Analyzes selected works as individual literary creations and situates each author in her specific socio-cultural, historical and literary contexts. PREREQ: One SPAN 300-level survey of literature course.
- SPAN 466 INDEPENDENT STUDY 1-3**
- SPAN 475 TOPICS: HISPANIC CULTURE AND CIVILIZATION 3**
Study of topics in Hispanic culture and civilization, ranging through the geography, history, art and society of Spain and Latin American countries. PREREQ: Either SPAN325 or SPAN326.
- SPAN 484 CONTEMPORARY SPANISH THEATRE 3**
Twentieth century Spanish theater as a reflection of and commentary on society. Principal authors: Garcia Lorca, Buero Vallejo and Sastre. PREREQ: One SPAN300-level survey of literature.
- SPAN 601 ADVANCED SPANISH GRAMMAR 3**
Study and practice of selected problems of written and oral Spanish syntax and vocabulary as well as textual analysis.
- SPAN 603 HISTORY OF THE SPANISH LANGUAGE 3**
History of the language from Latin to the present. Historical phonology and morphology.
- SPAN 615 LATIN AMERICAN LITERATURE AND ITS POLITICAL CONTEXT 3**
In-depth analysis of selected works by contemporary Latin American authors, focusing on techniques used by these writers to reveal the political upheaval that has affected Latin America in recent years.
- SPAN 616 CERVANTES: DON QUIJOTE 3**
The reading of Don Quijote in Spanish; major themes of the book. The life and times of Cervantes. Antecedents to Don Quijote in Spanish literature. The purpose of Don Quijote. Introduction to the language of Cervantes.
- SPAN 617 HISPANIC NOBEL PRIZE AUTHORS 3**
Studies the works of Spanish and Latin American Nobel Prize authors - Echegaray, Benavente, Mistral, Jimenez, Asturias, Aleixandre, Neruda, Garcia Marquez, Paz and Cela - in relation to their cultural milieu on the regional, national and international levels and in relation to their authors' biographies.
- 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 fifteenth to the seventeenth centuries. Authors studied include Santillana, Diego de San Pedro, Luis de Leon, Zayas and others.
- SPAN 620 TOPICS: MEDIEVAL LITERATURE 3**
Works of one or more authors or of a special theme or genre within Spanish medieval literature. Example: Love and Passion in the Middle Ages on the Iberian Peninsula.
- SPAN 621 SPANISH MEDIEVAL LITERATURE 3**
Survey of the major authors and genres of Spanish medieval literature from the early lyric poetry through narrative poetry, short story, drama, novel to the 15th century.
- SPAN 630 LATIN AMERICAN NOVEL AND CINEMA 3**
Study of a selection of novels of the twentieth century which brought international recognition to Latin American writers. These novelists depict the social, economic, political and cultural traits of their respective countries. Film versions of some of the novels illustrate artistic interpretations of the subject matter.
- SPAN 636 TOPICS: LITERATURE OF THE SPANISH GOLDEN AGE 3**
Works of one or more authors or of a special theme or genre within Spanish literature of the Golden Age (sixteenth and seventeenth 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, Carmen Martin Gaité, and Esther Tusquets. Analysis of these works is grounded in international literary theory and criticism.
- SPAN 640 TOPICS: EIGHTEENTH AND NINETEENTH CENTURY HISPANIC LITERATURE 3**
Works of one or more authors or of a special theme or genre within Hispanic literature of the eighteenth and nineteenth centuries.

SPAN 647 CONTEMPORARY HISPANIC FICTION BY WOMEN	3	STAT 418 SAMPLING METHODS	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.		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.	
SPAN 650 TOPICS: MODERN HISPANIC LITERATURE 1898-1936	3	STAT 420 DATA ANALYSIS AND NONPARAMETRIC STATISTICS	3
Works of one or more authors or of a special theme, genre, or topic within Hispanic literature from 1898 to 1936.		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.	
SPAN 651 CONTEMPORARY SPANISH POETRY	3	STAT 466 INDEPENDENT STUDY	1-6
Analysis of Spanish poetry from Becquer to the present day. Special emphasis on stylistics.			
SPAN 655 SELECTED AUTHORS, WORKS AND THEMES	3	STAT 475 STATISTICS FOR ENVIRONMENTAL SCIENCE	3
Works of one or more outstanding authors or on a special theme. RESTRICTIONS: May be repeated for credit when topics vary.		Introduction to statistical methods for analyzing environmental data. Relevant probability and sampling theory introduced, as well as procedures for summarizing, modeling and estimating and making inferences from environmental data. Computer-based statistical package used to explore behavior of different statistical techniques with variety of environmental data sets. May be cross-listed with ENSC475. PREREQ: MATH243 and GEOG250. RESTRICTIONS: If STAT475 is taken, degree credit cannot be given for any of the following courses: STAT370, STAT371 or MATH450.	
SPAN 660 TOPICS: CONTEMPORARY HISPANIC LITERATURE 1936-PRESENT	3	STAT 601 PROBABILITY THEORY FOR OPERATIONS RESEARCH AND STATISTICS	3
Works of one or more authors or of a special theme, genre, or topic within Hispanic literature from 1936 to the present.		Provides basic background in probability theory for further work in statistics and operations research. Basic topics: sample spaces and axioms of probability; conditional probability and independence; Bayes theorem; random variables; moments and moment generating functions; transformations of random variables; common families of distributions; multivariate distributions, covariance and correlation; probability inequalities and limit theorems. PREREQ: MATH243.	
SPAN 662 TOPICS: HISPANIC SHORT FICTION	3	STAT 602 MATHEMATICAL STATISTICS	3
Explores short stories and novellas by major writers of the Hispanic world. Each narrative is analyzed as an individual work of literature and is situated in its literary, historical and critical contexts.		Derived sampling distributions; decision theory; estimation theory; multivariate normal; hypotheses testing; special topics. PREREQ: STAT601.	
SPAN 664 CONTEMPORARY SPANISH-AMERICAN LITERATURE BY WOMEN	3	STAT 603 VECTOR SPACES AND OPTIMIZATION	3
Explores twentieth century fiction by major women authors from diverse regions of Spanish America. Analyzes works as individual literary creations, and situates each author in her specific socio-cultural, historical and literary contexts. Examines the international criticism elicited by each work.		Bases, linear transformations, subspaces, projection theorem, least squares, eigenvalues, eigenvectors, matrix factorizations. Quadratic programming, convexity, duality, Karash-Kuhn-Tucker conditions, constraints, sequential quadratic programming. Linear programming, simplex method, interior point methods. Examples taken from maximum likelihood estimation, robust and ridge regression, resource allocation, transportation problems. PREREQ: MATH243 and MATH349.	
SPAN 675 TOPICS: HISPANIC CULTURE AND CIVILIZATION	3	STAT 608 STATISTICAL RESEARCH METHODS	3
Study of topics in Hispanic culture and civilization, ranging through the geography, history, art and society of Spain and Latin American countries.		See FREC608 for course description.	
SPAN 684 CONTEMPORARY SPANISH THEATRE	3	STAT 609 REGRESSION AND EXPERIMENTAL DESIGN	3
Twentieth-century Spanish theater as a reflection of and commentary on society. Principal authors: Garcia Lorca, Buero Vallejo and Sastre.		Introduction and overview of inferential methods used in analyzing regression models and linear models for experimental designs. PREREQ: STAT608 or equivalent.	
SPAN 869 MASTER'S THESIS	1-6	STAT 611 REGRESSION ANALYSIS	3
		Simple linear and nonlinear regression. Subset regression; principal component and ridge regression. Introduction to experimental design and design models. PREREQ: MATH202 or STAT371.	
SPAN 875 SEMINAR: TOPICS IN SPANISH LITERATURE	3	STAT 612 ADVANCED REGRESSION TECHNIQUES	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.		Selected topics in advanced regression analysis. RESTRICTIONS: Requires permission of instructor.	
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STATISTICS			
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STAT 200 BASIC STATISTICAL PRACTICE	3	STAT 615 DESIGN AND ANALYSIS OF EXPERIMENTS	3
Uses real data from variety of disciplines to explore topics in data analysis, estimation and inference such as graphical displays, estimation of and hypothesis tests on means and proportions, sampling distributions, confidence intervals, analysis of variance, simple linear regression, chi-square tests for independence. PREREQ: College algebra.		Fundamental principles of design, randomized designs, Latin squares, sources of error, components of error. Factorial designs, response surfaces, models for design. PREREQ: STAT371.	
STAT 266 SPECIAL PROBLEM	1-3	STAT 616 ADVANCED DESIGN 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 366 INDEPENDENT STUDY	1-6	STAT 617 MULTIVARIATE METHODS	3
		Multivariate analysis of variance and covariance; classification and discrimination; canonical correlation; principal components; factor analysis. PREREQ: STAT371.	
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 408 STATISTICAL RESEARCH METHODS I	3		
See FREC408 for course description.			
STAT 409 REGRESSION AND EXPERIMENTAL DESIGN	3		
Introduction and overview of inferential methods used in analyzing regression models and linear models for experimental designs. PREREQ: STAT200 or FREC408 or equivalent.			

