MAST 314  COMPARATIVE TERRESTRIAL AND MARINE ECOLOGY  3
Examines recurring issues and problems in Latin America. The conflict between church and state, nationalism and a place in world affairs, tensions between the individual and society and the influence of the United States.
RESTRICTIONS: Open to majors only.

MAST 317  AMERICAN ART IN CONTEXT  3
Designed to give the non-specialist in art history an understanding of how social, economic, religious, and cultural attitudes in America are reflected in its art, architecture, and decorative arts from the colonial period to the present. Discussion encompasses such subjects as patronage, regionalism, ethnicity, and gender.
RESTRICTIONS: Open to majors only.

MAST 319  THE SCIENTIST IN SOCIETY  3
Scientific research is directly influenced by the society in which it is conducted. In addition to financial limitations, constraints are imposed by societal norms of what are acceptable topics and procedures for research. Focus on the philosophical basis of science as well as consequences to society of the scientific revolution.
RESTRICTIONS: Open to majors only.

MAST 320  THE USE OF SCIENCE IN PUBLIC DISCOURSE  3
Examines important questions of general interest to both individuals and to governmental bodies that depend heavily on scientific information.
RESTRICTIONS: Open to majors only.

MAST 321  THE IMPACTS OF EUROPEAN CONTACTS ON NATIVE AMERICANS  3
Considers how the arrival of the first Europeans in North America affected the indigenous Native Americans.
RESTRICTIONS: Open to majors only.

MAST 322  INTERPRETING THE PAST  3
Considers the different perspectives that can be applied to learning about the past.
RESTRICTIONS: Open to majors only.

MAST 324  INTRODUCTION TO GRADUATE RESEARCH/WRITING IN LIBERAL STUDIES  3
Focuses on developing research and writing skills by concentrating on one issue, such as the family, the environment, or education. Students are taught to narrow the focus of a topic, create an arguable thesis, gather source information from both library and on-line resources, evaluate the source of information, organize a logical argument, incorporate source information into the argument and revise into a finished paper.
RESTRICTIONS: Open to majors only.

MAST 325  FILM AND AMERICAN SOCIETY  3
Using major motion pictures, explores how Hollywood dealt with critical historical events: the Cold War, McCarthyism, the Civil Rights Movement, Vietnam, Watergate, and the modern Presidency.
RESTRICTIONS: Open to graduate majors only.

MAST 326  STUDIES IN TWENTIETH CENTURY AMERICAN LITERATURE  3
Examines narrative and thematic concerns in American fiction written before and after World War II. The fiction is explored against a background of cultural, philosophical, and literary trends.
RESTRICTIONS: For MALS students only.

MAST 366  INDEPENDENT STUDY  1-6
Students design a research project with an advisor and present it to peers, advisors and instructor.

MAST 368  UNDERGRADUATE RESEARCH  1-6
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.

MAST 601  INTRODUCTION TO OCEANOGRAPHY  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.

MAST 602  PHYSICAL OCEANOGRAPHY  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.

MAST 603  INTRODUCTION TO MARINE AND AQUATIC EDUCATION  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.

MAST 604  ENVIRONMENTAL DATA MANAGEMENT  1
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.

MAST 605  TOPICS: MARINE SCIENCE EDUCATION  1-4
Stimulates Delaware teachers into incorporating integrated marine sciences into their classroom teaching.

MAST 606  OCEAN AND ATMOSPHERE REMOTE SENSING  3
Fundamentals of ocean and atmosphere remote sensing including space platforms, their orbits, instruments, data retrieval and image processing methods. Oceanographic and atmospheric applications of remote sensing and new developments in sensors and data analyses.
May be cross-listed with CIEG606, ELEG606, GEOG606.

MAST 607  WRITING PAPERS IN THE MARINE SCIENCES  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 figures, figures and scientific ideas into a coherent story; and strategies and techniques used in effective writing.

MAST 615  INTRODUCTION TO MARINE BIOLOGY  3
Involves laboratory, field and lecture study for broad understanding of marine biology and biochemistry.
RESTRICTIONS: For non-biologically oriented marine studies graduate students.

MAST 616  METHODS IN MOLECULAR BIOLOGY  3
Conceptual experience in molecular biological techniques with emphasis on their application to marine related problems. Topics include: nucleic acid extractions, cloning, gene amplification and characterization, and expression methodologies.
PREREQ: MAST634.

MAST 617  METHODS IN MOLECULAR BIOLOGY LABORATORY  3
Provides practical experience in molecular biological techniques with emphasis on applications to marine related problems.
COREQ: MAST616.

MAST 618  MARINE MICROBIAL ECOLOGY  3
Examines role of microbes in the oceans and their impact on oceanographic processes and biogeochemical cycles in marine environments. Emphasis is on bacteria and their interactions with other marine organisms. Introduces use of molecular tools to examine uncultivated microbes.
RESTRICTIONS: Requires permission of instructor.
MAST 620  ENERGY POLICY AND ADMINISTRATION  3
See POSC624 for course description.

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

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

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

MAST 625  MICROSRA PHYSIOLOGY AND DIVERSITY  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.

MAST 626  TOPICS IN HALOPHYTIE BIOLOGY  1
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.

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

MAST 628  OFFSHORE WIND POWER: SCIENCE, ENGINEERING AND POLICY  1-4
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.

MAST 629  TOPICS IN MARINE ECOLOGY  1-6
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.

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

MAST 635  TURBULENCE IN THE ENVIRONMENT  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.

MAST 637  GEOLOGICAL OCEANOGRAPHY  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.

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 648  WATER WAVE MECHANICS  3
See CIEG672 for course description.
PREREQ: CIEG305.

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

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

MAST 670  UNITED STATES OCEAN AND COASTAL POLICY  3
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 671  COASTAL PROCESSES AND MANAGEMENT  3
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 672  APPLIED POLICY ANALYSIS  3
Empirical analysis of environmental and natural resource policy issues. Topics include valuation of natural resources, decision making under uncertainty, dynamic control and intertemporal issues in resource use and institutional aspects of policy analysis.
May be cross-listed with ECON670.
PREREQ: ECON401.

MAST 673  INTERNATIONAL LAW  3
Origins, sources and applications of law to international relations, including the nature of treaties, the legal powers of states and international organizations, jurisdiction and immunities, and the role of international courts. Special attention given to the law of the sea for navigation, fisheries conservation, mineral exploitation and environmental protection.
May be cross-listed with LEST673 and/or POSC604.
RESTRICTIONS: Requires permission of instructor.

MAST 674  LEGAL ASPECTS OF THE COASTAL ZONE  3
Examines basic legal doctrines and public policy implications relevant to 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 675  ECONOMICS OF NATURAL RESOURCES  3
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 676  ENVIRONMENTAL ECONOMICS  3
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 677  INTERNATIONAL OCEAN AND ENVIRONMENTAL POLICY  3
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 678  ADMIRALTY AND MARITIME LAW  3
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 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 ELEC681 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, thermaline 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
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 geophysics, inviscid theory of Rossby waves, and Ekman boundary layers.
PREREQ: MEEG663 and MEEG664.

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; shell 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. Ensuring discussion aids preparation of research proposals and sharpens critical assessment of own and colleagues’ work.

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

MAST 827 Current Topics in Marine Biology 1-4
Subject areas change each term and are announced in registration booklet. Topics include aspects of plant biology, fish and invertebrate ecology and other aspects of marine biology. 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, spectrophotometric, 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.
MATH 852 ISOTOPIC GEOCHEMISTRY 3
Introduction to field of isotopic geochemistry and application of isotopic 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.

MATH 853 OCEANOGRAPHY SEMINAR 1-12
Review of current oceanographic literature through student presentations.
RESTRICTIONS: May be repeated for credit when topics vary.

MATH 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.

MATH 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.

MATH 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.

MATH 868 RESEARCH 1-9

MATH 869 MASTER’S THESIS 1-6

MATH 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.

MATH 871 ENVIRONMENTAL POLICY AND ADMINISTRATION 3
See POSC818 for course description.

MATH 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.

MATH 875 ADVANCED FISHERIES 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.

MATH 882 PHYSICAL OCEAN SCIENCE AND ENGINEERING SEMINAR 1
Review of current literature in physical ocean science and engineering through student presentations.

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

MATH 969 DOCTORAL DISSERTATION 1-12 PF

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 112 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: 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.
MATH 217  ALGEBRA FOR MIDDLE SCHOOL TEACHERS  3  
Examines algebraic concepts developed in the middle grades, including linearity, meanings and uses of variables; and the representation of situations using functions, graphs, and equations.  
RESTRICTIONS: Credit is not given for mathematics majors or minors.  

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

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

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

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

MATH 241  ANALYTIC GEOMETRY AND CALCULUS A  4  
Functions, limits, continuity, derivatives and definite integrals. Exponential and logarithmic 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.  

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.  

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

MATH 245  AN INTRODUCTION TO PROOF  3  
Basic set operations, relations, equivalence relations, functions, inverse functions, cardinality, order properties of real numbers, least upper bound, greatest lower bound, completeness axiom, topology of reals, complex numbers.  
PREREQ: MATH210 and MATH242.  

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

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

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

MATH 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.  

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 invites on mathematical endeavors and professional activities in an informal atmosphere.  
PREREQ: MATH241 or equivalent.  

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

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

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

MATH 305  APPLIED MATHEMATICS FOR CHEMICAL ENGINEERING  3  
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.  

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.  

MATH 315  DISCRETE MATHEMATICS II  3  
Algorithmic graph theory and computational geometry. Topics in graph theory cover shortest path problems, coloring problems, and others. The computational geometry covers Steiner tree, convex hull, design of experiments and selected topics.  
PREREQ: MATH210.  

MATH 341  DIFFERENTIAL EQUATIONS WITH LINEAR ALGEBRA I  3  
Topics include first and second order differential equations, systems of algebraic equations, determinants, vector spaces, eigenvalues and eigenvectors of matrices and systems of differential equations. Emphasis on interaction between these topics and appropriate physical systems.  
PREREQ: MATH242.  
RESTRICTIONS: Credit not given for both MATH341 and either MATH302, MATH349 or MATH351. Open to majors outside mathematics.  

MATH 342  DIFFERENTIAL EQUATIONS WITH LINEAR ALGEBRA II  3  
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.  

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

MATH 351  PROBLEM SUPERVISORY SEMINAR  1  

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.
PREREQ: 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
RESTRICTIONS: Open to MEEG and CIEG majors.

MATH 366 Independent Study 1-6
Aims, course planning, instructional strategies, evaluation and selection of materials for teaching mathematics in secondary schools.
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.
PREREQ: CHEM527, MATH353 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 ECON350.
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 using 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 statistical/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 secondary mathematics 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 Lebesque 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 MEEG683 or PHY5207.

MATH 612  INTRODUCTION TO NUMERICAL METHODS FOR PARTIAL DIFFERENTIAL EQUATIONS 3
PREREQ: MATH505 or MEEG683 or PHY5207.

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 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 672 Vector Spaces 3
Vector spaces, linear transformations, decomposition theorems and bilinear forms. 
PREREQ: MATH349.

MATH 688 Combinatorics and Graph Theory I 3
Combinatorial enumeration, designs and geometries, graphs, set systems, partially ordered sets, existence and construction of various combinatorial objects, Ramsey theory. 
PREREQ: MATH650 or consent of instructor.

MATH 689 Combinatorics and Graph Theory II 3
Methods of linear algebra in combinatorics and graph theory, basics of coding theory and associated designs, number theory and cryptography, communication complexity. 
PREREQ: Knowledge of linear algebra.

MATH 694 Methods of Optimization 3
Review of linear programming, unconstrained and constrained non-linear programs, numerical methods, Kuhn-Tucker theory, duality and Lagrange multipliers.

MATH 805 Real Analysis 3
Lebesgue measure and integration, differentiation and absolute continuity, Lp spaces, distributions and Sobolev spaces. 
PREREQ: MATH602.

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

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

MATH 810 Asymptotic and Perturbation Methods 3
Asymptotic expansions of real and complex integrals; singular perturbation theory for ODEs and PDEs; WK and multiple-scale expansion techniques. Selected applications. 
PREREQ: MATH617 and knowledge of analytic function theory or consent of instructor.

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

MATH 821 Topics in Applied Analysis 3
Topics chosen from ordinary differential equations, harmonic analysis, optimization theory and integral equations. 
RESTRICTIONS: Requires permission of instructor.

MATH 824 Topics in Applied Mathematics 3
Topics chosen from numerical analysis, elasticity, electromagnetic theory, fluid dynamics and other areas. 
RESTRICTIONS: Requires permission of instructor.

MATH 826 Topics in Pure Mathematics 3
Topics vary and are chosen from a variety of areas in pure mathematics. 
RESTRICTIONS: Requires permission of instructor.

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

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

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

MATH 838 Numerical Methods for Partial Differential Equations 3
Introduces concepts of consistency, stability and convergence of numerical schemes. Finite element and finite difference schemes and their applications to fundamental partial differential equations are emphasized. 
PREREQ: MATH612 or equivalent.

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

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

MATH 868 Research 1-6

MATH 869 Master’s Thesis 1-6

MATH 870 Reading in Mathematics 1-6

MATH 884 Finite Geometries and Designs 3
Classical projective and affine spaces, nondesarguesian planes, coordinate systems, spreads and packings, conics and unital, collineation groups and Singer cycles. Further topics chosen from related geometrical designs, associated codes and algebraic surfaces/varieties. 
PREREQ: MATH688 and MATH845.

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

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

MATH 969 Doctoral Dissertation 1-12 PF

MEDICAL TECHNOLOGY

MEDT 100 Introduction to Medical Technology 1
Orientation to 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.

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.

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MEDT 372 **Diagnostic Parasitology** 2
Study of human parasites, emphasizing detection and identification of diagnostic forms.
*Restrictions:* Open to medical technology majors only.

MEDT 375 **Clinical Laboratory Principles and Statistics** 2
Basic laboratory principles including solution preparation, mathematics, safety, quality assurance and spectrophotometry. Introductory statistics including applications to laboratory information systems and research.
*Restrictions:* Requires permission of instructor.

MEDT 380 **Clinical Immunology and Medical Virology** 4
Introductory immunology concepts and 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.
*Prerequisites:* BISC 208, BISC 300, and CHEM 213 or CHEM 321.
*Restrictions:* Requires permission of instructor.

MEDT 390 **Introduction to Molecular Diagnostics** 2
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.
*Prerequisites:* BISC 208, and CHEM 213 or CHEM 321.
*Restrictions:* Requires permission of instructor.

MEDT 400 **Urinalysis and Body Fluids** 2
Study of routine urinalysis examination, renal function and body fluid testing procedures.
*Restrictions:* Open to medical technology majors only.

MEDT 401 **Clinical Physiological Chemistry I** 3
*Restrictions:* Open to medical technology majors only.

MEDT 403 **Clinical Physiological Chemistry II** 4
Application and theory of methodologies in enzymology, endocrinology and toxicology. Relationship of normal and abnormal laboratory findings in organ functional tests.
*Prerequisites:* MEDT 401.

MEDT 404 **Hematology I** 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.

MEDT 405 **Hematology II** 2
Study of pathophysiology of erythrocytic and leukocytic disorders and laboratory findings of these disorders.
*Prerequisites:* MEDT 404.

MEDT 406 **Medical Microbiology** 3
Study of occurrence and pathogenesis of human infections and microorganisms associated with humans in health and disease.
*Restrictions:* Open to medical technology majors only.

MEDT 409 **Immunohematology I** 1
Study of antigen and antibody systems of human red cells and compatibility testing of blood for transfusion.
*Restrictions:* Open to medical technology majors only.

MEDT 411 **Clinical Physiological Chemistry Laboratory I** 2
Laboratory exercises that complement topics covered in MEDT 401.
*Corequisites:* MEDT 401.

MEDT 413 **Clinical Physiological Chemistry Laboratory II** 2
Laboratory exercises that complement topics covered in MEDT 403.
*Corequisites:* MEDT 403.

MEDT 414 **Hematology I Laboratory** 1
Study and implementation of laboratory procedures that correlate with material taught in MEDT 404.
*Corequisites:* MEDT 404.

MEDT 415 **Hematology II Laboratory** 2
Study and implementation of laboratory procedures in hematology consistent with material taught in MEDT 405.
*Corequisites:* MEDT 405.

MEDT 416 **Medical Microbiology Laboratory** 2
Laboratory study of microorganisms important in normal flora and infectious diseases of humans.
*Prerequisites:* MEDT 406.

MEDT 418 **Medical Technology Senior Seminar** 0 PF
Readings, case studies, career planning and orientation for clinical education.
*Restrictions:* Requires senior and major status.

MEDT 419 **Immunohematology I Laboratory** 1
Laboratory procedures consistent with MEDT 409.
*Corequisites:* MEDT 409.

MEDT 420 **Immunohematology II** 1
Study of blood and component transfusions, their risks, complications and quality assurance. Also blood component therapy and testing of neonate and adult.
*Prerequisites:* MEDT 409.

MEDT 421 **Immunohematology II Laboratory** 1
Laboratory procedures consistent with MEDT 409.
*Corequisites:* MEDT 420.

MEDT 430 **Diagnostic Bacteriology and Medical Mycology** 2
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.
*Prerequisites:* MEDT 406 and MEDT 416.
*Corequisites:* MEDT 431.

MEDT 431 **Diagnostic Bacteriology and Medical Mycology Laboratory** 2
Study and implementation of laboratory procedures that correlate with material taught in MEDT 430.
*Corequisites:* MEDT 430.

MEDT 450 **Anatomy of Professionalism** 1-3
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 firsthand 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 461 **Laboratory Practice and Leadership I** 1
Introduction to clinical laboratory practice and leadership with emphasis on management styles, motivational techniques, communication skills, organizational leadership and administration of personnel.
*Restrictions:* Requires permission of instructor.

MEDT 466 **Independent Study** 1-6

MEDT 471 **Laboratory Practice and Leadership II** 1
Discussion of clinical laboratory practice and leadership. Emphasis on responsibilities relating to daily operation of laboratory, including human resource management, financial planning, cost analysis, laboratory design, laboratory information systems, marketing, government regulations and accreditation.
*Prerequisites:* MEDT 461.
*Restrictions:* Requires permission of instructor.

MEDT 472 **Clinical Urinalysis Practicum** 1 PF
Clinical experience in application of laboratory theory and techniques in urinalysis.
*Prerequisites:* MEDT 400.

MEDT 473 **Clinical Chemistry Practicum** 3 PF
Supervised experience in application of laboratory theory and techniques in clinical chemistry.
*Prerequisites:* MEDT 403 and MEDT 413.

MEDT 475 **Clinical Hematology Practicum** 3 PF
Supervised experience in application of laboratory procedures in hematology.
*Prerequisites:* MEDT 405 and MEDT 415.
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
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
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
PREREQ: PHYS310, MATH352, MATH353.
RESTRICTIONS: Open to majors only.

MEEG 344 THERMODYNAMICS 3
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 MEEG334 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
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 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: MEEG211 and MEEG215.

MEEG 406 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 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 underwater vehicles, pressure vessels and other continuous structures.
PREREQ: MEEG211 and MEEG215.

MEEG 415 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: MEEG215.

MEEG 422 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 423 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
PREREQ: MEEG331.
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: MEEG32 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, 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 454 Manufacturing Processes and Systems 3
Explains key concepts and elements of basic processes (metal cutting, forming, plastic molding, etc), technologies (robotics, ergonomics, material handling, quality management, machine vision, etc), industries/systems (pharmaceutical, automotive, packaging, food, etc) and current advances (lean, just-in-time, etc). PREREQ: MEEG321 or consent of instructor.

MEEG 466 Independent Study 1-6
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 481 Computer Solution of Engineering Problems 3
Prerequisites: MEEG 211, MEEG 311 and MATH 352.

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: PHYS 201 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: PHYS 201 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 pathways. PREREQ: MEEG331.

MEEG 510 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 511 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 512 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: PHYS 201 or 207.

MEEG 515 Mechanical Properties of Materials 3
See MSE615 for course description.

MEEG 516 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 517 Composite Materials 3
Fiber and matrix materials, fiber-matrix interface, polymer, metal, ceramic and carbon matrix composites, geometic aspects, elastic properties, laminate theory, strength of unidirectional composites, strength of laminates, durability, hybrid composites, flexible composites and textile structural composites.

MEEG 518 Fracture of Solids 3
Introduction to field of fracture mechanics, covering both theoretical approaches and practical applications. Examines fundamentals of linear elastic and plastic fracture mechanics, and offers short introduction to basic premises and approaches for treatment of dynamic fracture mechanics. May be cross-listed with MSE618.

MEEG 519 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: MATH 351 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: MEEG 211, MEEG 311 and MATH 352.
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, cerebral spinal 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,
aerodynamic, 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, 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: MEEG610 or MEEG813.

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 modeling 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 secretary 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,
motion analysis, muscle forces and interaction with orthopedic devices.

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

MEEG 818 PLATES AND SHEELS IN AEROSPACE STRUCTURES I

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

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

MEEG 823 VIBRATION ANALYSIS
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 824 STRUCTURAL DYNAMICS AND CONTROL
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 830 SPECIAL TOPICS IN FLUID MECHANICS
Offered occasionally and with varying subject matter. Topics may include turbulence, plasma kinetic theory, stability, etc.

MEEG 831 FLUID DYNAMICS
PREREQ: MATH630, MEEG690, or permission of instructor.

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

MEEG 837 MULTIPHASE FLOW AND TRANSPORT
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 840 SPECIAL TOPICS IN CONTINUUM MECHANICS
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.

MEEG 855 PRINCIPLES OF COMPOSITES MANUFACTURING
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.

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

MEEG 862 ADVANCED ENGINEERING ANALYSIS
Emphasis on asymptotic and perturbation methods. Topics from among following: deepest descent and stationary phase; phase plane; asymptotic analysis of ODEs and PDEs using such methods as WKBJ, matched asymptotic expansions, Pade approximants, straining, and multiple scales; similarity methods; catastrophe theory; and chaos. Engineering applications.