STAT 618	SAMPLING TECHNIQUES	3	
			Simple random sampling; stratified random sampling; ratio estimates; regression estimates; systematic sampling; cluster sampling; double sampling. PREREQ: STAT371.
STAT 619	TIME SERIES ANALYSIS	3	
			Fundamental topics in time series analysis - features Box and Jenkins techniques of fitting time series data. Includes introduction to appropriate statistical packages. RESTRICTIONS: Requires permission of instructor.
STAT 620	NONPARAMETRIC STATISTICS	3	
			Statistical procedures valid under unrestrictive assumptions; scales of measurement; efficiency comparisons; signed rank procedures; two-sample rank tests; zeros, ties, and other problems of discrete data; order statistics; k-sample procedures; nonparametric measures of correlation. PREREQ: STAT371, STAT601.
STAT 621	SURVIVAL ANALYSIS	3	
			Statistical techniques used in analysis of censored data including Kaplan-Meier estimator, analysis of one, two and K sample problems, and regression analysis based on Cox proportional hazards model. RESTRICTIONS: Requires permission of instructor.
STAT 624	ADVANCED TOPICS IN STATISTICS	3	
			Current statistical and research techniques not covered in other courses. RESTRICTIONS: Requires permission of instructor.
STAT 635	STATISTICAL QUALITY CONTROL	3	
			Process variation, sequence plotting, control charts, cumulative sum process control procedures; process capability studies, acceptance sampling, quality management and organization, and trouble shooting using graphical techniques. PREREQ: STAT371.
STAT 640	STATISTICAL CONSULTING	3	
			Topics include client/consultant relationship; effective communication; identifying the question, developing a plan and presenting results; following up; actual consulting experience.
STAT 641	STATISTICAL LABORATORY	1	
			Requires attendance at weekly statistical laboratory meetings.
STAT 656	BIOSTATISTICS	3	
			Introduction to statistics focused toward applications in biological, medical and other life sciences. Topics include graphical and numerical techniques, random variables and their distribution, estimation and inference. PREREQ: MATH201.
STAT 657	STATISTICS FOR EARTH SCIENCES	3	
			Spatial distributions; directional data; statistical graphics, regression and time series analysis; model validation; sampling; principal components; cluster analysis; discriminant analysis; and statistical software routines. May be cross-listed with GEOL657. PREREQ: MATH201.
STAT 664	STATISTICS INTERNSHIP	1-6 PF	
			Supervised on-the-job experience, performing statistical analysis of problems for clients. RESTRICTIONS: Requires permission of instructor.
STAT 674	APPLIED DATA BASE MANAGEMENT	3	
			See FREC674 for course description.
STAT 675	LOGISTIC REGRESSION	3	
			Practical and computational introduction to logistic regression and related topics. Applications include financial, marketing and biomedical research. Use of SAS and other statistical packages emphasized. RESTRICTIONS: Requires permission of instructor.
STAT 800	ESTIMATION AND STATISTICAL INFERENCE I	3	
			Selected topics in estimation and inference such as uniformly most powerful tests, uniformly most powerful unbiased tests, similarity and completeness, sufficiency, likelihood ratio tests, invariant tests, permutation test. PREREQ: STAT602, MATH602.
STAT 801	ESTIMATION AND STATISTICAL INFERENCE II	3	
			Further topics in estimation and inference covered. PREREQ: STAT800.
STAT 815	LINEAR STATISTICAL INFERENCE I	3	
			Vector random variables, matrix operations, multivariate normal distributions, distribution of functions of vector random variables, topics from multivariate analysis and specific linear models. PREREQ: STAT602, STAT615.
STAT 816	LINEAR STATISTICAL INFERENCE II	3	
			Topics from general linear hypotheses of full rank and not full rank. PREREQ: STAT815.
STAT 818	MULTIVARIATE ANALYSIS	3	
			Likelihood estimation, vector random variables, Hotelling's T-squared distribution of correlation coefficients, classification and discrimination, distribution of sample covariance matrix and generalized variance, and testing multiple hypotheses. PREREQ: STAT800.
STAT 824	ADVANCED TOPICS IN STATISTICS I	3	
			Presentation of current area of statistical application or research. Examples of topics which may be covered include: biometry, bootstrapping, data analysis, response surfaces, survival analysis and time series. PREREQ: STAT816.
STAT 831	TIME SERIES ANALYSIS	3	
			Introduction to fundamental topics in time series analysis featuring analysis in both time and frequency domains. The Box and Jenkins technique of fitting data to autoregressive moving average models used in time domain. Emphasis on model building, evaluation and forecasting. Analysis in frequency domain includes such topics as digital filtering and methods of estimating and interpreting spectrum. PREREQ: STAT602.
STAT 832	TOPICS IN DATA ANALYSIS	3	
			Topics: graphical analysis; model evaluation, robust procedures; influence functions; multidimensional data plots, residual analysis; Bayesian concepts in data analysis.
STAT 836	RESPONSE SURFACE METHODOLOGY	3	
			Derivation of nonlinear relationships between variables. Techniques for characterization and interpreting multidimensional systems through canonical and ridge analysis. Correlation analysis through eigenvalues and eigenvectors for linear systems. PREREQ: STAT602 and either STAT611 or STAT617.
STAT 840	STATISTICAL COMPUTING	3	
			Computer organization. Error in floating point computation. Approximating probabilities. Random numbers: generating and testing. Simulation. Computational linear algebra. Optimization methods appropriate for maximum likelihood computation. Fast Fourier transforms. PREREQ: STAT602 and knowledge of Fortran or equivalent.
STAT 852	ADVANCED TOPICS IN MATHEMATICAL STATISTICS	3	
			Selected topics: Sequential methods, reliability theory, multivariate contingency tables, large sample theory, density estimation, robust and nonparametric estimation. RESTRICTIONS: Requires permission of Department.
STAT 969	DOCTORAL DISSERTATION		1-12 PF
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THEATRE			
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THEA 102	INTRODUCTION TO PERFORMANCE	3	
			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	Use of voice and speech in performance. Includes exercises to develop relaxation, breath support, resonance, vocal strength, optimum pitch and articulatory precision, as well as studies in basic vocal anatomy. Studio format. RESTRICTIONS: Involves some strenuous physical activity.
THEA 206	INTRODUCTION TO DANCE	3	Examines the function and impact of dance in the lives of individuals, societies, and cultures. Lecture and participatory format.
THEA 207	TECHNICAL PRODUCTION PRACTICUM	1-4	Laboratory course for the production of scenery, properties, lighting and sound for public performances of the Professional Theatre Training Program Productions.
THEA 209	COSTUME PRODUCTION PRACTICUM	1-4	Laboratory course for the production of costumes and costume crafts for public performances of the Professional Theatre Training Program Productions.
THEA 226	FUNDAMENTALS OF ACTING	3	Exploration of basic elements of the actor's art and craft so as to deepen and broaden the experience of viewing the theatre. May utilize theatre games, basic text work, improvisation and lecture/demonstrations.
THEA 236	FUNDAMENTALS OF JAZZ DANCE	3	Jazz dance as an art form and vehicle for individual and group expression. Emphasis on rhythm and style. RESTRICTIONS: Previous dance experience recommended.
THEA 300	FUNDAMENTALS OF STAGECRAFT	3	Concentrates on traditional techniques used in the construction and rigging of scenery and properties for the stage. Demonstrates basic techniques and processes through a combination of classroom lecture and laboratory experience. PREREQ: THEA200 or THEA202.
THEA 301	FUNDAMENTALS OF PROPERTIES CONSTRUCTION	3	Introduces basics of organization and management of properties for a theatrical production in addition to basic techniques of property construction. Demonstrates basic techniques and processes through a combination of classroom lecture and laboratory experience. PREREQ: THEA200 or THEA202.
THEA 302	FUNDAMENTALS OF STAGE LIGHTING	3	Introduces basic techniques and processes used in the lighting of theatrical productions. Emphasis on the use and manipulation of lighting equipment. Demonstrates equipment and basic techniques and processes through a combination of classroom lecture and laboratory experience. PREREQ: THEA200 or THEA202.
THEA 303	FUNDAMENTALS OF SCENE PAINTING	3	Introduction to the tools, materials, and techniques of painting scenery for the stage. Demonstrates basic techniques and processes through a combination of classroom lecture and laboratory experience. PREREQ: THEA200 or THEA202.
THEA 304	FUNDAMENTALS OF AUDIO FOR THE THEATRE	3	Introduces the physical phenomenon of sound and the techniques of controlling and manipulating it for theatrical productions. Demonstrates basic techniques and processes through a combination of classroom lecture and laboratory experience. PREREQ: THEA200 or THEA202.
THEA 305	FUNDAMENTALS OF COSTUME CONSTRUCTION FOR THE STAGE	3	Introduces basic costume construction techniques through lectures, demonstrations, and laboratory experience. Culminates in the construction of a finished costume. PREREQ: THEA203.
THEA 306	FUNDAMENTALS OF PATTERNMAKING FOR THE STAGE	3	Teaches basic patternmaking techniques required in costuming through lectures, demonstrations, and laboratory experience. Includes how to recreate historical details used for period theatrical garments. PREREQ: THEA203.
THEA 307	FUNDAMENTALS OF DRAPING FOR THE STAGE	3	Teaches basic draping skills and applies them to period costumes. Examines several historical periods commonly used in theatrical productions. Students create muslins or finished garments from at least four historical periods. PREREQ: THEA203.
THEA 308	FUNDAMENTALS OF COSTUME CRAFTS	3	Provides basic experience in several crafts-related areas commonly utilized in costuming, including maskmaking, surface design, hatmaking, leather work and thermoplastics. PREREQ: THEA203.
THEA 309	FUNDAMENTALS OF STAGE MANAGEMENT	3	Study of the techniques and procedures used in managing theatrical productions from conception through performance. PREREQ: THEA200 or THEA202.
THEA 310	FUNDAMENTALS OF MASKMAKING	3	Includes casting, sculpting human and animal features, and explores various methods and materials for constructing theatrical masks. Students construct three to four masks. PREREQ: THEA203.
THEA 311	FUNDAMENTALS OF SCENE DESIGN	3	Introduction to the exploration of conceptual principles underlying the practice of scene design. Explore elements of visual thinking through the manipulation of drafting and drawing with emphasis on line, form, color, and spatial relationships as they relate to the play. Some artistic ability is helpful. PREREQ: THEA200, or THEA202, or permission of instructor.
THEA 341	THEATRE/DRAMA: CLASSIC/MEDIEVAL	3	Survey of major historical and theoretical developments in theatre practice and dramaturgy during the period. Readings in primary and secondary historical sources, major critical and theoretical texts, and representative plays of the period. May be cross-listed with 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	See MUSC345 for course description.
THEA 347	SPECIAL TOPICS IN THEATRE HISTORY	3	Series of changing topics in history and theory. Topics range from studies of significant movements in theatre to the study of theoretical issues and individual playwrights and genres.
THEA 360	FUNDAMENTALS OF ORAL INTERPRETATION	3	Basic course in interpretation of text for the stage. Concentrates on texts from plays; explores prose and poetry. Emphasis on diction, meaning and presentation. Studio format.
THEA 366	INDEPENDENT STUDY	1-6	
THEA 407	THEATRE PRACTICUM FOR MAJORS	1-4	Students assigned production responsibilities on departmental productions in the areas of lighting, sound, scenery, properties, costuming, stage management, painting and theatre management. RESTRICTIONS: Open to majors only. Requires permission of instructor.
THEA 410	FUNDAMENTALS OF DRAMATURGY	3	Topics covered include various methods of dramatic and entertainment analysis, scene analysis, development of dramaturgical plot, fable and practice. Survey of function and role of the dramaturgy in contemporary theatre. Readings in primary and secondary material.
THEA 420	FUNDAMENTALS OF STAGE DIRECTING	3	Exploration of the director's part in the creative process of theatre. Philosophy, techniques and problems of directing plays. PREREQ: THEA104.
THEA 466	INDEPENDENT STUDY	1-6	