MEEG 868 RESEARCH
1-9

MEEG 869 MASTER’S THESIS
1-6
Experimental investigation conducted for purpose of contributing new useful data and theory in some field of mechanical engineering. Although supervised, investigations independent in character to encourage development of initiative.

MEEG 871 RANDOM VIBRATIONS
PREREQ: CIEG311 (for CIEG students), MEEG311 (for MEEG students).
Knowledge of MEEG824 is desirable but not required.

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

MEEG 873 APPLIED NONLINEAR CONTROL
PREREQ: MEEG824 or equivalent, MEEG690, and permission of instructor.

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

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

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

MEEG 969 DOCTORAL DISSERTATION
1-12 PF

MANAGEMENT INFORMATION SYSTEMS

MISY 160 INTRODUCTION TO BUSINESS INFORMATION SYSTEMS I
3
Introduction to computers: components and operations. Introduction to management information/support systems and the system development process. Emphasis on microcomputers and software packages used in business.

MISY 225 MODERN BUSINESS COMPUTING
3
Use of higher level contemporary computing languages to structure prototyping applications of systems.
PREREQ: MISY160 or CISC101.

MISY 261 INTRODUCTION TO BUSINESS INFORMATION SYSTEMS II
3
Introduction to management information systems. Programming techniques for problem solving with business productivity tools and software. Emphasis on business applications.
PREREQ: MISY160 or CISC101.

MISY 330 DATABASE DESIGN AND IMPLEMENTATION
3
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.

MISY 395 GLOBAL ISSUES IN INFORMATION TECHNOLOGY
3
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 strategy, 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, gather 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 relationships between broad strategic goals and organizational mission, and specific technical 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 rappel, use a map and compass, understand the basics of physical fitness and familiarize with Army traditions and ceremonies. No military obligation associated with this course.

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

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

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

MLSC 215 LEADER DEVELOPMENT 4
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. 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.

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. No military obligation associated with this course.

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. Focusses 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: MLSC305.

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
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. 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 startup enterprises. Range of topics from finance, marketing, engineering, law and early and late-stage start-up companies provide perspective on challenges of launching new business ventures. Work in cross-disciplinary teams to develop R&D strategic and business plans 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
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
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 startup enterprises. Range of topics from finance, marketing, engineering, law and early and late-stage start-up companies provide perspective on challenges of launching new business ventures. Work in cross-disciplinary teams to develop R&D strategic and business plans 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 622  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  EQUILIBRIA IN MATERIAL SYSTEMS  3

MSEG 804  KINETICS IN MATERIAL SYSTEMS  3

MSEG 806  PHYSICAL PROPERTIES OF SOLIDS  3

MSEG 807  PHYSICAL PROPERTIES OF MATERIALS II  3
Continuation of MSEG607 with emphasis on 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 MEG817 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
RESTRICTIONS: Requires permission of instructor. Studio reconstructions, lectures and library research. Copperplate engraving, etching, drypoint, aquatint, mezzotint, lithograph and intaglio printmaking. Time frame: ca. 1400-1920. Major topics include woodcut, major masters and the materials, tools and techniques of relief, planographic and intaglio printing. 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. Lecture-studio presentation on materials and 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. Lecture-studio presentation covering analytical and practical aspects of mixing and matching colorants without instrumentation. Pigments, dyes and the manufacture of 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. Lecture-studio presentation on materials and 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. 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. 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. 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.
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.
REQUIREMENTS: 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.
REQUIREMENTS: 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.
REQUIREMENTS: MUSC335 with a grade of C- or better.
REQUIREMENTS: 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.
REQUIREMENTS: MUSC335 with a grade of C- or better.
REQUIREMENTS: 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.
REQUIREMENTS: MUSC379 with a grade of C- or better, and MUED336 or MUED337 with a grade of C- or better.
REQUIREMENTS: For vocal music education majors. Offered spring semester only.

MUED 390 MUSIC IN EARLY CHILDHOOD 3
Introduction to early childhood music materials and approaches through lecture and clinical experiences.
REQUIREMENTS: 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.
REQUIREMENTS: MUSC379 with a grade of C- or better, and MUED336 or MUED337 with a grade of C- or better.
REQUIREMENTS: Restricted to music education majors. Offered in fall semester only.

MUED 574 MUSIC CONCEPTS IN THE ELEMENTARY SCHOOLS 3
Methods and materials for developing children's understanding of music concepts by involvement in listening to, performing and describing musical sound events.
REQUIREMENTS: Requires permission of instructor.

MUSIC

MUSC 100 RECITAL ATTENDANCE 0 PF
Recital experience; see Department of Music Student Handbook for details.
REQUIREMENTS: 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.
REQUIREMENTS: 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.
PREREQUISITE: MUSC301 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.
REQUIREMENTS: Offered in fall semester only.

MUSC 104 INTRODUCTION TO OPERA 3
Introduction to opera, concentrating on opera comique, singspiel, operaetta, baroque opera, seria, and Wagnerian music drama. Explores philosophies associated with music in the context of opera. Time span covered is 1607 to present.
REQUIREMENTS: 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.
REQUIREMENTS: 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.
PREREQUISITE: MUSC105.
REQUIREMENTS: 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.
REQUIREMENTS: 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.
REQUIREMENTS: May be repeated for credit. Offered in fall and spring semesters. Students may sign up for 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.
REQUIREMENTS: May be repeated for credit. Offered in fall and spring semesters. Students may sign up for 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 CHORALES 0-1
Members enter by audition. Chora is the university's most select chorus of mixed voices.
REQUIREMENTS: May be repeated for credit. Offered in fall and spring semesters. Students may sign up for 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.
PREREQUISITES: Audition/permission of instructor.

MUSC 113 MARCHING BAND 1
REQUIREMENTS: 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 O-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 O-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 O-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 O-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 O-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 O-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 O-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 O-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 O-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 135 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.
RESTRICTIONS: Requires audition. May be repeated for credit. Offered in fall and spring semesters.

MUSC 136 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.
RESTRICTIONS: For bachelor of music students only. Offered in fall and spring semesters.

MUSC 137 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.
RESTRICTIONS: For bachelor of art and spring semesters.

MUSC 138 PRIVATE STUDY FOR 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.
RESTRICTIONS: For bachelor of arts (music) students and music minors only. Offered in fall and spring semesters.

MUSC 139 PRIVATE STUDY FOR SECONDARY AND METR 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 an orchestral instrument. Includes a one-hour studio class. May be repeated for credit.
RESTRICTIONS: Requires permission of instructor. Offered in fall and spring semesters.

MUSC 140 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 141 CLASS VOICE I 1
Fundamentals and techniques of singing.
RESTRICTIONS: For nonmusic majors.

MUSC 142 CLASS VOICE: BEGINNING I 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 143 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 144 CLASS PIANO: ELEMENTARY II 1
Continuation of MUSC175. Scale and arpeggio playing, keyboard harmony, repertory 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 145 CLASS PIANO: ADVANCED I 1
Introduction to the fundamentals of guitar technique and note reading for nonmusic 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 146 CLASS PIANO: ADVANCED 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**
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**
Private studio instruction covering improvisational techniques and interpretation used in jazz performance. Examines a cross-section of styles and repertoire.
**Restrictions:** Requires audition and permission of instructor. Offered in fall and spring semesters.

MUSC 182 **Private Study for Applied Jazz Styles and Techniques**
Private studio instruction covering improvisational techniques and interpretation used in jazz performance. Examines a cross-section of styles and repertoire.
**Prerequisite:** MUSC 181 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**
Techniques of sight singing and music reading skills. Development of ability in the aural recognition of melody, harmony and rhythm.
**Coreq:** MUSC 195.
**Restrictions:** Must pass department musicality test. Offered in fall and winter semesters.

MUSC 186 **Ear Training and Sight Singing II**
Techniques of sight singing and music reading skills. Development of ability in the aural recognition of melody, harmony and rhythm.
**Prerequisite:** MUSC 185 and MUSC 195 with grades of C- or better.
**Coreq:** MUSC 196.
**Restrictions:** Open to music majors and minors only. Offered in spring semester.

MUSC 193 **Sight Reading at the Keyboard I**
Techniques for improving coordination and musical comprehension when playing from sight at the keyboard.
**Restrictions:** For keyboard majors. Offered in fall and spring semesters.

MUSC 194 **Sight Reading at the Keyboard II**
Continuation of MUSC 193.
**Prerequisite:** MUSC 193 with a grade of C- or better.
**Restrictions:** For keyboard majors. Offered in fall and spring semesters.

MUSC 195 **Harmony I**
**Coreq:** MUSC 185.
**Restrictions:** Must pass department musicality test. Offered in fall and winter semesters.

MUSC 196 **Harmony II**
Continuation of harmony: diatonic through chromatic harmony with keyboard application. Chord structures and functional relationships. Basic melodic and contrapuntal compositional techniques. Writing, playing and analysis.
**Prerequisite:** MUSC 185 and MUSC 195 with grades of C- or better.
**Coreq:** MUSC 186.
**Restrictions:** Open to music majors and minors only. Offered in spring semester.

MUSC 197 **Jazz Harmony**
Study of elementary aspects of melody, harmony, texture, dynamics, rhythm and form in selected jazz and American popular literature; development of elementary aural-perceptual and compositional skills related to jazz and American popular music.
**Prerequisite:** MUSC 105 with a grade of C- or better.
**Restrictions:** Offered in odd numbered years, fall semesters only.

MUSC 205 **Music of the World**
Survey of Western world musical cultures utilizing textbook, reprinted reserve articles, films and in-class performance/demonstrations. Goal is the understanding and appreciation of various world music.

MUSC 206 **Music of China, Korea and Japan**
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**
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 BAMS 207.
**Prerequisite:** MUSC 105 with a C- or better.
**Restrictions:** Offered in spring semester only.

MUSC 209 **History of Spanish Music**
Covers the most outstanding traditions of Spanish music, including Arab-influenced Andalusian music, 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**
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**
Survey of selected works in music history with emphasis on selected basic terminology, forms and style changes, through score reading and listening.
**Prerequisite:** MUSC 195 with a grade of C- or better.
**Restrictions:** Offered in fall semester only.

MUSC 212 **History of Liturgy and Hymns**
Study of the evolution, structure and content of 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**
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**
Development of performing and teaching skills. Offered to music education and theory/composition majors. Offered in fall semester.

MUSC 215 **High Brass Instruments Class**
Development of performing and teaching skills. Offered to music education and theory/composition majors. Offered in fall semester.

MUSC 216 **Low Brass Instruments Class**
Development of performing and teaching skills. Offered to music education and theory/composition majors. Offered in spring semester.

MUSC 217 **Woodwind Instruments Class I**
Development of performing and teaching skills. Offered to music education and theory/composition majors. Offered in spring semester.

MUSC 218 **Woodwind Instruments Class II**
Development of performing and teaching skills. Offered to music education and theory/composition majors. Offered in spring semester.

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

MUSC 220 **Marching Band Techniques**
Focuses on designing and charting a show of the complete contemporary marching band. Overview of history and development of the marching band, as well as "hands-on" sessions in marching percussion and color guard.
**Prerequisite:** MUSC 113 with a grade of C- or better.
**Restrictions:** Offered spring semester only.

MUSC 221 **Marching Percussion Techniques**
Focuses on advancing skills on the marching snare drum, multi-toms, 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.
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.
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.
RESTRICTIONS: For bachelor of arts (music) students and music minors only. Offered fall and spring semesters only.

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.
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 repertoire 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
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
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.
RESTRICTIONS: 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.
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.
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.
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.
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.
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 bass, 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.
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: MUSC221 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: MUSC221 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: MUSC221 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: MUSC426 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 455 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 O-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.
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, orchestral instrument, composition or conducting 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 665 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 666 SEMINAR IN MUSIC EDUCATION 3
Advanced topics in music education.
RESTRICTIONS: Requires permission of instructor.

MUSC 667 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 668 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 685 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.

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**MUSIC 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.

**MUSIC 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.
PREREQ: NTDT200 and a physiology course.
RESTRICTIONS: Enrollment by permission of instructor.

**MUSIC 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.

**MUSIC 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.

**MUSIC 869 Master's Thesis** 1-6

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**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 understanding concepts of clinical dietetics 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 the United States. Contribution of selected dietary patterns to knowledge of health and disease prevention. Impact of migration to different cultural settings.

**NTDT 256 Multicultural Foods Laboratory** 1
Sampling of foods of diverse cultural groups utilizing demonstrations by restauranteurs 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 NTDT201.

**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 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
Junior level independent study.

**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, CHEM124 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.

**NTDT 410 Overweight/Obesity Prevention and Management** 3
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
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
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

NTDT 451 MEDICAL NUTRITION THERAPY II

NTDT 452 TOPICS IN NUTRITION AND DIETETICS
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
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
Direct client contact through delivery of nutritional services in community health maintenance and health care delivery facilities. Field experience with nutritional management of clients in community nutrition program. PREREQ: NTDT322. COREQ: NTDT460.

NTDT 466 INDEPENDENT STUDY
Senior level independent study.

NTDT 475 TRANSCULTURAL FOODS AND CUISINE
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: NTDT400.

NTDT 550 DIETETICS PRACTICUM I
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
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
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
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
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
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
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
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
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
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
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
Analysis of specific topic in area of nutrition and dietetics. RESTRICTIONS: Requires permission of instructor.

NTDT 654 ADVANCED RUMINANT NUTRITION
See ANSC654 for course description.

NTDT 660 COMMUNITY NUTRITION
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.

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
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.
### NUTRITION AND DIETETICS

**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, ENG110, PSYC100. Traditional students: 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** 3
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 Life Span** 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 Life Span** 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, STAT201, 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 function. Emphasizes identification of etiology and pathogenesis of selected diseases.

**PREREQ:** BISC276, BISC300, IFST201, NTDT200, PSYC100 and STAT200.

**RESTRICTIONS:** Open to nursing majors only.

**NURS 333 Baccalaureate for the Registered Nurse Orientation** 1
Orientation to online 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, NURS345.

**RESTRICTIONS:** Open to BRN majors only. Course sequence alteration requires permission of instructor.

**NURS 352 Adult Health Nursing** 3
Examines selected concepts and theories related to restoring and maintaining optimal health in adult populations. Focuses on major body systems, including immune, endocrine, renal and gastrointestinal; also discusses concepts of cancer. Selected laboratory and field experiences 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
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 biotechnology, environment, and occupational health included.
PREREQ: All 200 level required nursing courses, BISC276 and BISC300.
RESTRICTIONS: Open to nursing and health studies majors, or by permission of professor.

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 healthcare systems where nursing care is 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
Preceptor 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 610  CROSSCULTURAL HEALTHCARE
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
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
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 BSN major or BSN degree or bachelor's degree in another discipline.

NURS 616  PRIMARY CARE IN COMMUNITY HEALTH
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
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
See HSAD619 for course description.
RESTRICTIONS: Permission of department required.

NURS 620  ADVANCED HEALTH ASSESSMENT
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 corequisite.
RESTRICTIONS: Permission of department required.

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

NURS 622  ADVANCED PHARMACOLOGY
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
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
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
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
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
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
See HSAD635 for course description.
RESTRICTIONS: HSAD604 required as prerequisite or corequisite.

NURS 636  ADULT HEALTH I
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
See HSAD637 for course description.
RESTRICTIONS: HSAD604 required as prerequisite or corequisite.

NURS 638  HEALTH SERVICES EVALUATION
See HSAD638 for course description.
RESTRICTIONS: HSAD604 required as prerequisite or corequisite.

NURS 646  ADULT HEALTH II
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
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
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
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.

NURS 671  PSYCHIATRIC MENTAL HEALTH NURSING I
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
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
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
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

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

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

ORES 869  MASTER'S THESIS  1-6

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

ORES 969  DOCTORAL DISSERTATION  1-12 PF

PHILOSOPHY

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

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

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 philosphic 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 BAM307 for course description.

PHIL 308 TOPICS IN JEWISH THEOLOGY 3
Critical evaluation of the theological views of major branches of Judaism on such
topics as: the significance of Israel; the status of Jewish law, the meaning of Jewish
ritual and the mission of the Jewish people.
May be 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-eighteenth centuries) through
Ockham (fourteenth century) and includes Avicenna, Alhazari, 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 philosophical 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 existentialist 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:
variation 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 ecosocialism 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.
PHYSICS AND ASTRONOMY

PHIL 366  INDEPENDENT STUDY  1-6
PHIL 389  TOPICS: WOMEN AND HEALTH ISSUES  3
See WOMS389 for course description.
PHIL 390  HONORS COLLOQUIUM  3
PHIL 392  HONORS COLLOQUIUM  3
Racism, sexism and specism
PHIL 404  ANIMAL MINDS  3
See CGSC404 for course description.
PHIL 418  MEANING AND LANGUAGE USE  3
See LING418 for course description.
PHIL 421  PHILOSOPHY, BIOLOGY, SOCIETY  3
See CGSC421 for course description.
PHIL 444  MEDICAL ETHICS  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.
PHIL 448  ENVIRONMENTAL ETHICS  3
Ethical problems associated with environmental protection, local, national, and international. Relations to social and political movements. Seminar format.
PHIL 450  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 CGSC450.
PHIL 454  PHILOSOPHY OF SOCIAL SCIENCE  3
Critical examination of the central historical and contemporary questions about the concepts, methods, social structure and purposes of social science inquiry.
May be cross-listed with ANTH465.
PREREQ: A theory of methodology course in a social science, or an epistemology or philosophy of science course.
PHIL 463  ETHICAL THEORY  3
Justification of ethical beliefs, alternative criteria of moral rightness and the meaning of moral concepts.
PREREQ: PHIL202 or PHIL203.
PHIL 465  SENIOR SEMINAR  3
Various authors and themes; e.g., Plato, Kant, epistemology, philosophy of mind.
RESTRICTIONS: May be repeated once for credit when topics vary.
PHIL 466  INDEPENDENT STUDY  1-6
PHIL 604  ANIMAL MINDS  3
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 UAP648.
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.

PHYSICS AND ASTRONOMY

PHYS 104  ELEMENTARY PHYSICS  3
Overview of the principles of physics and their applications. Designed for beginners with no previous exposure to physics.
RESTRICTIONS: Requires working knowledge of algebra and the use of scientific notation. Only one course among PHYS104, PHYS201, PHYS207 and SCEN101 can count toward graduation.
PHYS 133  INTRODUCTION TO ASTRONOMY  4
Objects of the universe from the earth to galaxies. How the universal laws that govern them; e.g., gravity and electromagnetic radiation, permit us to learn their nature from quantitative observations. Telescopic observations, visual and electronic, included in the laboratory.
RESTRICTIONS: Not for credit for those who have taken PHYS144.
PHYS 139  STAR AND CONSTELLATION IDENTIFICATION  1
Familiarity with the sky, its changing aspects, constellations, mythology, bright stars, and planets. Topics include use of sky maps and coordinates, how to estimate directions and time from knowledge of the sky, and the use of binoculars and small telescopes.
PHYS 140  GREAT CONCEPTS OF PHYSICS  3
Designed for non-science majors, concentrates on understanding both the content and impact of five great concepts of physics: the Newtonian Universe, Conservation of Energy, Entropy, Relativity, and Wave-Particle Duality. The influence of these concepts in other areas of human concern, e.g., philosophy, art, history, politics, medicine, etc. will be an important feature.
PHYS 141  LIGHT, LASERS, CAMERAS, PERCEPTION  3
Introduction to the phenomena of light, optics and perception for non-science majors. Topics include: nature of light, sources of light and shadows, rainbows, mirages and other atmospheric phenomena, cameras, telescopes, microscopes, color creation and observation, physics influences in art, the human eye and perception.
PHYS 143  ENERGY TECHNOLOGY AND SOCIETY  3
Basic principles of physics are applied to discuss forms of energy (mechanical, thermal, chemical, electrical and nuclear), and how energy is derived from sources such as coal, petroleum, solar, nuclear fusion and fusion. Environmental consequences of energy use are treated. PREREQ: College algebra.
PHYS 144  CONCEPTS OF THE UNIVERSE  3
Survey of astronomy emphasizing early and modern concepts. Stars, planets, galaxies, cosmic evolution and intelligent life are studied in the context of physical principles which describe the dynamics of the universe. Scientific process is used to interpret observations that shape our perceptions of the cosmos.
RESTRICTIONS: Not for credit for those who have taken PHYS133.
PHYS 145  BLACK HOLES AND COSMIC EVOLUTION  3
Geared toward a general audience and focuses on topics such as finding black holes in space; the nature of space, time and black holes; the origin of the Universe; and the development of complex life here on Earth.
PHYS 146  QUARKS, GLUONS, AND THE BIG BANG: PARTICLES AND COSMOLOGY  3
Non-mathematical course focusing on the elementary particles and their influence on the early evolution of the universe. Major topics are quarks and the forces they feel, Einstein’s theory of relativity, Quantum Mechanics made fairly simple, and the Inflationary Universe.
RESTRICTIONS: Requires high school algebra.
PHYS 147  ATOMS FOR EVERYONE  3
Elementary but earnest inquiry into the sources of our knowledge that these completely invisible building blocks of ordinary matter exist as discrete entities, and exist to the exclusion of all other possibilities. PREREQ: College algebra.
PHYS 169  PERSPECTIVES ON PHYSICS AND ASTRONOMY  1 PF
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.
PHYS 199  EXPLORING PHYSICS CONCEPTS I  3
Exploration of physics concepts for first year students with no prior physics background. Emphasis on physics of light, color, electrical circuits and structure of matter.
RESTRICTIONS: Open to first year students only and to university studies majors.
PHYS 201  INTRODUCTORY PHYSICS I  4
First course in a sequence with PHYS202 that provides an introduction to physics for students in the life and environmental sciences. Emphasis on topics including mechanics, fluid dynamics, optics and thermodynamics.
PREREQ: MATH115.
RESTRICTIONS: Requires a strong mathematics background in geometry, algebra and trigonometry. Only one course among PHYS104, PHYS201, PHYS207 and SCEN101 can count toward graduation.
PHYS 202  INTRODUCTORY PHYSICS II  4
Final course in a sequence with PHYS201 that provides an introduction to physics for students in the life and environmental sciences. Topics include rotation and oscillatory motion, waves, electricity and magnetism, structure and properties of nuclei, atoms, molecules and solids.
PREREQ: PHYS201
RESTRICTIONS: Only one course from PHYS202 and PHYS208 can count toward graduation.
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<tr>
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<td>PHYS 207</td>
<td>Fundamentals of Physics I</td>
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<td>PHYS 208</td>
<td>Fundamentals of Physics II</td>
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<td>PHYS 245</td>
<td>Introduction to Electricity and Electronics</td>
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<td>PHYS 309</td>
<td>Physics of the Twentieth and Twenty First Centuries</td>
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<td>PHYS 310</td>
<td>Introduction to Thermal Physics</td>
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<td>PHYS 313</td>
<td>Physical Optics</td>
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<td>PHYS 333</td>
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<td>PHYS 366</td>
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<td>PHYS 419</td>
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<td>PHYS 424</td>
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<td>PHYS 445</td>
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<td>PHYS 511</td>
<td>Topics in High School Physics: Force, Motion and Energy</td>
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<td>PHYS 600</td>
<td>Physics Research Talks</td>
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<td>PHYS 601</td>
<td>Introduction to Teaching Physics and Astronomy</td>
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<tr>
<td>PHYS 603</td>
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**PREREQ:** PHYS208