THEA 490 SEMINAR IN THEATRE AND DRAMA	3	Seminar in theatre and drama. Topics will be announced. RESTRICTIONS: Requires permission of instructor.	THEA 616 STAGE SPEECH IIA	1	Continuation of THEA615 with an emphasis on phrasing and verse scansion. PREREQ: THEA615.
THEA 600 DISTINCTIONS OF PROFESSIONAL THEATRE PRACTICE	1-3	Inquiry into the nature of the theatre as an art form; techniques and issues of communication, organization, management, leadership team participation and creativity necessary to the pursuit and accomplishment of fulfilling careers in institutional and commercial theatres. Explores how the nature and purpose of the theatre as an art informs the day-to-day practices, values and behavior of the individual artist. RESTRICTIONS: Requires enrollment in Professional Theatre Training Program. May be repeated up to 12 credit hours.	THEA 617 STAGE SPEECH IIB	1	Continuation of THEA616. PREREQ: THEA616.
THEA 601 DYNAMICS	1	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 up to six credit hours.	THEA 618 STAGE SPEECH IIIA	1	Stage dialects and advanced work in phrasing and verse scansion. Individual tutoring in problem areas. PREREQ: THEA617.
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 619 STAGE SPEECH IIIB	1	Continuation of THEA618. PREREQ: THEA618.
THEA 603 VOICE DEVELOPMENT IB	1	Continuation of THEA602. PREREQ: THEA602.	THEA 620 REHEARSAL AND PERFORMANCE/ACTING	1-6	Practical instruction and assignments in the preparation, rehearsal and performance of theatrical productions. RESTRICTIONS: Requires enrollment in the Professional Theatre Training Program/Acting. May be repeated up to 24 credit hours.
THEA 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 633 STAGE MANAGEMENT ORGANIZATIONAL AND MANAGERIAL TECHNIQUES II	1-2	Development of organizational structuring and communication techniques for the administration of stage managerial projects. RESTRICTIONS: Requires enrollment in the Professional Theatre Training Program/Stage Management.
THEA 605 VOICE DEVELOPMENT IIB	1	Continuation of THEA604. PREREQ: THEA604.	THEA 634 STAGE MANAGEMENT ORGANIZATIONAL AND MANAGERIAL TECHNIQUES IB	1-2	Further development of organizational structuring and communication techniques for the administration of stage managerial projects. PREREQ: THEA633.
THEA 606 VOICE DEVELOPMENT IIIA	1	Individual instruction to identify habitual vocal patterns and to strengthen individual weaknesses in voice. PREREQ: THEA605.	THEA 635 STAGE MANAGEMENT ORGANIZATIONAL AND MANAGERIAL TECHNIQUES IIA	1-2	Development of organizational structuring and communication techniques for the administration of stage managerial projects. PREREQ: THEA634.
THEA 607 VOICE DEVELOPMENT IIIB	1	Continuation of THEA606. PREREQ: THEA606.	THEA 636 STAGE MANAGEMENT ORGANIZATIONAL AND MANAGERIAL TECHNIQUES IIB	1-2	Further development of organizational structuring and communication techniques for the administration of stage managerial projects. PREREQ: THEA635.
THEA 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 638 STAGE MANAGEMENT ORGANIZATIONAL AND MANAGERIAL TECHNIQUES IIIB	1-2	Further development of organizational structuring and communication techniques for the administration of stage managerial projects. PREREQ: THEA637.
THEA 609 STAGE MOVEMENT IB	1	Continuation of THEA608. PREREQ: THEA608.	THEA 639 STAGE MANAGEMENT PRODUCTION SKILLS IA	1-2	Development of stage managerial skills for organizing, preparing and fulfilling theatrical productions from inception through rehearsals and performance. RESTRICTIONS: Requires enrollment in the Professional Theatre Training Program/Stage Management.
THEA 610 STAGE MOVEMENT IIA	1	Continuation of THEA609, with an emphasis on stage combat, tumbling, circus and other advanced movement techniques. PREREQ: THEA609.	THEA 640 STAGE MANAGEMENT PRODUCTION SKILLS IB	1-2	Further development of stage managerial skills for organizing, preparing and fulfilling theatrical productions from inception through rehearsals and performance. PREREQ: THEA639.
THEA 611 STAGE MOVEMENT IIB	1	Continuation of THEA610. PREREQ: THEA610.	THEA 641 STAGE MANAGEMENT PRODUCTION SKILLS IIA	1-2	Development of stage managerial skills for organizing, preparing and fulfilling theatrical productions from inception through rehearsals and performance. PREREQ: THEA640.
THEA 612 STAGE MOVEMENT IIIA	1	Individual instruction to identify habitual movement patterns and to strengthen individual weaknesses in stage movement. PREREQ: THEA611.	THEA 642 STAGE MANAGEMENT PRODUCTION SKILLS IIB	1-2	Further development of stage managerial skills for organizing, preparing and fulfilling theatrical productions from inception through rehearsals and performance. PREREQ: THEA641.
THEA 613 STAGE MOVEMENT IIIB	1	Continuation of THEA612. PREREQ: THEA612.	THEA 644 STAGE MANAGEMENT PRODUCTION SKILLS IIIB	1-2	Further development of stage managerial skills for organizing, preparing and fulfilling theatrical productions from inception through rehearsals and performance. PREREQ: THEA643.
THEA 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 645 REHEARSAL AND PERFORMANCE/STAGE MANAGEMENT	1-5	Practical instruction and assignments in the preparation, rehearsal and performance of theatrical productions. RESTRICTIONS: Requires enrollment in the Professional Theatre Training Program/Stage Management. May be repeated up to 24 credit hours.
THEA 615 STAGE SPEECH IB	2	Continuation of THEA614. Beginning work on verse scansion. PREREQ: THEA614.			

THEA 648	COSTUME CONSTRUCTION	1	Introductory exploration of the mechanics and technology of the art of costuming. Surveys all aspects of the costumer's craft including practical work in the costume shop. RESTRICTIONS: Requires enrollment in the Professional Theatre Training Program/Costume Construction.	THEA 687	SCENERY PAINTING	1	Painting tools, materials, color theory and scenery painting techniques for theatrical production. RESTRICTIONS: Requires enrollment in Professional Theatre Training Program/Technical Production.
THEA 664	INTERNSHIP IN PROFESSIONAL THEATRE	1-9	Engagement with professional theatre in individual discipline area. RESTRICTIONS: Requires enrollment in the Professional Theatre Training Program. May be repeated up to 18 credit hours.	THEA 688	COMPUTER AIDED DRAFTING AND SCENERY CONSTRUCTION	1	Continued work on CAD (drafting) with emphasis on construction work drawings for scenery construction. Further study of standard and specialized scenery construction methods. PREREQ: THEA686.
THEA 665	THEATRE LITERACY	2	Discussion, research, and practicum in theatre terminology, literature and history. RESTRICTIONS: Requires enrollment in the Professional Theatre Training Program. May be repeated up to 12 credit hours.	THEA 692	PRODUCTION AND PERFORMANCE/TECHNICAL	1-6	Practical instruction and assignments in the technical preparation and production of Professional Theatre Training Program public performances. Assignments include (but are not limited to): Master Carpenter, Master Electrician, Property Master, Audio Engineer, Scenic Artist and Technical Director. RESTRICTIONS: Requires enrollment in the Professional Theatre Training Program/Technical Production. May be repeated up to 20 credit hours.
THEA 668	RESEARCH	1-6		THEA 693	PRODUCTION SEMINAR	1	Development of management and communication techniques for effective interaction among stage management, costume production and technical production areas of theatre. RESTRICTIONS: Requires enrollment in the Professional Theatre Training Program. May be repeated up to six credit hours.
THEA 674	SCENERY PRODUCTION	1	Materials, tools, hardware and construction methods used for scenery construction. Emphasis on traditional scenic construction with wood as the primary material. RESTRICTIONS: Requires enrollment in the Professional Theatre Training Program/Technical Production.	THEA 694	SPECIAL TOPICS IN THEATRE PRODUCTION	1-3	Multiple units on advanced topics in theatre production and management. Students select topics from a list offered by PTPP production faculty. RESTRICTIONS: Requires enrollment in the Professional Theater Training Program. May be repeated up to nine credit hours.
THEA 675	PROPERTIES PRODUCTION	1	Concentrates on property production techniques with emphasis on properties management, acquisition, and health and safety. RESTRICTIONS: Requires enrollment in the Professional Theatre Training Program/Technical Production.	<hr/> <hr/> URBAN AFFAIRS AND PUBLIC POLICY <hr/> <hr/>			
THEA 676	SCENERY: METALWORKING	1	Materials, tools and methods of working with metal for scenery construction. PREREQ: THEA674.	UAPP 601	MEASURING AND DEFINING PLANNING PROBLEMS	1	Methods for identifying and measuring planning-related problems, including analyses of land use patterns, population dynamics, economic trends, social indicators, and ecological characteristics as predictors and determinants of future development
THEA 677	PROPERTIES PRODUCTION II	1	Tools, materials and methods for upholstery and drapery, casting, mold-making, and other properties techniques. PREREQ: THEA675.	UAPP 602	INTRODUCTION TO COMPREHENSIVE PLANNING	1	Overview of comprehensive planning process. Description of goals, objectives and components behind development of comprehensive plan and methods for preparing and understanding value of comprehensive plan to community.
THEA 679	SCENERY: STAGE RIGGING	1	Tools, hardware and methods of rigging scenery. Emphasis on standard theatre rigging systems. PREREQ: THEA674.	UAPP 603	INTRODUCTION TO ZONING AND LAND USE CONTROLS	1	Survey of theories underlying land use patterns and description of legal structure and methods surrounding public sector control and management of land use including police power, eminent domain, zoning, subdivision control, and master plans.
THEA 680	LIGHTING PRODUCTION	1	Electrical theory and practice as applied to theatre production. Emphasis on current lighting production practice, systems and equipment. RESTRICTIONS: Requires enrollment in the Professional Theatre Training Program/Technical Production.	UAPP 604	LEADERSHIP IN ORGANIZATIONS	3	Understanding process of change and positively affecting change in organizations through exercise of leadership skills and knowledge.
THEA 681	AUDIO PRODUCTION	1	Sound theory and practice as applied to contemporary theatre production. Emphasis placed on utilizing current systems, equipment and technology for audio production. RESTRICTIONS: Requires enrollment in Professional Theatre Training Program/Technical Production.	UAPP 605	TOPICS IN URBAN AFFAIRS	3	Focuses on selected topics in urban affairs such as urban politics and government, urban education and neighborhood analysis. RESTRICTIONS: May be repeated up to nine credits when topics vary.
THEA 682	LIGHTING DESIGN	1	Essential skills and procedures for creating, documenting and realizing a lighting design for a theatrical production. PREREQ: THEA680.	UAPP 606	LOCAL ECONOMIC DEVELOPMENT: POLICY AND PRACTICE	3	Examines theory and contemporary practice for promoting economic development of local communities. Reviews alternative ways of understanding dynamics of local economic development and devising strategies that benefit community residents.
THEA 683	PRODUCTION PROJECT MANAGEMENT	1	Examines how project management techniques are applied to technical production. Techniques for project analysis, priority setting, scheduling, resource allocation and project tracking will be examined. RESTRICTIONS: Requires enrollment in the Professional Theatre Training Program/Technical Production.	UAPP 607	SEMINAR IN COMMUNITY DEVELOPMENT AND NONPROFIT LEADERSHIP	1	Examines complex ways in which concepts of community analysis and development are used and understood. May be cross-listed with IFST607.
THEA 684	TECHNICAL PRODUCTION SEMINAR	1	Investigation and discussion of technical problems and issues encountered in productions. RESTRICTIONS: Requires enrollment in the Professional Theatre Training Program/Technical Production. May be repeated up to six credit hours.	UAPP 608	POVERTY, NEIGHBORHOODS AND COMMUNITY DEVELOPMENT	3	Examines social science literature through which multidisciplinary analysts described and explained poverty, analyzed neighborhoods, and categorized community development efforts. Focusing on United States, particular attention paid to analyses from 1960 to present. May be cross-listed with IFST608. RESTRICTIONS: Undergraduates require permission of instructor.
THEA 686	INFORMATION TECHNOLOGIES FOR THEATRE	1	Application of computer software to theatrical production practice. Emphasis is placed on CAD (drafting) techniques for theatre production. RESTRICTIONS: Requires enrollment in the Professional Theatre Training Program/Technical Production.				