**RESTRICTIONS:** Year of high school is recommended. Only one course from PHYS104, PHYS207 and SCEN101 can count toward graduation.
PHYS 607  METHODS OF MATHEMATICAL PHYSICS
Mathematics commonly used in physics. Main topics are linear algebra, vector calculus, Fourier series, integral transforms, and eigenfunction methods for differential equations. 3

PHYS 608  METHODS OF MATHEMATICAL PHYSICS
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. 3

PHYS 610  QUANTUM MECHANICS

PHYS 616  KINETIC THEORY AND THERMODYNAMICS
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 ELEG416. PREREQ: MATH243 and PHYS309. 3

PHYS 620  CLASSICAL MECHANICS II
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. 3

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

PHYS 624  INTRODUCTION TO SOLID STATE PHYSICS
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. 3

PHYS 626  INTRODUCTION TO ATOMIC, MOLECULAR AND OPTICAL PHYSICS
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. 3

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

PHYS 632  ASTROPHYSICS
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. 3

PHYS 633  INTRODUCTION TO STELLAR ASTROPHYSICS
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. 3

PHYS 634  PHYSICS OF THE SUN
Physics of processes which occur in the outer regions of the Sun. Topics include radioactive 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. 3

PHYS 635  SPACE PHYSICS
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. 3

PHYS 638  SELECTED TOPICS IN PHYSICS
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. 3

PHYS 641  NANOMATERIALS AND THIN FILM PROCESSES
Includes physical and chemical vapor deposition processes. Topics selected from Vacuum Science and Technology, Thin-Film Evaporation Processes, Discharges, Plasma, 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 MSE641. 3

PHYS 644  ELEMENTARY PARTICLES AND BIG BANG COSMOLOGY
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. 3

PHYS 645  ELECTRONICS FOR SCIENTISTS
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. 3

PHYS 646  INSTRUMENTATION FOR SCIENTISTS
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. 3

PHYS 650  QUANTUM COMPUTATION

PHYS 660  COMPUTATIONAL METHODS OF PHYSICS
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. 3

PHYS 669  OBSERVATIONAL ASTRONOMY
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. 3

PHYS 680  SOLID STATE PHYSICS
Crystal structure; mechanical, thermodynamic, electrical, optical and magnetic properties of solids; and imperfections in crystals. PREREQ: PHYS624. 3

PHYS 806  ATOMIC, MOLECULAR AND OPTICAL PHYSICS
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. 3

PHYS 809  ELECTROMAGNETIC THEORY
Review of statics; Maxwell’s equations, physical optics and wave guides. May be cross-listed with ELEG809. PREREQ. PHYS604. 3

PHYS 810  ELECTROMAGNETIC THEORY
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. 3
PHYS 811  QUANTUM MECHANICS  3
Develops formal description of quantum systems as states in a complex vector space. Topics include time evolution, path integrals, symmetry groups and conservation laws, parity, angular momentum and tensor operators, operator treatment of the harmonic oscillator, identical particles, time independent and time dependent perturbation theory, and radiative transitions. Includes a summary of special functions and boundary problems appropriate to simple quantum systems. PREREQ: PHYS607 and PHYS610.

PHYS 812  QUANTUM MECHANICS  3
Continuation of PHYS811. Topics include: many-particle wave functions and many-body operators, electron 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, linear response functions, second quantization, scalar, vector and Fermion fields, quantum electrodynamic, Feynman rules, renormalization theory and the renormalization group. 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 electrodynamic, Feynman rules, renormalization theory and the renormalization group. PREREQ: PHYS825.

PHYS 825  INTERMEDIATE CONDENSED MATTER PHYSICS  3

PHYS 826  ADVANCED TOPICS IN CONDENSED MATTER PHYSICS  3
Topics include Superfluidity, Superconductivity, Magnetism, Linear response theory, Bose-Einstein condensation, Electrodynamic 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 866  RESEARCH  1-9

PHYS 869  MASTER’S THESIS  1-6

PHYS 894  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 996  DOCTORAL DISSERTATION  1-12 PF

PHYS 966  INDEPENDENT STUDY  1-6

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
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
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
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
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
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
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
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
Introduction to thermal modalities and soft tissue mobilization techniques commonly used in current physical therapy practice.
PREREQ: PHYT632.
Restrictions: Open to physical therapy graduate students only.

PHYT 641 - ROUNDS I
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
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
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
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
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
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
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: PHYT622.
Restrictions: Open to physical therapy graduate students only.

PHYT 804 - NEUROPHYSIOLOGIC EVALUATION AND TREATMENT
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: PHYT622.
Restrictions: Open to physical therapy graduate students only.

PHYT 805 - REHABILITATION
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
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
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
Discusses biomechanics, pathophysiology and disability associated with spine pain and dysfunction. Includes understanding of role of physical therapy in evaluation 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
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
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
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, 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 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.

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 design 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 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

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, management 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 CHEM313 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 nematicides 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**
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 440 **Integrated Pest and Disease Management**
See ENWC440 for course description.

PLSC 444 **Physiology of Plant Stress**
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 446 **Plant Cell Biology**
See BISC446 for course description. PREREQ: Introductory organic chemistry.

PLSC 450 **Planting Design**
Comprehensive solution of landscape problems. Field application of principles of construction and design. PREREQ: PLSC211, PLSC212 and PLSC332.

PLSC 454 **Management of Landscape Enterprises**
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 455 **Issues in Plant and Soil Sciences**
Introduction to current and emerging issues facing plant and soil sciences professionals. Ethics, professionalism, environment, politics, technology and practices of discussion groups, student oral and written presentations, case studies, guest lecturers and field trips. RESTRICTIONS: Open to junior and senior majors only.

PLSC 461 **Soils and Wetland Deleination**
Soil taxonomy, use of a soil survey, properties of hydric soils and wetland delineation using soil characteristics, hydrology and plant ecological principles. PREREQ: PLSC101, PLSC204 and PLSC205.

PLSC 465 **Seminar**
Oral and written reports in one of the fields of plant science.

PLSC 466 **Independent Study**
1-6

PLSC 470 **Weed Biology and Control**
Introduction to weed science: weed biology and identification, survival strategies, competition, and impact of weeds. Weed management principles and practices including cultural, biological, and chemical control methods. PREREQ: PLSC101 or PLSC151 or PLSC204.

PLSC 601 **Agronomic Crop Science**
Production and management of the major grain and forage crops, with emphasis on diagnosis of production problems and decision making. PREREQ: PLSC151.

PLSC 602 **Physiological Plant Productivity**
Plant growth spanning net dry matter assimilation, growth habit plasticity, and management concerns. May be cross-listed with BREG603. PREREQ: PLSC204.

PLSC 603 **Soil Physics**
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 on the field; infiltration, evapotranspiration, heat, gas and solute (contaminant) transport in soil. May be cross-listed with BREG603. PREREQ: PLSC204.

PLSC 604 **Plant Taxonomy**
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 605 **Plant Breeding**
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 606 **Soil Genesis and Classification**
Soil forming factors and processes; chemical, physical and mineralogical parameters useful in characterizing soil; geologic and geomorphic settings in Delaware and their influence on soil formation and classification; soil taxonomy and soil limitations and interpretations. PREREQ: PLSC204.

PLSC 607 **Plant and Soil Water Relations**
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 608 **Environmental Soil Chemistry**
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 609 **Plant Microtechnique**
Introduction to techniques useful in microscopically examining diseased and nondiseased plant structures. Emphasis on fixation, embedding, sectioning, staining and interpretation of prepared materials.

PLSC 611 **Diagnostic Plant Pathology**
Consideration of major pathogenic causes of economic losses of plants. Emphasis on principles of etiology, epiphytology, symptoms and control. PREREQ: PLSC303.

PLSC 613 **Principles of Plant Disease Control**
Exclusion, eradication, resistance and protection with emphasis on fungicides, bactericides and nematocides and their use. PREREQ: PLSC303.

PLSC 615 **Vascular Plant Anatomy**
Developmental and comparative study of cells, tissues and organs of vascular plants. Readings in current anatomical literature.

PLSC 616 **Plant Virology**
Epidemiology, detection, identification and control of plant viruses and virus-like agents. PREREQ: PLSC303.

PLSC 619 **Soil Microbiology**
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 620 **Plant Physiology Laboratory**
Extraction from higher plants of enzymes and other macromolecules, and assay by chemical tests. Pigment extraction, organelle separation, ion uptake, protein manipulation using centrifuge, spectrophotometer, chromatography and electrophoresis. COREQ: PLSC410.

PLSC 629 **Introduction to the Fungi**
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 630 **Collections Management and Curation**
Organization and maintenance of curatorial records including: plant records and labeling, organization of seed plants (phylogeny), nomenclature, policy statements and management concerns. COREQ: PLSC402.

PLSC 635 **Plant Developmental Biology**
Anatomical and molecular analysis of plant growth and development with focus on how genes regulate pattern formation and cellular differentiation. PREREQ: PLSC300.
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 640 INTEGRATED PEST AND DISEASE MANAGEMENT 3
See ENWC640 for course description.

PLSC 644 PHYSIOLOGY OF PLANT STRESS 3
Angiosperms’ response to biotic and abiotic environmental stresses; mineral nutrients, salt, drought, cold, heat, light, pathogens and herbivores at physiological and molecular levels.
PREREQ: PLSC410.

PLSC 646 PLANT CELL BIOLOGY 3
See BISC646 for course description.
PREREQ: Introductory organic chemistry.

PLSC 655 POLLUTION MICROBIOLOGY 3
Integration of basic chemical, physical and biological processes that affect biotransformation of organic and inorganic pollutants in soils and subsurface sediments. Organization based on progression from molecular to field scale processes.
PREREQ: PLSC204, CHEM213, PLSC101 or BISC207.

PLSC 660 PESTICIDES IN THE ENVIRONMENT 3
PREREQ: CHEM102.

PLSC 670 WEED BIOLOGY AND CONTROL 4
Introduction to weed science: weed biology and identification, survival strategies, competition, and impact of weeds. Weed management principles and practices including cultural, biological, and chemical control methods.
PREREQ: PLSC101 or PLSC151 or PLSC204.