UAPP 609 FINANCIAL STATEMENT ANALYSIS FOR NONPROFITS	1	UAPP 621 CONFLICT RESOLUTION	1
Geared toward graduate students with little or no background in accounting or reading financial statements. Gives basic understanding of financial statement analysis. Covers basic accounting concepts with emphasis on understanding financial statements of nonprofit organizations.		Introduction to conflict resolution skills. Provides communication and problem solving skills designed to de-escalate conflicts and create win-win solutions. Students learn new ways of approaching conflict while gaining understanding of their own conflict management style. Examines how these skills transfer to workplace. RESTRICTIONS: Requires permission of instructor.	
UAPP 610 URBAN LAND USE PLANNING AND ADMINISTRATION	3	UAPP 622 RESOURCES, DEVELOPMENT AND THE ENVIRONMENT	3
Interaction of political, economic and social forces in planning and land use control process. Emphasis on planning agency administration and current policies impacting planning process, including recently enacted environmental and community development legislation. Concern for role of planner, planning agency and planning function as it relates to economic and community development.		See GEOG622 for course description.	
UAPP 611 REGIONAL WATERSHED MANAGEMENT	3	UAPP 623 INDEPENDENT STUDY IN GEOGRAPHICAL INFORMATION SYSTEMS	1
Reviews practical applications of watershed planning as tool to manage land, water and ecosystem resources. Explores public policies and practices of watershed planning by examining case studies. Uses multidisciplinary approach involving fields of geography, environmental science, geology, public policy, land planning, geographic information systems (GIS) and engineering. May be cross-listed with FREC611.		Students complete self-paced individualized tutorials and apply knowledge in project of their choice. Material addressed includes creation and display of digital maps and data bases, preparation of data sets, sources of data and GIS standards.	
UAPP 612 URBAN HOUSING POLICY AND ADMINISTRATION	3	UAPP 624 SEMINAR IN CRIMINAL JUSTICE	3
Examines problems associated with providing adequate and affordable housing in United States. Covers structure and dynamics of housing market; supply and demand factors; market failure; financing methods; federal, state and local public policy affecting housing, including taxation, regulation, subsidy programs, and land use controls.		Discussion and evaluation of institutional components of criminal justice systems. Topics include police, judicial and correctional systems.	
UAPP 613 PLANNING THEORY AND URBAN POLICY	3	UAPP 625 ENERGY POLICY AND ADMINISTRATION	3
Provides overview of development and current conceptual normative and methodological issues in planning theory as applied to urban regions.		See POSC624 for course description.	
UAPP 614 THE AMERICAN SUBURB	3	UAPP 626 CONSERVATION AND RENEWABLE ENERGY POLICY	3
Examination of historical and geographical origins of American suburb and its role in metropolitan development and larger society. Includes evolution of streetcar and automobile suburbs with special emphasis on post World War II suburban boom and contemporary post-suburban trends. May be cross-listed with GEOG614 and/or HIST614.		Covers current policy issues for energy conservation, energy efficiency, and renewable energy sources. Some prior background in energy policy assumed. Topics include environmental impacts, utility programs, and international comparisons. May be cross-listed with MAST622 and/or POSC626. PREREQ: POSC624.	
UAPP 615 URBAN, REGIONAL AND ENVIRONMENTAL PLANNING	3	UAPP 627 COMPARATIVE ENVIRONMENTAL POLITICS	3
Provides introduction to urban planning. Focuses mainly on United States, 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.		Examines the effect of institutional and systemic factors in the formulation and implementation of environmental policy in several developed and developing countries. Considers the impact of modes of political participation, level of development, and type of political economy on policy. May be cross-listed with POSC628.	
UAPP 616 VOLUNTEER MANAGEMENT	1	UAPP 628 ISSUES IN LAND USE AND ENVIRONMENTAL PLANNING	3
Introduction and overview of field of volunteer administration. Explores components of effective management of volunteers and builds students' problem solving skills. Comparisons to management of paid staff and role of volunteerism in larger organizational structure.		See GEOG628 for course description.	
UAPP 617 CONTEMPORARY ISSUES IN ENVIRONMENTAL AND ENERGY POLICY	1	UAPP 629 THEORY AND PRACTICE OF HISTORICAL PRESERVATION PLANNING	3
Links students with leading energy and environmental policy scholars on bi-weekly basis to debate key issues such as global warming, ozone layer deterioration, environmental justice, sustainable development and ecological democracy. International, national and community dimensions of these and other policy issues explored through seminar discussion.		Examines historic preservation planning process, theory supporting this process and contemporary practices. Case studies used to demonstrate integration of theory and practice. May be cross-listed with ARTH628, HIST652 and/or MSST629.	
UAPP 618 HUMAN SERVICE SYSTEMS: POLICY, PRACTICES, ADMINISTRATION	3	UAPP 630 METHODS IN HISTORIC PRESERVATION	4
Centers on operational practices and administration of human service systems. Includes analysis of human service systems concepts and policies, delivery practices and administration. Human service systems dimensions reviewed in relation to rising influence of organized human service professional (practitioner) groups and organized human service consumer groups.		Upper-level field research seminar concentrating on developing graphic, photographic and narrative skills for architectural documentation and professional skills related to historic preservation. Involves classroom and field sessions.	
UAPP 619 CONTEMPORARY ISSUES IN URBAN AFFAIRS AND PUBLIC POLICY	2	UAPP 631 DOCUMENTATION OF HISTORIC STRUCTURES	1
Overview of origins of urban affairs and public policy and its current academic role and status as a profession. Students meet with and engage in discussions with leading scholars and policy makers invited to campus to talk about their current research and interests.		Focuses on learning to create scaled, annotated field notes of historic resources in preparation for making measured drawings of buildings. Students spend all of their time in field, working as part of team to record variety of buildings through plans, sections, elevations and details. May be cross-listed with HIST638.	
UAPP 620 CRIMINAL JUSTICE ADMINISTRATION	3	UAPP 632 MAKING THE AMERICAN CITY	3
Focuses on issues of concern to students planning careers as administrators in criminal justice system. Covers administrative policy, organizational dynamics, budgetary matters, and role of computer in criminal justice. Explores complexities, conflicts and ambiguities of criminal justice management.		Advanced research and reading seminar on 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 of interpreting the city as artifact and symbolic setting. Includes field trips to cities in region. Students work with primary sources including archaeological materials, architecture and documentary evidence. May be cross-listed with ARTH632 and/or HIST632.	
		UAPP 633 ANALYSIS AND INTERPRETATION OF HISTORICAL LANDSCAPES	3
		Explores interpretation of historic vernacular and designed landscapes, with emphasis on application to historic preservation planning. Focuses on examination of series of historic American landscapes from eighteenth to twentieth century suburban and industrial environments. Involves field orientation and individual projects interpreting historical landscape.	
		UAPP 634 HOUSING FINANCE AND DEVELOPMENT	3
		Fundamentals of real estate and housing finance and methods available to finance 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 availability of housing credit. Function, operation and regulation of financial and related institutions, including FHA, FNMA, GNMA, FHLBB and FHLMC.	

UAPP 635 THE EVOLUTION OF THE AMERICAN URBAN LANDSCAPE	3	Reading and research seminar on evolution of American urban landscape from approximately 1850 to present. Examination of historical, cultural and geographical issues and processes related to industrialism and capitalism, technology, gender and ethnicity, housing, poverty and wealth as means of understanding formation of historic American urban landscape. Includes field trips to cities in region. May be cross-listed with GEOG635 and/or HIST635.	UAPP 650 VALUES AND ETHICS OF LEADERSHIP	3	Looks at "ends" served by leaders in various contexts (including government, nonprofits, business, and media) and ethical standards by which leaders' actions are judged. Examines cases of unethical conduct as well as cases of exemplary conduct.
UAPP 636 RESEARCH TOPICS IN HISTORIC PRESERVATION	3	Seminar addressing specific research issues within historic preservation including hypothesis construction, design of research methodology and evaluation of results. Emphasis on use of primary sources and application of data-base techniques. May be cross-listed with ARTH622, GEOG636 and/or HIST636.	UAPP 651 MANAGING RISK AND SECURITY	1	Examines policy agenda regarding risk reduction during time of increasing threats to safety and security. Readings and presentations by practitioners introduce public entity and intergovernmental risk assessment and response strategies. Topics include information system development, exposure reduction, loss prevention, incident management, and resource coordination.
UAPP 637 ORGANIZING FOR SOCIAL JUSTICE	1	Analysis and comparison of four contemporary types of organizing styles used in United States; examining their ideologies, methods of application, theories of change and expected outcomes relative to initiatives to change, propose, and/or oppose social, economic and political policies and practices.	UAPP 652 GEOGRAPHIC INFORMATION SYSTEMS IN PUBLIC POLICY	1	Hands-on introduction to Geographic Information Systems (GIS) and their uses in public policy areas. Content varies. Exercises focus on using geographic data in fields such as environmental analysis, land use planning, and socio-economic analysis.
UAPP 638 WORLD CITIES IN COMPARATIVE PERSPECTIVE	3	See GEOG638 for course description.	UAPP 653 POLITICS AND HEALTHCARE	3	See POSC653 for course description.
UAPP 639 COMMUNITY DEVELOPMENT THEORY, CONCEPTS AND PRACTICE	3	Explores evolution of core principles and concepts associated with community development, examines various models of practice, and identifies and assesses current challenges and issues confronting field in United States.	UAPP 654 VERNACULAR ARCHITECTURE	3	See HIST654 for course description.
UAPP 640 INTERNATIONAL AND DEVELOPMENT ADMINISTRATION	3	See POSC640 for course description.	UAPP 655 GEOGRAPHIC INFORMATION SYSTEMS IN THE PUBLIC AND NONPROFIT SECTORS	3	Introduction to use of Geographic Information Systems (GIS) in urban planning and water-resources fields. Emphasis on practical experience in developing research methodologies employing GIS techniques. Topics include data/metadata creation, remote sensing as it relates to GIS, cartographic representation of spatial data, and vector/raster spatial modeling. No previous GIS experience required.
UAPP 641 TOPICS IN NONPROFIT MANAGEMENT AND LEADERSHIP	3	Offers additional and advanced opportunity to delve into nonprofit management and leadership in context of current sociopolitical and economic environment. Expands knowledge and understanding of issues confronting sector as a whole and builds analytic and problem-solving skills. RESTRICTIONS: May be repeated for credit when topics vary.	UAPP 656 POLITICS AND DISASTER	3	See POSC656 for course description.
UAPP 642 STRATEGIC PLANNING FOR PUBLIC AND NONPROFIT ORGANIZATIONS	1	Provides introduction to process of strategic planning and attempts to build skills and knowledge required for carrying out strategic planning in private nonprofit and public agencies. Focuses on organizational environments in which planning takes place, examines theories which underlie planning in general and strategic planning in particular and presents usable model for strategic planning.	UAPP 657 HEALTH POLICY	3	Provides basic understanding of United States health system and practical experience in analyzing how healthcare reform and health policy more generally affect various sectors of economy.
UAPP 643 HISTORIC ROADSIDE ARCHITECTURE	3	Examines various historic hospitality and retail venues with emphasis on their development throughout this automobile-based century. Hotels, motels, diners, fast food and full service restaurants, roadside attractions and retail outlets discussed as they relate to travel and tourism. May be cross-listed with HRIM643.	UAPP 658 CONTEMPORARY ISSUES IN PUBLIC ADMINISTRATION	1	Focus on "cutting edge" issues in field of public administration and public affairs, including response of those in public administration as they seek to more clearly establish role of administrators in governance process.
UAPP 644 GRANTSMANSHIP AND PROPOSAL WRITING	1	Helps public and nonprofit managers hone their abilities to successfully secure grant funding. Sessions cover currently available resources for identifying promising targets for one's grant proposal, do's and don'ts in dealings with foundations, what grant makers really look for in a winning grant proposal, and strategies for transforming idea into feasible proposal capable of effectively attracting grant support.	UAPP 659 TOPICS IN PUBLIC ADMINISTRATION	1-3	Focuses on micro and macro public administration issues, i.e., privatization, health care cost containment, flexible benefits packages, ethics, organizational productivity, concession and productivity bargaining. May be cross-listed with POSC659.
UAPP 645 CIVIC ENGAGEMENT	3	Provides both hands-on experience and skill-building in engaging community groups in planning and implementing civic engagement initiatives that address government and nonprofit decision-making; and, opportunity to examine and explore concepts and philosophies that support civic engagement, collaborative leadership, and facilitative participation.	UAPP 660 SEMINAR IN URBAN MANAGEMENT	3	Provides theoretical and conceptual orientation to urban management; perspectives on development of urban management as a profession; description of intergovernmental, sociopolitical and economic environment of urban management, and analyses of current issues in area.
UAPP 646 ADMINISTRATIVE LAW	3	Introduces basic concepts and rules of administrative law and of legal issues affecting public and nonprofit organizations in dealing with governmental agencies. Special attention placed on impact politics has on efforts by administrators to comply with administrative law rules and regulations. No prior legal training or command of legal language necessary. May be cross-listed with LEST646.	UAPP 661 COMPARATIVE PUBLIC ADMINISTRATION AND POLICY	1	Examines contemporary experience in public administration and policy in other cultures and systems.
UAPP 648 ENVIRONMENTAL ETHICS	3	See PHIL648 for course description.	UAPP 662 MUNICIPAL MANAGEMENT	3	Surveys major operational functions of local government with emphasis on practical elements and problems in management of these functions. Functions include solid waste disposal; economic development; planning and land use control; water supply; police and emergency services; and cultural, social and recreational services. Emphasis on innovative approaches to the provision of services.
UAPP 649 CIVIL RIGHTS LAW AND POLICY	3	Examines origin and evolution of laws and policies that govern rights of African-Americans and other people of color in United States. Examines emerging approaches to civil rights scholarship and considers implications of Supreme Court's recent embrace of conservative posture in civil rights issues. May be cross-listed with BAMS649 and/or LEST649.	UAPP 663 DECISION TOOLS FOR POLICY ANALYSIS	3	See MAST663 for course description.
			UAPP 664 CASE STUDIES IN STATE AND LOCAL MANAGEMENT	3	Uses analyses of cases in state and local decision making to enable students to improve their communication, decision-making and management skills. Cases deal with broad range of subject areas (e.g., health and recreation) and problems (e.g., facility location and personnel).
			UAPP 666 SPECIAL PROBLEM	1-12	
			UAPP 670 FUND DEVELOPMENT: FUNDRAISING FROM INDIVIDUALS	1	Introduction to principles of fund development, guide to organizing for fund development, and overview of fundamentals of annual, major and planned fundraising from individuals.

<p>UAPP 671 FUND DEVELOPMENT: FUNDRAISING FROM INSTITUTIONS 1 Second in series of three, one-credit courses which focuses on corporate, foundation and government fund development activity in support of nonprofit organizations. Includes presentations by practitioners from corporate, foundation and government sectors, helping students understand issues from perspective of funding sources and from professional fundraisers on identifying potential donors through research.</p> <p>UAPP 675 LAND USE AND TRANSPORTATION LINKAGES 1 Explores linkages between land use planning and provision of transportation infrastructure. Discussions include guest speakers who are recognized practitioners in fields of land use and transportation planning. Land development techniques and patterns which influence transportation needs are covered. Shows how interplay between land use patterns and transportation infrastructure influences travel and development characteristics.</p> <p>UAPP 676 SURVEY RESEARCH 1 Introduces major concepts of survey research to include questionnaire development, sampling, survey management, quality control, and analytical concerns. Follows all aspects of pre-election polling undertaken by The Center for Applied Demography and Survey Research during semester.</p> <p>UAPP 677 PLANNING INFORMATION TECHNOLOGY-ENHANCED PROJECTS 1 Introduces issues surrounding planning for projects requiring acquisition and application of technology in public and nonprofit sectors. Focuses on three themes that impact adoption, implementation, and evaluation of information technology (IT) efforts: technology, policy, and administration.</p> <p>UAPP 678 ADMIRALTY AND MARITIME LAW 3 See MAST678 for course description.</p> <p>UAPP 679 VIRTUAL GOVERNMENT 1 Explores evolving field of E-government and evaluates opportunities to enhance delivery of government services. Reviews developments throughout world and strategies for implementation in Delaware.</p> <p>UAPP 680 MYERS-BRIGGS AND PERSONAL DEVELOPMENT 1 Emphasis on intensive understanding of elements of Myers-Briggs Type Indicator (MBTI) indexes as they apply to individuals. Includes application to and opportunity for individual development, conflict, communication, change and leadership. Although not as rigorous as full qualifying program, it offers a thorough understanding and direct application to many other areas that impact individuals personally.</p> <p>UAPP 681 METROPOLITAN INFRASTRUCTURE AND TRANSPORTATION 3 Movement is essential for metropolitan area performance. Roads and water systems are infrastructure components that impact on where houses, stores, and jobs are located; which in turn links into movement, pollution and congestion. Treats infrastructure decision-making using approaches from public economics. May be cross-listed with POSC681. PREREQ: UAPP834 or microeconomics.</p> <p>UAPP 682 MYERS-BRIGGS AND EFFECTIVE ORGANIZATIONS 1 Explores "Type" of organizations, how to build effective teams and how to work with people who are not just like we are. PREREQ: A basic understanding of Myers-Briggs personality preferences and how they apply to oneself.</p> <p>UAPP 683 REGIONAL POLICY ANALYSIS 3 Why do some regions-cities grow and change? Presents theories of regional development, methods of inter-regional analysis, as well as internal-regional topics such as land use, migration, city-surburban shifts, and neighborhoods. Various kinds of regional policies analyzed. May be cross-listed with POSC683. PREREQ: UAPP834 or microeconomics.</p> <p>UAPP 684 PERFORMANCE MANAGEMENT 3 Increases knowledge of techniques and definitions used in managing-for-results movement; introduces indicators used by government and their use for accountability and improved effectiveness; furthers competence in areas of strategic planning, benchmark indicators, performance-based budgeting, and performance measurement; and explores linkages and alignments of systems for improved efficiency and effectiveness.</p> <p>UAPP 685 PERSONNEL AND HUMAN RESOURCE ISSUES: CURRENT TOPICS 3 Analysis of selected policies, practices, and issues currently important in field of public personnel/human resources. Topics vary depending on instructor (illustrations: EEO developments, "Glass Ceiling" issues, ADA, benefits/cost containment, labor negotiation trends, changing workforce and workplace). Seminar with individually-tailored projects. May be cross-listed with POSC685. PREREQ: UAPP837. RESTRICTIONS: Based on prior coursework and professional experience, prerequisite may be waived with instructor approval.</p>	<p>UAPP 686 STATE AND LOCAL GOVERNMENT: CONCEPTS AND ISSUES 3 Explores state and local government context in which public managers work. Examines organizational, administrative, and economic forces shaping state and local public action, as well as political decision-making apparatus used by subnational governments. Assesses their contemporary role in federal system. May be cross-listed with POSC686.</p> <p>UAPP 687 STATE GOVERNMENT POLICY AND MANAGEMENT 3 Focuses on roles and functions of United States state government. Topics include legislative policy making and operations, executive branch organization and functions, structure and role of state courts, and role of governor and states in intergovernmental policy-making. State government in Mid-Atlantic region receives special attention. May be cross-listed with POSC687.</p> <p>UAPP 688 TOPICS IN STATE AND LOCAL MANAGEMENT 3 Focuses on selected topics in state and local management and policymaking. May include in-depth exploration of management processes/instruments (e.g., budgeting) and/or contemporary policy issues (e.g., educational reform, environmental crises) within state and local government with which public managers must contend. May be cross-listed with POSC688.</p> <p>UAPP 692 ENVIRONMENTAL VALUES, MOVEMENTS AND POLICY 3 See MAST692 for course description.</p> <p>UAPP 800 RESEARCH METHODS AND DATA ANALYSIS 4 Focuses on concepts, issues and techniques related to research design, data acquisition and data analysis in fields of urban affairs and public policy.</p> <p>UAPP 801 PROCESSES OF SOCIAL INQUIRY 3 Explores philosophical underpinnings of social inquiry and epistemological and methodological issues surrounding development and use of social research. Encourages students to consider role of critical analysis in social change. Students prepare research designs on topics of their choosing and are assisted by instructors in developing them into thesis and dissertation proposals.</p> <p>UAPP 802 ELECTRICITY POLICY AND PLANNING 3 Analyzes technological and regulatory policy evolution of electricity industry. Considers how technology innovations and policy/regulatory actions guided planning of industry from its early days.</p> <p>UAPP 803 SEMINAR: PUBLIC ADMINISTRATION 3 Reading and discussion of theories and problems of public administration, including organization, coordination, field administration, contracts, personnel, policy making, participation, adjudication, budgeting and administrative behavior. May be cross-listed with POSC803.</p> <p>UAPP 804 PROGRAM EVALUATION FOR HEALTH AND SOCIAL SERVICES 3 Introduces quantitative and qualitative methods for evaluating health and social service programs. Emphasizes program design evaluation, process evaluation, experimental and quasi-experimental design, and clinical trials.</p> <p>UAPP 806 SURVEY RESEARCH 3 Methods and procedures for design, administration and analysis of sample surveys.</p> <p>UAPP 808 QUALITATIVE METHODS FOR PROGRAM EVALUATION 3 Provides skills and examines issues in use of qualitative methods in context of program evaluation. Qualitative design, sampling approaches, data collection, and analysis included. PREREQ: UAPP800, IFST615 or comparable research methods course. RESTRICTIONS: Enrollment limited to 15.</p> <p>UAPP 810 POLITICAL ECONOMY OF THE ENVIRONMENT 3 Reviews major theories developed over last half century to explain nature-society relations. Policy case studies on environmental justice, trade and environment, global climate change, and sustainable development used to evaluate current range of political-economic explanations of nature-society relations. International, national and local responses to these problems analyzed. May be cross-listed with MAST814 and/or POSC814.</p> <p>UAPP 815 PUBLIC MANAGEMENT STATISTICS 3 Emphasis on practical knowledge of statistical techniques and their use in management of data (or data systems) in public sector. Discussion and appraisal of various statistical tools from a theoretical standpoint, and application of statistical methods and procedures in laboratory situation for collection, organization and analysis of statistical information in public management research.</p> <p>UAPP 816 ADVANCED SOCIAL STATISTICS 3 Provides advanced training in applied social research. 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.</p>
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- UAPP 817 PUBLIC INVESTMENT POLICY 3**
Focuses on means by which government activities 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., design of instruments, fiscal capacity, rating system and market behavior.
May be cross-listed with POSC817.
- UAPP 818 ENVIRONMENTAL POLICY AND ADMINISTRATION 3**
See POSC818 for course description.
- UAPP 819 MANAGEMENT DECISION MAKING IN PUBLIC AND NONPROFIT SECTORS 3**
Focuses on analytical decision making within public and nonprofit organizations. Examines processes by which decisions are made and evaluated. Emphasis on conceptual factors that provide guide to decisions and evaluations of decision methodologies, e.g., systems analysis, cost-benefit analysis, PERT/critical path method, decision trees, performance measurement and time series.
May be cross-listed with POSC819.
PREREQ: Excel.
- UAPP 820 INTERNATIONAL PERSPECTIVES ON ENERGY AND ENVIRONMENT 3**
See POSC820 for course description.
- UAPP 821 PROSEMINAR: TECHNOLOGY, ENVIRONMENT AND SOCIETY 3**
Over last two centuries, forces of industrialization and urbanization have transformed economic, social and political life and natural environment. Examines theories that explain and assess these transformations, with goal of fostering critical analysis of social and environmental transformation in international, national and local contexts.
May be cross-listed with POSC821.
- UAPP 822 PROSEMINAR IN GOVERNANCE, PLANNING AND MANAGEMENT 3**
Deals with policy and research issues concerning making, administering and outcomes of public policies affecting urban populations and with how urban governance, planning and management processes are influenced by interaction of public, private and third sectors at local, national and international scales.
- UAPP 823 PROSEMINAR: SOCIAL AND URBAN POLICY 3**
Social policy attempts to promote well-being of individuals, families and communities through public action. Explores efforts to address social and economic problems in urban society. Considers differential policy impacts by social class, race/ethnicity, gender and age. Topics: welfare, housing, social security, health, education, criminal justice and employment.
May be cross-listed with EDUC825 and/or IFST823.
- UAPP 824 SUSTAINABLE ENERGY POLICY AND PLANNING 3**
Analyzes sustainable energy strategies in terms of their technology, economics, impacts on environment and governance attributes. Also analyzes policy options to facilitate a sustainable energy future.
RESTRICTIONS: Graduate students with a background in policy, economics and/or technology. Senior-level undergraduate students only with permission of instructor.
- UAPP 825 COMPARATIVE PUBLIC ADMINISTRATION 3**
See POSC825 for course description.
- UAPP 826 MULTIVARIATE STATISTICAL ANALYSIS 3**
Provides in-depth understanding of advanced statistical methods with an applied focus on estimation, inferences, and prediction of models. Major topics: multiple regression, functional forms, types of data, regression diagnostics (collinearity, serial correlation, heteroscedasticity, and simultaneity), different estimators, comparison of models, dummy dependent variables, dynamic models and lags, and multi-equation models.
PREREQ: UAPP815.
RESTRICTIONS: A statistics course that introduces regression analysis.
- UAPP 827 PROGRAM AND PROJECT ANALYSIS 3**
Explores ways in which decision-makers in public sector evaluate feasibility of government programs and projects through application of Cost-Benefit Analysis (CBA), Cost Utility Analysis (CUA), and Cost Effectiveness Analysis (CEA). Focuses on determination of social costs and social benefits of public policies.
PREREQ: UAPP834 or comparable course in public economics and permission of instructor.
- UAPP 828 URBAN SOCIETY AND URBAN POLICY 3**
Traces evolution of major social, economic and physical dimensions of United States cities in order to understand the nature of current challenges facing American society. Compares "American" model of urban society with societal forms found in other parts of the world. Examines role of public policy as major determinant of nature of urban communities.
- UAPP 829 TAXATION AND FISCAL POLICIES 3**
Advanced course in theory and application of financing, spending and regulatory policy instruments of state and local governments. Topics include efficiency, equity and impacts of different types of taxation, user charges, expenditure approaches (transfers/subsidies) and regulation alternatives.
May be cross-listed with POSC829.
- UAPP 833 FINANCIAL MANAGEMENT IN PUBLIC AND NONPROFIT SECTORS 3**
Principles of public finance and public sector economics used to examine issues of demand for and delivery of public goods by state and local governments and nonprofit organizations. Topics include revenues, expenditures, intergovernmental and cross-sectoral relationships, budgeting, debt management and asset allocation.
May be cross-listed with POSC839.
PREREQ: UAPP834.
- UAPP 834 ECONOMICS IN PUBLIC AND NONPROFIT SECTORS 3**
Develops microeconomic concepts and applies them to public issues, policies, and programs. Applications deal with wide range of topics, including health care, education, transportation, housing, community development, energy and environment. Emphasizes how microeconomic analysis can enhance decision making.
- UAPP 835 ORGANIZATION AND MANAGEMENT IN PUBLIC AND NONPROFIT SECTORS 3**
Explores (1) theories and concepts of organizational phenomena, (2) current challenges and implications for public and nonprofit sectors, and (3) issues for individuals who work in these organizations. Behavioral competencies developed.
May be cross-listed with POSC835.
- UAPP 836 REAL WORLD ETHICS 1**
Examines real world situations requiring ethical considerations. Variety of topics covered including public policy issues, managerial responsibility and demonstrating ethical integrity in leadership.
- UAPP 837 HUMAN RESOURCES MANAGEMENT IN PUBLIC AND NONPROFIT SECTORS 3**
Examines human resources function from three perspectives: 1) basic technical competencies (recruitment, selection, compensation, benefits), 2) legal and constitutional issues in HR, and 3) leadership and organizational change.
May be cross-listed with POSC837.
- UAPP 838 PUBLIC POLICY ANALYSIS 3**
See POSC838 for course description.
- UAPP 839 ADMINISTRATIVE LAW SURVEY 1**
Introduces basic concepts and rules of administrative law and an understanding of legal issues affecting public and nonprofit organizations in dealing with governmental agencies. Special attention placed on impact politics has on efforts by administrators to comply with administrative law rules and regulations. No prior legal training or command of legal language necessary.
- UAPP 840 HISTORY AND DEVELOPMENT OF THE NONPROFIT SECTOR 3**
Traces history and development of nonprofit sector in United States with focus on social, economic, political and legal factors. Volunteerism and philanthropy emphasized. Role of nonprofit organizations in furthering goals of community development explored.
- UAPP 841 MANAGEMENT AND GOVERNANCE OF NONPROFIT ORGANIZATIONS 3**
Provides introduction to leadership and management issues facing nonprofit executives and governing boards. Topics include board relationships and voluntary leadership, financial management and budgeting, human resource management, organizational marketing and strategic planning, records management and use of information technology in management and governance.
- UAPP 843 GLOBAL GOVERNANCE: THEORY AND CASES 3**
See POSC843 for course description.
- UAPP 860 INTERNSHIP SEMINAR 1**
Prepares students for Internship Fieldwork requirement of Master of Public Administration program. Focuses on informational interview skills, resume preparation and personal statement development. Introduces job search strategies and provides orientation to Career Services Center. Helps students make decisions about specialization, internship and career objectives.
- UAPP 861 ACADEMIC AND PROFESSIONAL DEVELOPMENT FOR UAPP DOCTORAL STUDENTS 1**
Explores range of topics related to academic processes and professional development for doctoral students. Topics may include: strategies for successful graduate study, advisor/committee strategies, topic selection, research experience, writing skills, time/stress management strategies, conference presentations, publishing, job searches, professional organizations and networking. Guest speakers include various faculty members, students and alumni.
RESTRICTIONS: Open only to UAPP doctoral students.