PLSC 675 CURRENT TOPICS: PLANT BIOLOGY 1 PF
Journal club for students interested in discussing hot issues of plant biology.

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

PLSC 801 PLANT SCIENCE TECHNIQUES 3
Theories, principles and applications of laboratory techniques used in planning and conducting plant science research.
RESTRICTIONS: Requires permission of instructor.

PLSC 802 PROFESSIONAL DEVELOPMENT 1
Professional development including grantmanship, manuscript writing and reviewing, resume preparation, job interviewing and presentation of research at professional meetings.

PLSC 805 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 804 PLANT MOLECULAR BIOLOGY 3
Fundamental and applied aspects of plant molecular biology, including organization of plant genes, genomes, gene expression, gene transfer and genetic engineering.
PREREQ: ANSC670 or BISC653.

PLSC 805 INSECT-PLANT CHEMICAL ECOLOGY 2
See ENWC805 for course description.

PLSC 810 KINETICS AND SURFACE CHEMISTRY OF SOILS 3
Kinetics and mechanisms of soil chemical reactions, including application of chemical kinetics to natural systems, rates of sorption/desorption, redox, precipitation/dissolution, and ion exchange processes and application of surface spectroscopic and microscopic techniques to elucidate reactions at soil mineral/water interface. May be cross-listed with CHEM810.
PREREQ: PLSC608, and either CHEM418 or CHEM443.

PLSC 819 ECOLOGICAL SOIL MICROBIOLOGY 3
Ecological principles of microbial activities and processes in soil-plant systems: dynamics of soil and rhizosphere populations, symbiotic interactions with plants, and selected topics in environmental quality.
PREREQ: PLSC619.

PLSC 823 SEMINAR: PRINCIPLES OF PLANT INFECTION 2
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 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 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 833 SEMINAR: SOIL SCIENCE 1
Current topics in soil science discussed from literature.

PLSC 834 CURRENT TOPICS IN AGRONOMY 1
Seminars to review current agronomic literature.

PLSC 835 ENVIRONMENTAL SOIL PHYSICS 4
PREREQ: PLSC204 and MATH221.

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 865 SEMINAR 1

PLSC 868 RESEARCH 1-9

PLSC 869 MASTER’S THESIS 1-6

PLSC 874 TOPICS IN MOLECULAR BIOLOGY 1
Provides a forum for the discussion of current topics in molecular biology, with critical reading of relevant primary literature.
RESTRICTIONS: Requires permission of instructor.

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

PLSC 969 DOCTORAL DISSERTATION 1-12 PF

PORTUGUESE

PORT 105 BRAZILIAN PORTUGUESE I - ELEMENTARY 4
Introduction to Brazilian Portuguese language and development of speaking, listening, reading and writing skills through the use of basic texts.

PORT 106 BRAZILIAN PORTUGUESE II - ELEMENTARY/INTERMEDIATE 4
Completion of basic Brazilian Portuguese. Increasing mastery of the basic skills of speaking, listening, reading and writing.
PREREQ: PORT105.
RESTRICTIONS: Two or three years of high school Brazilian Portuguese acceptable in lieu of prerequisite.

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.
POSC 100  INTRODUCTION TO POLITICAL SCIENCE  3
Introduction to the study of central concepts of the discipline, such as political power, authority, decision making, conflict management, representation and institutions of government.

POSC 102  CIVICS AND ECONOMICS FOR TEACHERS  3
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.
RESTRICTIONS: Elementary teacher education majors only.

POSC 150  AMERICAN POLITICAL SYSTEM  3
Constitutional principles, structure and functions of the political process in the United States.

POSC 151  EXPLORING AMERICAN POLITICS  1
Analysis of an array of problems in American government and politics. Individual and group participation expected.
COREQ: POSC150.
RESTRICTIONS: Open only to freshmen and sophomore political science and political science education majors.

POSC 201  INTRODUCTION TO GLOBAL ISLAM  3
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.
May be cross-listed with HIST201.

POSC 202  INTRODUCTION TO SCIENTIFIC INQUIRY  3
Introduces students to the foundations of scientific social research, with emphasis on political phenomena. Prepares students in the skills needed to conduct scientific research.
RESTRICTIONS: Students cannot take both POSC202 and POSC300 for credit.

POSC 203  INTRODUCTION TO PUBLIC ADMINISTRATION  3
Introduction to management in the public sector; personnel, budgeting, leadership, ethics, and the role of civil service in government.

POSC 206  ECONOMIC THEORY OF POLITICS  3
See ECON306 for course description.

POSC 209  POLITICAL CULTURE BY COUNTRY  3
Introduction to the political and civic cultures underpinning and supporting different political systems. Topics may vary depending on host country. May be cross-listed with FLIT309.
RESTRICTIONS: Offered only in conjunction with travel abroad programs. May be repeated for credit when topics vary.

POSC 210  EUROPEAN GOVERNMENTS  3
Structure and process of British, French, West German and Russian governments.

POSC 211  INTRODUCTION TO POLITICAL SCIENCE II  3
Forces determining public policy among the emerging nations. Cross-national comparative analysis.
RESTRICTIONS: Only one of either POSC211 or POSC311 can count for degree credit.

POSC 212  INTRODUCTION TO EAST ASIAN DEVELOPMENT  3
Examines contemporary issues and questions of political legitimacy and economic development in East and Southeast Asia. Traditional patterns of authority, impact of Western colonialism, emergence of new Southeast Asian states and the political and economic development of selected countries are covered.

POSC 213  AMERICAN FOREIGN POLICY  3
Theory, policies and administration of United States foreign policy.

POSC 215  THIRD WORLD WOMEN IN POLITICS  3
Introduction to the role of women in politics and society in Africa, Asia, Latin America and the Middle East.
May be cross-listed with WOMS315.

POSC 216  INTERNATIONAL RELIGION  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.

POSC 218  PUBLIC OPINION, POLITICS AND SOCIETY  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.

POSC 219  TOPICS IN POLITICS AND BROADCAST JOURNALISM  3
See COMM319 for course description.

POSC 220  INTRODUCTION TO POLITICS IN DEVELOPING COUNTRIES  3
Forces affecting politics in emerging nations. Impact of colonialism, economic development, military rule, instability and environment. Discussion of how developing nations affect the world political system.
RESTRICTIONS: Only one of either POSC211 or POSC311 can count for degree credit.

POSC 222  INTRODUCTION TO POLITICAL SCIENCE AND ECONOMICS  3
Emphasis on what government does, with a focus on substantive policy areas as well as the mechanisms of policy making. Case studies of policy areas (e.g., health policy, environmental policy, social welfare policy, etc.) used to illustrate relationship between political considerations and political behavior. Applied emphasis on survey methods and problems of measuring public opinion.

POSC 226  SPECIAL PROBLEM  1-3

POSC 227  COMPARATIVE POLITICS  3
Introduction to comparison of politics “within nations.” Covers Europe, Africa, Asia and Latin America.

POSC 228  CURRENTS IN POLITICAL THEORY  3
Basic introduction to political philosophy, organized 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 230  DATA ANALYSIS FOR POLITICAL SCIENCE  3
Applied statistical analysis, including regression, analysis of variance, descriptive statistics and exploratory data analysis, statistical inference, and measurement.

POSC 231  AMERICAN FOREIGN POLICY  3
Introduction to the study of central concepts of the discipline, such as political power, authority, decision making, conflict management, representation and institutions of government.

POSC 232  RACE AND POLITICS  3
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.
May be cross-listed with BAMS322.

POSC 233  INTRODUCTION TO WOMEN AND POLITICS  3
Political-legal status of American women since the Revolution, and their participation in the political process. Women’s present political-legal status, as illustrated through current issues such as reproductive rights, pay equity and the feminization of poverty.
May be cross-listed with WOMS323.

POSC 234  VOTING AND ELECTIONS  3
Examines various aspects of political behavior including political socialization, the formation of political attitudes and opinion, electoral behavior and political participation. Attention also given to the relationship of political behavior and public policy.

POSC 235  ETHICAL DECISION MAKING  3
Provides an understanding of how ethical issues are seen by political scientists and the political science community.

POSC 236  ECONOMIC THEORY OF POLITICS  3
Introduction to the study of the political economy, the political underpinnings and effects of economic policy, trade, financial and investment systems. Both relations among advanced countries, and between the advanced and poor countries considered.

POSC 237  POLITICAL CULTURE BY COUNTRY  3
Introduction to the political and civic cultures underpinning and supporting different political systems. Topics may vary depending on host country. May be cross-listed with FLIT309.
RESTRICTIONS: Offered only in conjunction with travel abroad programs. May be repeated for credit when topics vary.

POSC 238  INTERNATIONAL RELIGION  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.

POSC 239  INTERNATIONAL RELIGION  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.

POSC 240  INTRODUCTION TO INTERNATIONAL RELATIONS  3
Development of international systems, their structure and political economic dynamics. Fundamental analytical concepts and approaches.

POSC 241  EXPLORING INTERNATIONAL RELATIONS  1
Analysis of an array of problems facing the global community. Individual and group participation expected.
COREQ: POSC240.
RESTRICTIONS: Open only to freshmen and sophomore international relations majors.

POSC 242  THEORY OF POLITICAL SCIENCE  3
Introduction to the study of central concepts of the discipline, such as political power, authority, decision making, conflict management, representation and institutions of government.

POSC 243  INTRODUCTION TO COMPARATIVE POLITICS  3
Introduction to comparison of politics “within nations.” Covers Europe, Africa, Asia and Latin America.

POSC 244  CURRENTS IN POLITICAL THEORY  3
Basic introduction to political philosophy, organized 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 245  DATA ANALYSIS FOR POLITICAL SCIENCE  3
Applied statistical analysis, including regression, analysis of variance, descriptive statistics and exploratory data analysis, statistical inference, and measurement.

POSC 246  SPECIAL PROBLEM  1-3

POSC 247  COMPARATIVE POLITICS  3
Introduction to comparison of politics “within nations.” Covers Europe, Africa, Asia and Latin America.

POSC 248  CURRENTS IN POLITICAL THEORY  3
Basic introduction to political philosophy, organized 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 249  DATA ANALYSIS FOR POLITICAL SCIENCE  3
Applied statistical analysis, including regression, analysis of variance, descriptive statistics and exploratory data analysis, statistical inference, and measurement.

POSC 250  STATE AND LOCAL GOVERNMENT  3
American federalism with emphasis on government and politics, with special attention to Delaware.
POSC 330  POLITICAL TERRORISM  3
Selectively examines cases, trends and organizations which have made the violence termed terrorism so salient. Also examines whether governments, including the United States, are responding appropriately to the challenge. RESTRICTIONS: Not open to freshmen except with consent of instructor.

POSC 333  CONTEMPORARY POLITICAL IDEOLOGIES  3
Considers the theoretical development of liberal democracy and significant theoretical and ideological challenges to its dominance including Marxist, Islamist, poststructural and postmodernist political theories. Students read the original sources of these positions while considering their historical development and application to contemporary politics.