UAPP 862 TEACHING PRACTICUM IN URBAN AFFAIRS AND PUBLIC POLICY 3
 In consultation with a SUAPP faculty member and based on student's long-term goals and professional background, student participates in development (or revision) and teaching of a course. Exposes Ph.D. students who anticipate teaching careers to pedagogical issues, and planning and implementation of course instruction.
 PREREQ: One semester of Ph.D. graduate study.
 RESTRICTIONS: Requires permission of academic advisor and faculty member sponsoring practicum.

UAPP 863 DOCTORAL DISSERTATION PROPOSAL 3
 Requirement of doctoral program. A "defensible dissertation proposal" must be achieved for successful course completion.
 RESTRICTIONS: Ph.D. students only.

UAPP 864 INTERNSHIP FIELDWORK 2
 Three-month (or equivalent) compensated fieldwork, followed by submission of a reflective paper. Requires prior approval of SUAPP Internship Coordinator, completion of work plan, and a professional performance evaluation by site supervisor.
 PREREQ: UAPP860.

UAPP 866 SPECIAL PROBLEM 1-12

UAPP 868 RESEARCH 1-6

UAPP 869 MASTER'S THESIS 1-6

UAPP 870 READINGS 1-6

UAPP 872 ANALYTICAL PAPER 3
 Demonstrates student's ability to analyze particular policy or administrative problem and develop appropriate response.
 RESTRICTIONS: Requirement of the M.A. and M.P.A. programs.

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

UAPP 969 DOCTORAL DISSERTATION 1-12 PF

UNIVERSITY COURSES

UNIV 101 FIRST YEAR EXPERIENCE I 1 PF
 Provides an integrated, content-based, co-curricular experience for LIFE cluster students. Fosters academic and social competencies necessary for university success and provides structured, regular time for LIFE cluster students to meet with peer mentors and faculty.
 RESTRICTIONS: For freshmen only.

UNIV 102 FIRST YEAR EXPERIENCE II 1 PF
 Continuation of UNIV101.
 PREREQ: UNIV101.

UNIV 103 FIRST YEAR EXPERIENCE III 1 PF
 Continuation of UNIV102.
 PREREQ: UNIV102.

UNIV 111 UST FRESHMAN SEMINAR: FINDING YOUR WAY 1 PF
 Aids University Studies freshmen in achieving a successful transition from high school to the University of Delaware. Self-exploration exercises and exposure to the many majors at UD enable each student to develop a plan of action for selecting and seeking admission to the desired major.
 RESTRICTIONS: Open only to UST first-time freshmen.

UNIV 112 SKILMOD: ACADEMIC SELF MANAGEMENT 1 PF
 Focuses on self-organization and growth in a college environment. Students investigate the nature of a university, learn how to maximize their productivity through time-management and careful decision-making and examine what a liberal arts education can mean to them.

UNIV 113 SKILMOD: STUDY SKILLS 1 PF
 Teaches strategies for understanding and remembering college lectures and text materials. Strategies include identifying the underlying discourse structure of the field, summarizing, comprehension monitoring and transforming notes into test formats. Students practice on their own course materials.

UNIV 114 SKILMOD: CRITICAL THINKING 1 PF
 Teaches strategies of good reasoning in humanities, social sciences and other liberal arts areas. Students learn how to become independent, well-informed thinkers and how to make persuasive arguments, using their own course materials.