POSC 334  LIBERALISM AND CONSERVATISM  3
Introduces capitalism, socialism, liberalism, conservatism and democratic forms of Marxism. Accents problems of economic growth, equality, freedom and self-realization, bureaucracy, representation, justice, brotherhood, the profit motive, social cohesion, nationalism and the international order.

POSC 339  BRITAIN AND EUROPE  3
Examines Britain's role in an integrated Europe, with focus on contemporary problems and prospects of closer British ties to the European Union and related bodies.

POSC 340  POLITICS AND THE MEDIA  3
Political roles of the media in socialization, political competence, agenda setting, the electoral process and political crises. Emphasis on media-political system interaction and its impact in a democratic society. May be cross-listed with COMM340.

POSC 341  ENVIRONMENT OF MULTINATIONAL CORPORATIONS  3
See BIAD341 for course description.

POSC 343  SOCIETY, POLITICS AND HEALTHCARE  3
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 350  POLITICS AND THE ENVIRONMENT  3
Political context of environmental issues; air and water pollution, population control, and conservation.

POSC 355  URBAN POLITICS AND COMMUNITY DEVELOPMENT  3
Examines the decision making processes and the exercise of political power in urban communities. Special focus placed on urban politics and government and the impact of social and economic problems on the development of urban society. Explores the concepts and practices of community development in urban communities.

POSC 362  DIPLOMACY  3
Diplomacy is the art of formal representation and policy implementation. Diplomats need to understand complex material and represent positions in an effective manner. These skills are applicable in a variety of contexts. Readings, discussions, cases and simulations are used to introduce diplomatic skills.

POSC 363  INTERNATIONAL LAW AND ORGANIZATION  3
Introduction to the development of international law and international organization.

POSC 366  INDEPENDENT STUDY  1-6

POSC 372  EAST CENTRAL EUROPEAN POLITICS  3
Survey of East Central European political systems (Poland, Hungary, Czechia and Slovakia, Germany, Romania, former Yugoslavia, Bulgaria and Albania) after World War II. The so-called new federal states in Germany (ex-DDR) are emphasized.

POSC 377  ARAB-ISRAELI POLITICS  3
Development of the Arab-Israeli conflict examined from the Dreyfus Affair and the Balfour Declaration to current events. May be cross-listed with JWST377.

POSC 380  INTRODUCTION TO LAW  3
Broad overview of the nature, functions and limits of law. Emphasis on law as the political instrument used to regulate, control and promote behavior and deal with social problems. May be cross-listed with LEST380.

POSC 387  AMERICAN POLITICAL THOUGHT  3
Overview of American political thought. Focuses on critical formative periods in American politics, such as the Founding, Civil War and Industrial Revolution, with readings selected from the writings and speeches of key American statesmen.

POSC 390  HONORS COLLOQUIUM  3

POSC 400  PRACTICUM IN TEACHING POLITICAL SCIENCE  3 PF
Available to outstanding senior political science majors interested in obtaining teaching experience at the college level. Provides opportunity to lead discussion sections of students in lower division courses. RESTRICTIONS: Requires permission of instructor.

POSC 401  TOPICS IN CONSTITUTIONAL LAW  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.

POSC 402  CIVIL LIBERTIES: INDIVIDUAL FREEDOMS  3
Constitutional issues of freedom of speech, press, religion, and separation of church and state.

POSC 403  CIVIL LIBERTIES: EQUAL PROTECTION CLAUSE  3
Focuses on fundamental rights and the constitutional guarantee of equal protection of the laws.

POSC 404  THE JUDICIAL PROCESS  3
Structure, process and personnel of American courts; factors influencing decisions and judicial policy making.

POSC 405  CONSTITUTIONAL LAW OF THE UNITED STATES  3
Constitutional principles regulating organization and function of federal government. United States Supreme Court decisions placed in a socio-political context.

POSC 407  AMERICAN PRESIDENCY  3
Modern American presidency with emphasis on presidential recruitment, organization and staffing. The nature and exercise of presidential power in the decision making process.

POSC 408  INTERNATIONAL ORGANIZATION  3
Analysis of the organization of the international system, its structure, operating principles, formal and informal components.

POSC 409  CONTEMPORARY PROBLEMS OF WORLD POLITICS  3
Critical areas of international politics. Topics vary by instructor. May be cross-listed with JWST409. RESTRICTIONS: May be repeated once when topics vary.

POSC 410  ISLAM IN GLOBAL AFFAIRS  3
Explores three main elements of political Islam - epistemological, reformatory and militant, and examines how the struggle to construct Islam is reconstructing the international system.

POSC 411  POLITICS AND POVERTY  3
Relationship of policy making and social conditions in the United States with regard to capacity of government to cope with problems arising from overpopulation and socio-economic differences.

POSC 412  FOREIGN POLICY OF THE POST-SOVIET UNION  3
Principles, foreign policies and administration of the former Soviet government and its most important successor states.

POSC 413  PROBLEMS IN AMERICAN GOVERNMENT  3
Contemporary problems in American government and politics. May be cross-listed with WOMS413. RESTRICTIONS: May be repeated for credit once when topics vary.

POSC 414  PROBLEMS IN AMERICAN FOREIGN POLICY  3
Contemporary problems in American foreign policy and policy making. RESTRICTIONS: May be repeated for credit once when topics vary.

POSC 415  FORCE AND WORLD POLITICS  3
Interrelationship of military and foreign policy; military strategies, arms control and disarmament; and the American experience.

POSC 418  CONSTITUTIONAL ISSUES IN AMERICAN PUBLIC SCHOOLS  3
Case studies are used to explore how controversial issues have arisen in public education over the years, what laws and legal precedents presently govern them, how policies have evolved over time and what questions remain unsolved.

POSC 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  
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  
Democratic functions of a modern legislature; legislative structures and processes; coalitions and cleavages; parties, ideological factions and interest groups; the Federal budget, national priorities and Congressional intervention in the economy; central policy issues before Congress; Congressional oversight of the bureaucracy; Congress and the Presidency; and election of the Congress.

POSC 424  ENERGY POLICY AND ADMINISTRATION  
World and 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  
See COMM425 for course description.

POSC 426  LATIN AMERICAN POLITICAL SYSTEMS  
Impact of social and economic change on the political processes.

POSC 427  POLITICS IN CHINA  
General introduction to politics of the People's Republic of China, including examination of politics and modernization efforts under Mao Zedong and Deng Xiaoping and legacies left by both. Significance of Tiananmen, dilemmas of economic and political liberalization, regionalization, and future of Communist Party also discussed.

POSC 428  POLITICS IN JAPAN  
An in-depth study of who governs Japan and how these relations have evolved since the end of World War II.

POSC 429  SOUTHEAST ASIA AND THE WORLD  
Examines patterns of international relations within Southeast Asia and between the region and greater powers. Southeast Asia's insecurity and patterns of relations at the domestic, regional and global levels. Discussion of contemporary issues including the emergence of economic blocs, the rise of China and the future of the Association of Southeast Asian Nations.

POSC 430  INTERMESTIC RELATIONS OF ISLAM AND AMERICA  
Explores intermestic (international and domestic) relations between Islam and the 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  
Contemporary political events in three Latin American nations. Comparisons of the actions and influence of the military, church, bureaucracies, political parties and guerrilla groups in three different Latin American settings: modern, transitional and traditional.

POSC 432  POLITICAL SYSTEM OF THE POST-SOVIET UNION  
Structure and process of the political system of the USSR and its most important successor states (Russia, Ukraine, Byelarus, Kazakhstan and others).

POSC 433  AFRICAN POLITICS  
Overview of politics and society in sub-Saharan Africa including: colonialism, the rise of nationalism, decolonization, single-party and military rule, the role of social movements and religious, class, gender and ethnic identities and the move toward economic and political liberalization.

POSC 434  POLITICAL THOUGHT I  
From Plato to Machiavelli.

POSC 435  POLITICAL THOUGHT II  
From Machiavelli to present.

POSC 436  POLITICS AND LITERATURE  
Class, civil rights, feminism, revolution and other political issues examined through novels, film and other literary works. May be cross-listed with FLIT436 and/or WOMS436.

POSC 437  WHO GOVERN: PERSPECTIVES ON POLITICAL POWER  
Raises the question "Who Governs?" and attempts to answer it by critically examining various schools of thought about who actually has and who should have political power in capitalist countries.

POSC 439  PROBLEMS IN AFRICAN POLITICS  
Examination of selected topics in contemporary African politics. Focuses in-depth on aspects of politics and society in a specific region of Africa or investigates in greater detail issues confronting Africa today such as economic structural adjustment, democratization and state-society relations. May be cross-listed with BAM5439.

POSC 441  PROBLEMS OF WESTERN EUROPEAN POLITICS BY COUNTRY  
Intensive examination of European politics from the perspective of a specific country, e.g., Spain, England and France.

RESTRICTIONS: Offered only in conjunction with travel abroad programs. May be repeated for credit when topics vary.

POSC 442  PROBLEMS OF WESTERN EUROPEAN POLITICS  
Examination of current political trends in Western European politics, including changes in party systems and problems of European integration.

POSC 443  CHINA AND THE WORLD  
Historical and theoretical examination of Chinese foreign policy since 1949, including discussion of China's relations with larger and developing powers, China's historical conception of itself in the world, significance of China's interdependence with the world and China's participation in international and regional organizations.

POSC 444  GLOBAL AGENDA  
Seminar survey of current geopolitical problems facing the 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.

RESTRICTIONS: May be repeated for credit when topics vary.

POSC 445  HUMAN RIGHTS AND WORLD POLITICS  
Alternative theories of human rights examined in cross-cultural and international contexts. International documents, contemporary cases (e.g. South Africa) and United States foreign policies also examined and evaluated.

POSC 446  INTERNATIONAL HUMAN RIGHTS ON FILM  
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  
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  
Current political issues in selected Latin American countries.

POSC 451  PROBLEMS IN POLICY AND ADMINISTRATION  
Examination of select topics related to contemporary public administration or the study of public policy and issues and controversies in a select policy area.

POSC 452  URBAN POLITICS AND POLICY  
Examines the exercise of political power, the policy making process, and contemporary policy issues in urban areas. Special emphasis on the study of contemporary political relationships and the social, political, and economic problems and dilemmas within urban communities.

POSC 453  PUBLIC SECTOR HUMAN RESOURCE MANAGEMENT  
Recruitment, selection, training, performance assessment and pay issues in public personnel administration.

POSC 454  ORGANIZATIONAL BEHAVIOR AND THEORY IN THE PUBLIC SECTOR  
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  
Revenue and expenditure systems, alternative budget formats, basic principles of accounting and capital financing in the public sector.

POSC 456  DISASTER AND POLITICS  
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
Fieldwork experiences in public or private community service agencies. Students share and analyze experiences in a seminar setting with academic requirements.
RESTRICTIONS: May be repeated for credit once when topics vary.

POSC 463 THE UNITED NATIONS AND WORLD AFFAIRS 3
Examines the development, institutional structure, and prospects of the United Nations and UN system.

POSC 464 INTERNSHIP IN POLITICAL SCIENCE 1-6
Internship in a political science or international relations-related field. Includes preparation of a journal of activities and a final project.
RESTRICTIONS: Requires permission of instructor.