UNIV 115 SKILMOD: PROBLEM SOLVING 1 PF
 Teaches problem-solving strategies for college courses in chemistry, physics, economics, engineering, etc. Students learn methods for breaking problems into manageable components and for using example problems strategically. Students apply these techniques to courses they are currently taking.

UNIV 240 PEER TUTOR PRACTICUM I 0-1 PF
 Focus on strategies for individual and group tutorials for tutors in Academic Enrichment Center tutoring program.
 RESTRICTIONS: Not open to freshmen. Requires permission of instructor.

UNIV 260 EXPERIENTIAL TEACHING 0-3 PF
 Teaching experience as group tutor, peer facilitator/instructor, workshop guide, or undergraduate teaching assistant. Leadership skills developed and applied in laboratory, problem-based learning (PBL), or peer-led team learning mode of instruction in an undergraduate course. Evaluation based on preparation and engagement in teaching and leadership process.
 RESTRICTIONS: Requires permission of instructor. May not substitute for major courses required in department curriculum.

UNIV 262 EXPERIENTIAL LEARNING 0-6
 Learning experience on or off campus under the supervision of a faculty member. Instructional learning out of class and beyond existing department courses. Non-major required discovery learning experiences such as service learning, fieldwork, co-op, apprenticeship, internship, and independent study.
 RESTRICTIONS: Requires permission of instructor. May not substitute for major courses required in department curriculum.

UNIV 268 UNDERGRADUATE RESEARCH 0-6
 Undergraduate research conducted on or off campus, out of class, and under the supervision of a faculty member.
 RESTRICTIONS: Requires permission of instructor. May not fulfill course requirements in a major curriculum except by departmental permission.

UNIV 301 PEER MENTOR PRACTICUM I 1 PF
 Seminar for peer mentors working in the LIFE program. Covers issues in peer mentor activities and LIFE clusters.

UNIV 302 PEER MENTOR PRACTICUM II 1 PF
 Continuation of UNIV301.
 PREREQ: UNIV301.

UNIV 303 PEER MENTOR PRACTICUM III 1 PF
 Continuation of UNIV302.
 PREREQ: UNIV302.

UNIV 320 CONTEMPORARY ISSUES FOR RESIDENT ASSISTANTS I 1
 Introduces new resident assistants to issues affecting college students, specifically issues of social justice, leadership, and citizenship. All topics focus on needs of new resident assistant in Office of Residence Life.
 RESTRICTIONS: Must be a resident assistant.

UNIV 321 CONTEMPORARY ISSUES FOR RESIDENT ASSISTANTS II 1
 Discovery learning experience for resident assistants in their second, third, or fourth semesters as RAs. Explores concepts of citizenship, leadership, and community through self reflection and service learning experiences within the context of the Resident Assistant position.
 PREREQ: UNIV320.
 RESTRICTIONS: Must be resident assistant.

UNIV 322 CONTEMPORARY ISSUES FOR RESIDENT ASSISTANT III 1
 Advanced discovery learning experience for resident assistants in their third or fourth semesters as RAs. Explores concepts of citizenship, leadership, and community through self reflection and service learning experiences and apply these concepts to civic engagement and issues of sustainability.
 PREREQ: UNIV320, UNIV321.
 RESTRICTIONS: Must be resident assistant.

UNIV 360 EXPERIENTIAL TEACHING 0-3 PF
 Teaching experience as group tutor, peer facilitator/instructor, workshop guide, or undergraduate teaching assistant. Leadership skills developed and applied in laboratory, problem-based learning (PBL), or peer-led team learning mode of instruction in an undergraduate course. Evaluation based on preparation and engagement in teaching and leadership process.
 RESTRICTIONS: Requires permission of instructor. May not substitute for major courses required in department curriculum.

UNIV 362 EXPERIENTIAL LEARNING 0-6
 Learning experience on or off campus under the supervision of a faculty member. Instructional learning out of class and beyond existing department courses. Non-major required discovery learning experiences such as service learning, fieldwork, co-op, apprenticeship, internship, and independent study.
 RESTRICTIONS: Requires permission of instructor. May not substitute for major courses required in department curriculum.

UNIV 363 EXPERIENTIAL LEARNING SUSTAINING 0 PF
 Experiential learning under the supervision of a faculty mentor.
 RESTRICTIONS: Limited to students appointed as Experiential Learning Scholars within the Discovery Learning Experience. Must have approval of the Associate Director of Undergraduate Studies.

UNIV 364 EXPERIENTIAL INTERNSHIP 3
 Internship experience of fifty hours combined with a seminar emphasizing career development, reflection, and personal learning skills. Internship must be arranged and Learning Contract signed prior to first class meeting. Open to major and non-major related internships, paid or volunteer.
 RESTRICTIONS: May not substitute for major courses required in department curriculum.

UNIV 368 UNDERGRADUATE RESEARCH 0-6
 Undergraduate research conducted on or off campus, out of class, and under the supervision of a faculty member.
 RESTRICTIONS: Requires permission of instructor. May not fulfill course requirements in a major curriculum except by departmental permission.

UNIV 369 UNDERGRADUATE RESEARCH SUSTAINING 0 PF
 Research apprenticeship with faculty mentor.
 RESTRICTIONS: Limited to those appointed as Undergraduate Research Scholars in the Undergraduate Research Program. Must have approval of the Coordinator of Undergraduate Research.

UNIV 401 SENIOR THESIS 2-4
 Senior thesis for students working toward a degree with distinction.
 RESTRICTIONS: Total credits for UNIV401 and UNIV402 not to exceed six.

UAPP 402 SENIOR THESIS 2-4
 Continuation of UNIV401.
 RESTRICTIONS: Total credits for UNIV401 and UNIV402 not to exceed six.

UNIV 440 PEER TUTOR PRACTICUM III 0-1
 Continuation of UNIV340.
 PREREQ: UNIV340.
 RESTRICTIONS: Requires permission of instructor.

UNIV 460 EXPERIENTIAL TEACHING 0-3 PF
 Teaching experience as group tutor, peer facilitator/instructor, workshop guide, or undergraduate teaching assistant. Leadership skills developed and applied in laboratory, problem-based learning (PBL), or peer-led team learning mode of instruction in an undergraduate course. Evaluation based on preparation and engagement in teaching and leadership process.
 RESTRICTIONS: Requires permission of instructor. May not substitute for major courses required in department curriculum.

UNIV 462 EXPERIENTIAL LEARNING 0-6
 Learning experience on or off campus under the supervision of a faculty member. Instructional learning out of class and beyond existing department courses. Non-major required discovery learning experiences such as service learning, fieldwork, co-op, apprenticeship, internship, and independent study.
 RESTRICTIONS: Requires permission of instructor. May not substitute for major courses required in department curriculum.

UNIV 468 UNDERGRADUATE RESEARCH 0-6
 Undergraduate research conducted on or off campus, out of class, and under the supervision of a faculty member.
 RESTRICTIONS: Requires permission of instructor. May not fulfill course requirements in a major curriculum except by departmental permission.

UNIV 490 HONORS TUTORIAL: HUMANITIES 3
 Designated faculty direct the studies of up to four students per semester. Readings of classical works in the humanities described. Group as well as individual discussions.
 RESTRICTIONS: Requires 3.4 GPA, junior standing or above, and permission of the Honors Program.

UNIV 491 HONORS TUTORIAL: NATURAL/SOCIAL SCIENCE 3
 Designated faculty direct the studies of up to four students per semester. Reading of classical works in the social and natural sciences described. Group as well as independent discussions.
 RESTRICTIONS: Requires 3.4 GPA, junior standing or above and permission of the Honors Program.

UNIV 495 HONORS SEMINAR 3
 Topics vary; usually interdisciplinary.
 RESTRICTIONS: Requires 3.4 GPA, junior status or above, and permission of the Honors Program. May be repeated for credit with a different topic and instructor.

UNIV 500 LEAVE OF ABSENCE 0 NR

UNIV 600 LEARNING 0 PF
 Explores cognitive, affective and social aspects of the learning process through research and reflection on learning and teaching literature in higher education. Students develop skills to facilitate learning in their respective disciplines. Modern information technologies and library resources access essential.
 RESTRICTIONS: May be repeated with different Learning Module.

UNIV 601 PEDAGOGY 0 PF
 Presents research-based teaching principles and innovative teaching methodologies. Offers practical orientation to enhance pedagogical effectiveness in respective disciplines. Opportunity to observe and reflect on outstanding UD faculty's instructional practices. Modern information technologies and library resources access essential.
 RESTRICTIONS: May be repeated with different Pedagogy Module.

UNIV 602 FACULTY ROLES 0 PF
 Introduces the range of faculty roles and responsibilities at different types of institutions. Assists with identifying ideal academic settings and understanding the possibilities and responsibilities concomitant to such appointments. Modern information technologies and library resources access essential.

UNIV 603 ACADEMIC JOB SEARCH 0 PF
 Prepares for insertion into the academic workplace by focusing on CV construction, teaching portfolio preparation, and refining interviewing skills. Modern information technologies and library resources access essential.

UNIV 899 MASTER'S SUSTAINING 0 FT

UNIV 999 PH.D. SUSTAINING 0 FT

WOMEN'S STUDIES

WOMS 200 CULTURAL INTRODUCTION TO SEXUALITIES AND GENDER STUDIES 3
 See SGST200 for course description.

WOMS 201 INTRODUCTION TO WOMEN'S STUDIES 3
 Study of the causes and conditions determining women's status in society, as evidenced in institutional structures and personal relations between men and women. Taught from multidisciplinary perspectives.

WOMS 202 INTRODUCTION TO INTERNATIONAL WOMEN'S STUDIES 3
 Examines how public policies and traditional customs affect women's lives around the world. Focuses on the effects of political and economic status, social norms and institutional structures on women's conditions in family life, education and employment.

WOMS 203 CONTEMPORARY MORAL PROBLEMS 3
 See PHIL202 for course description.

WOMS 205 WOMEN IN THE ARTS AND HUMANITIES 3
 Interdisciplinary survey of women's contributions to the arts and humanities, also including literary/artistic images of women, contributions of minority and non-Western women, and study of the relationship between women's social-economic roles and cultural expressions.

WOMS 206 WOMEN AND WORK 3
 Covers a variety of topics including women in traditional and non-traditional occupations, gender-based discrimination (wage inequities, sexual harassment, exclusionary policies), the contributions of women to the economy and the role of law in shaping conditions for women in the workplace.
 May be cross-listed with SOCI206.

WOMS 207 WOMEN, POWER AND SUCCESS 3
 Research, theory and possible strategies related to expanding the horizons in achieving "power" and "success" in women's lives. Topics include socializing girls to be successful, evaluating personal strengths and goals, and a new model of women and power.

WOMS 208 CURRENT ISSUES IN SEXUALITY AND GENDER LECTURE SERIES 1-3
 See SGST208 for course description.
 RESTRICTIONS: May be repeated for credit when topics vary.

WOMS 210 WOMEN AND RELIGION 3
 Examines the impact of Near Eastern and Judeo-Christian scriptures on women in the family and society, especially focusing on women's roles as mystics and leaders within and outside of institutional religion. Also covers recent feminist approaches to religion.
 May be cross-listed with 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 213 MEN AND WOMEN IN AMERICAN SOCIETY** 3
See SOCI213 for course description.
- WOMS 215 QUEER SEXUAL IMAGERY IN THE VISUAL ARTS** 3
See MSST215 for course description.
- WOMS 216 INTRODUCTION TO FEMINIST THEORY** 3
See PHIL216 for course description.
- WOMS 222 LANGUAGE AND GENDER** 3
See LING222 for course description.
- WOMS 223 FOOD, GENDER AND CULTURE** 3
See ANTH223 for course description.
- WOMS 233 WOMEN, BIOLOGY AND MEDICINE** 3
Considers societal theories and medical practices concerning women and discusses their biological basis, their biological effects, sources of information with which to evaluate them, etc. Emphasis on preparing student to make own medical and obstetrical decisions and to critically evaluate claims concerning male/female differences.
- WOMS 240 WOMEN AND VIOLENCE** 3
Analyzes a variety of issues and topics relating to women and violence, including rape, domestic violence, images of women in popular culture, incest and child abuse, pornography, sexual harassment and women who use violence. Presents descriptive materials, sociological analysis and strategies for change.
- WOMS 242 WOMAN AS IMAGE AND IMAGEMAKER** 3
See ARTH242 for course description.
- WOMS 250 TOPICS IN INTERNATIONAL WOMEN'S STUDIES** 3
Explores topics related to women's lives in various parts of the world and may include women's history, women's creativity, and social movements in Africa, Asia, Europe, Australia or Latin America.
RESTRICTIONS: May be repeated for credit when topics vary.
- WOMS 260 WOMEN: CULTURAL REPRESENTATIONS** 3
Examines issues of representation across time and cultures. Offers critical analysis of how women have presented and represented themselves, as well as how their cultural productions and creative labors in a variety of media have been represented by others.
- WOMS 290 WOMEN AND GENDER IN INTERNATIONAL FILMS** 1 PF
Through viewing feature films about women and/or gender in cultures outside that of mainstream United States, explores how sex and gender shape lives and experiences. Enriches understanding of the diversity of gendered cultural norms and ways filmmakers choose to illustrate them.
- WOMS 291 WOMEN'S HISTORY THROUGH FILM** 1
Explores women's historical experiences through the medium of film. Students view and discuss a variety of documentary films on women and read materials related to topics covered in the films. Films will deal with historical and contemporary issues in the United States and internationally.
May be cross-listed with HIST291.
RESTRICTIONS: May be repeated for credit when topics vary.
- WOMS 298 RESEARCH ON RACE, ETHNICITY AND CULTURE** 1 PF
Lecture series in which faculty and guest speakers discuss their research on contemporary and historical perspectives on race, ethnicity and culture. Research presented from several disciplines, including sociology, history, literature, anthropology and psychology, among others.
May be cross-listed with BAMS298.
RESTRICTIONS: May be repeated for credit when topics vary.
- WOMS 299 RESEARCH ON WOMEN** 1 PF
Interdisciplinary lectures in which faculty, staff and advanced students share results of their research on women. Lectures cover issues in anthropology, sociology, political theory, psychology, philosophy, literature, history, theology, ethnic studies, music, art, math education, health, etc.
RESTRICTIONS: May be repeated for credit when topics vary.
- WOMS 300 WOMEN IN AMERICAN HISTORY** 3
See HIST300 for course description.
- WOMS 301 GAY AND LESBIAN FILM** 3
See SGST301 for course description.
- WOMS 302 WOMEN IN MUSIC: AN ALTERNATE SURVEY** 3
See MUSC302 for course description.
- WOMS 305 THE EVOLUTION OF HUMAN SEX ROLES AND REPRODUCTION** 3
See ANTH305 for course description.
- WOMS 310 ASIAN WOMEN'S LIVES** 3
See ANTH310 for course description.
- WOMS 311 RENAISSANCE WOMEN, SOCIETY AND ART** 3
See ARTH311 for course description.
- WOMS 312 ASIAN WOMEN IN THE GLOBALIZED WORKPLACE** 3
See ANTH312 for course description.
- WOMS 315 THIRD WORLD WOMEN IN POLITICS** 3
See POSC315 for course description.
- WOMS 316 ISLAM AND GENDER** 3
See ANTH 316 for course description.
- WOMS 318 STUDIES IN FILM** 3
See ENGL318 for course description.
PREREQ: ENGL110.
RESTRICTIONS: May be repeated for credit when topics vary.
- WOMS 320 VARYING AUTHORS AND GENRES** 3
See FLIT320 for course description.
- WOMS 321 TOPICS: CHINESE LITERATURE IN TRANSLATION** 3
See FLIT321 for course description.
RESTRICTIONS: May be repeated for credit when topics vary.
- WOMS 322 TOPICS: CLASSICAL LITERATURE IN TRANSLATION** 3
See FLIT322 for course description.
- WOMS 323 INTRODUCTION TO WOMEN AND POLITICS** 3
See POSC323 for course description.
- WOMS 324 FEMINISM AND SEXUALITIES** 3
Examines issues of sexual identity from a feminist perspective and may focus on topics such as cross-dressing, transgenderism, queer studies, etc.
- 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 327 RACE, GENDER, SCIENCE** 3
See PHIL327 for course description.
- WOMS 328 TOPICS: JAPANESE LITERATURE IN TRANSLATION** 3
See FLIT328 for course description.
- WOMS 329 TOPICS: ITALIAN LITERATURE IN TRANSLATION** 3
See FLIT329 for course description.
- WOMS 330 VARYING AUTHORS, THEMES AND MOVEMENTS** 3
See FLIT330 for course description.
- WOMS 332 WOMEN, RACE AND ETHNICITY** 3
Examines the intersection of gender with issues of racial and ethnic identity in either a national or transnational context.
- WOMS 333 PSYCHOLOGY OF WOMEN** 3
See PSYC333 for course description.
- WOMS 334 AFRICAN AMERICAN WOMEN'S HISTORY** 3
See HIST334 for course description.
- WOMS 350 GENDER AND CRIMINAL JUSTICE** 3
See CRJU350 for course description.
- WOMS 352 STUDIES IN NINETEENTH CENTURY LITERATURE** 3
See ENGL352 for course description.
PREREQ: ENGL110.
RESTRICTIONS: May be repeated once for credit when topics vary.

WOMS 353 TWENTIETH CENTURY BRITISH LITERATURE	3	WOMS 420 WOMEN'S STUDIES SENIOR THESIS	3-6
See ENGL353 for course description.		Senior thesis for women's studies majors or minors.	
WOMS 363 WOMEN IN CROSS-CULTURAL PERSPECTIVE	3	COREQ: Students enrolled in WOMS420 must also take WOMS410 the same semester or the following semester.	
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.		RESTRICTIONS: Women's studies majors or minors and permission of the WOMS program.	
May be cross-listed with ANTH363.		WOMS 430 FAMILY LIFE EDUCATION	3
WOMS 366 INDEPENDENT STUDY	1-6	See IFST430 for course description.	
WOMS 372 POPULAR CULTURE IN URBAN JAPAN	3	WOMS 436 POLITICS AND LITERATURE	3
See HIST372 for course description.		See POSC436 for course description.	
WOMS 375 TOPICS: RUSSIAN AND SOVIET CULTURE IN TRANSLATION	3	WOMS 439 WOMEN AND REVOLUTION IN AFRICA	3
See FLIT375 for course description.		See HIST439 for course description.	
WOMS 380 WOMEN WRITERS	3	WOMS 440 TOPICS IN INTERPERSONAL AND ORGANIZATIONAL COMMUNICATION	3
See ENGL380 for course description.		See COMM440 for course description.	
WOMS 381 WOMEN IN LITERATURE	3	WOMS 442 TOPICS IN ORGANIZATIONAL COMMUNICATION	3
See ENGL381 for course description.		See COMM442 for course description.	
WOMS 382 STUDIES IN MULTICULTURAL LITERATURE IN ENGLISH	3	WOMS 444 SEMINAR: WOMEN IN THE ISLAMIC MIDDLE EAST	3
See ENGL382 for course description.		See HIST444 for course description.	
WOMS 383 TOPICS: CHINESE CULTURE IN TRANSLATION	3	WOMS 460 WOMEN IN INTERNATIONAL DEVELOPMENT	3
See FLIT383 for course description.		See SOCI460 for course description.	
RESTRICTIONS: May be repeated for credit when topics vary.		WOMS 465 STUDIES IN LITERATURE GENRES, TYPES AND MOVEMENTS	3
WOMS 385 WOMEN AND THE ECONOMY	3	See ENGL465 for course description.	
See ECON385 for course description.		WOMS 466 INDEPENDENT STUDY	1-6
PREREQ: ECON151.		WOMS 472 SEMINAR IN MEDIEVAL HISTORY	3
WOMS 389 TOPICS: WOMEN AND HEALTH ISSUES	3	See HIST471 for course description.	
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.		WOMS 475 SEMINAR IN MODERN EUROPEAN HISTORY	3
May be cross-listed with PHIL389.		See HIST475 for course description.	
RESTRICTIONS: May be repeated for credit when topics vary.		WOMS 480 SEMINAR	3
WOMS 390 HONORS COLLOQUIUM	3	See ENGL480 for course description.	
WOMS 392 HONORS COLLOQUIUM	3	WOMS 484 WOMEN IN SPORTS	3
See PHIL392 for course description.		See HESC484 for course description.	
WOMS 401 FOUNDATIONS OF HUMAN SEXUALITY	3	WOMS 498 INTERNSHIP IN WOMEN'S STUDIES	3
See IFST401 for course description.		Students work 115 hours per semester in an agency or program associated with women's issues. Academic knowledge applied to actual working situations.	
WOMS 402 TOPICS IN CONSTITUTIONAL LAW	3	Seminar discussions focus on internship experience in light of academic research and theory.	
See POSC401 for course description.		RESTRICTIONS: Requires permission of instructor.	
RESTRICTIONS: May be repeated for credit when topics vary.		WOMS 610 CRITICAL ISSUES IN FEMINIST SCHOLARSHIP	3
WOMS 407 SOCIOLOGY OF SEX AND GENDER	3	Provides a survey introduction to women's studies for graduate students.	
See SOCI407 for course description and restrictions.			
WOMS 409 DOMESTIC VIOLENCE SERVICES	3		
See IFST409 for course description.			
PREREQ: IFST235 or SOCI201 or WOMS201.			
RESTRICTIONS: Open to juniors and seniors only.			
WOMS 410 THE STUDY OF WOMEN'S STUDIES	3		
Capstone for majors. Explores purpose, development, and developing concerns in field of women's studies. Aims to reflect upon what women's studies majors have learned in their WOMS classes, consider ongoing challenges to the field, and help prepare them for a future in which their WOMS major can play a significant and positive role.			
RESTRICTIONS: Senior majors. Requires approval of women's studies advisor and course instructor.			
WOMS 411 SEMINAR IN AMERICAN HISTORY	3		
See HIST411 for course description.			
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 418 RACE, GENDER AND POVERTY	3		
See SOCI418 for course description.			
PREREQ: SOCI201.			