POSC 465 MODEL ORGANIZATION OF AMERICAN STATES 3
Theoretical and practical preparation for participation in the Model Organization of American States conference held in Washington, D.C. each year. Participation as delegates to the week-long simulation.
RESTRICTIONS: May be repeated once for credit when topics vary. May only count toward political science or international relations major one time.

POSC 466 INDEPENDENT STUDY 1-6
Research conducted under the direction of or in conjunction with a faculty member. May result in a major research paper or be incorporated into a faculty project.

POSC 468 UNDERGRADUATE RESEARCH 1-6
Research conducted under the direction of or in conjunction with a faculty member. May result in a major research paper or be incorporated into a faculty project.

POSC 470 SENIOR HONORS SEMINAR 3

POSC 475 MODEL UNITED NATIONS 3
Intensive preparation for effective participation in the National Model United Nations held in New York City each spring.
RESTRICTIONS: May be repeated once for credit when topics vary. May only count toward political science or international relations major one time.

POSC 604 INTERNATIONAL LAW 3
See MAST673 for course description.

POSC 605 TOPICS IN LAW AND COURTS 3
Content varies from year to year. Possible topics may be comparative public law, jurisprudence, constitutionalism. A major research paper is required.

POSC 610 ISLAM IN GLOBAL AFFAIRS 3
Explores three main elements of political Islam - epistemological, reformatory and militant, and examines how the struggle to construct Islam is reconstructing the international system.

POSC 612 FOREIGN POLICY OF THE POST-SOVIET UNION 3
Principles, foreign policies and administration of the former Soviet government and its most important successor states.

POSC 614 JUDICIAL PROCESS 3
Examines the structure, personnel, and process of the American judiciary, including factors that influence judicial decisions and the scope and nature of judicial policy making.

POSC 615 FORCE AND WORLD POLITICS 3
Interrelationship of military and foreign policy; military strategies, arms control and disarmament; and the American experience.

POSC 624 ENERGY POLICY AND ADMINISTRATION 3
World and 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.

POSC 626 CONSERVATION AND RENEWABLE ENERGY POLICY 3
See UAPP626 for course description.

POSC 627 LATIN AMERICAN POLITICAL SYSTEMS 3
Impact of social and economic change on the political processes.

POSC 628 COMPARATIVE ENVIRONMENTAL POLITICS 3
See UAPP627 for course description.

POSC 629 SOUTHEAST ASIA AND THE WORLD 3
Examines patterns of international relations within Southeast Asia and between the region and greater powers. Southeast Asia’s insecurity and patterns of relations at the domestic, regional and global levels. Discussion of contemporary issues including the emergence of economic blocs, the rise of China and the future of the Association of Southeast Asian Nations.

POSC 632 POLITICAL SYSTEM OF THE POST-SOVIET UNION 3
Structure and process of the political system of the USSR and its most important successor states (Russia, Ukraine, Byelorussia, Kazakhstan and others).

POSC 633 AFRICAN POLITICS 3
Overview of politics and society in sub-Saharan Africa including colonialism, the rise of nationalism, decolonization, single-party and military rule, the role of social movements and religious, class, gender and ethnic identities and the move toward economic and political liberalization.

POSC 634 POLITICAL THOUGHT I 3
In-depth study of major political philosophers of the Western tradition from Plato to Machiavelli.

POSC 635 POLITICAL THOUGHT II 3
In-depth study of major political philosophers of the Western tradition from Machiavelli to the present.

POSC 639 PROBLEMS IN AFRICAN POLITICS 3
Examination of selected topics in contemporary African politics. Focus in-depth on aspects of politics and society in a specific region of Africa or investigate in greater detail issues confronting Africa today such as economic structural adjustment, democratization and state-society relations.

POSC 640 INTERNATIONAL DEVELOPMENT POLICY AND ADMINISTRATION 3
Poverty and inequality in developing countries and the economic development policies employed to alleviate them. Emphasis on policy reform, trade strategies, sustainable development, and the role of the state. The approaches used by the World Bank, the IMF and USAID. May be cross-listed with UAPP640.

POSC 642 PROBLEMS OF WESTERN EUROPEAN POLITICS 3
Examination of current political trends in Western European politics, including changes in party systems and problems of European integration.

POSC 650 PROBLEMS OF LATIN AMERICAN POLITICS 3
Current political issues in selected Latin American countries.

POSC 651 PROBLEMS IN POLICY AND ADMINISTRATION 3
Examination of select topics related to contemporary public administration or the study of public policy and issues and controversies in a select policy area.

POSC 652 TOPICS IN POLITICAL THEORY 3
Focuses on selected topics in political theory, including Marxism, Liberalism and Contemporary Political Theory.

POSC 653 POLITICS AND HEALTHCARE 3
Prepares students to understand and assess the American healthcare delivery system. Examines the political dynamics involved in developing healthcare policies in both the public and private sectors.
May be cross-listed with UAPP653.

POSC 656 POLITICS AND DISASTER 3
Politics and public administration of governmental preparedness for, and response to, natural and human-caused disasters and emergency incidents.
May be cross-listed with UAPP656.

POSC 659 TOPICS IN PUBLIC ADMINISTRATION 1-3
See UAPP659 for course description.

POSC 663 DECISION TOOLS FOR POLICY ANALYSIS 3
See MAST663 for course description.

POSC 678 ADMIRALTY AND MARITIME LAW 3
See MAST678 for course description.

POSC 681 METROPOLITAN INFRASTRUCTURE AND TRANSPORTATION 3
See UAPP681 for course description.

POSC 683 REGIONAL POLICY ANALYSIS 3
See UAPP683 for course description.

POSC 684 PERSONNEL AND HUMAN RESOURCE ISSUES: CURRENT TOPICS 3
See UAPP685 for course description.

POSC 686 STATE AND LOCAL GOVERNMENT 3
See UAPP686 for course description.

POSC 687 STATE GOVERNMENT MANAGEMENT AND POLICY 3
See UAPP687 for course description.

POSC 688 TOPICS IN STATE AND LOCAL MANAGEMENT 3
See UAPP688 for course description.
POSC 800  Seminar: 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.

POSC 806  Normative Issues in Global Governance  3
Examines normative issues in contemporary global governance from the 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 multinational government and private sector organizations, as well as non-governmental, nonprofit 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.

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, neorealism, 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.
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 COSC314. PREREQ: Grades of C- or better in PSYC207 and PSYC209.

PSYC 316 Biological Bases of Behavior 3
Evolutionary approaches 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 WOM533. 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 356 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
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: 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, Golman, 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 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 PSYCB835.
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

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 212  Russian Conversation  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 223  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 235  Russian Language and Literature  3
Continuation of RUSS107. Several short compositions. Grammar review where appropriate.

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 336  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 kites 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.

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 210  MEND, 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 DEVIANCY  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
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, riots, demonstrations; and processes of interaction: susceptibility, contagion, polarization and communication.
May be cross-listed with CRJU222.
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: SOCI201.

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: SOCI201 or SOCI207, and SOCI470.
RESTRICTIONS: Approval of the area coordinator

SOCI 327  SOCIOLOGY OF ORGANIZATIONS 3
Business enterprises, the military, governmental bureau 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: SOCIO204.

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 and race in class in patterns of social stratification.
May be cross-listed with WMS3407.
PREREQ: SOCI201, and either SOCI213 or WOMS201.
RESTRICTIONS: Restricted to junior and senior sociology and women's studies majors.
SOCI 410  HEALTH SERVICES PRACTICUM AND SEMINAR  4 PF
Field experience and related seminar. Placement in health service settings where
student works for about 160 hours under supervision of health service
administrators. Students meet in a weekly seminar with coordinator.
RESTRICTIONS: Requires permission of instructor.

SOCI 411  TECHNIQUES OF DEMOGRAPHIC ANALYSIS  3
Study of demographic equation (fertility, mortality and migration), population
processes (composition and distribution) and the use of computers to analyze
demographic data.
PREREQ: SOCI301.

SOCI 412  RESEARCH PRACTICUM  4 PF
Field experience and related seminar. Placement in research, planning and service
agencies where students work for approximately 160 hours under professionally
trained supervisors. Students meet in a weekly seminar with coordinator.
PREREQ: SOCI301.
RESTRICTIONS: Requires permission of instructor.

SOCI 415  RACE, CLASS AND GENDER  3
Analysis of current American social issues that show interrelationship of race, class
and gender. Readings from sociology, Afro-American studies, feminist studies,
history and literature.
May be cross-listed with BAMS415 and/or WOMS415.

SOCI 416  SOCIAL THOUGHT AND CONTEMPORARY SOCIETY  3
Seminar focuses on ways in which social thought defines and analyzes
contemporary society. Examines how alternative theories and methods serve to
create knowledge about contemporary concerns with everyday life, democracy,
equality, social structure and power.
PREREQ: SOCI312.

SOCI 418  RACE, GENDER AND POVERTY  3
Examination of contemporary American poverty with attention to race and gender
as fundamental dimensions of inequality. Social policy, employment and family
composition are key topics.
May be cross-listed with BAMS418 and/or WOMS418.
PREREQ: SOCI201.

SOCI 422  FADS AND FASHIONS  3
Examination of the dynamics of short-term enthusiasms. Emphasis will be on fads
and fashions in education, science, medicine, and other institutions, rather than on
fashions in clothing.

SOCI 428  CORPORATE CRIME  3
Nature and causes of the deviant behaviors and crimes of large organizations.
How organizations act, are accused of deviance and defend themselves in cases
such as price-fixing, sale of unsafe drugs and illegal spying.
May be cross-listed with CRJU428.

SOCI 430  COMPARATIVE SOCIOLOGY  3
Examines sociological similarities and differences between the United States and a
selected country on a number of critical sociological topics. Topics include ethnic
and religious diversity, culture, demographic structure, social institutions, social
stratification and urbanization.
May be cross-listed with JWST430.
RESTRICTIONS: Requires permission of instructor. Only three credits may apply
toward departmental requirement of six 400-level credits. Offered only in the study
abroad program and subject to acceptance by the Office of International Programs.

SOCI 435  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 441  SOCIAL WELFARE PRACTICUM AND SEMINAR  4 PF
Field experience and related seminar. Placement in social service agencies where
students work for approximately 160 hours under professionally trained supervisors;
students meet in a weekly seminar with coordinator.
PREREQ: SOCI341.
RESTRICTIONS: Requires permission of instructor.

SOCI 442  LAW AND SOCIETY PRACTICUM AND SEMINAR  4 PF
Field experience and related seminar. Placement in court, law firm or other law-
related institution where students work for approximately 160 hours under
professionally trained supervisors; weekly seminar with program coordinator.
PREREQ: SOCI345.
RESTRICTIONS: Requires permission of instructor.

SOCI 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 448  COMMUNITY-BASED TREATMENT  3
Explores issues related to the appropriateness and design of community-based
programs for the mentally disabled, substance abusers, the homeless, dependent
children, etc. Emphasis on analyzing client needs and community resources, and
on understanding the perspectives of clients, staff and neighbors about these
programs.
May be cross-listed with CRJU448.

SOCI 450  POLITICAL SOCIOLOGY  3
Analysis of political organization and action, including evaluation of major
approaches. Case studies of political structures and behavior.
PREREQ: SOCI201.

SOCI 452  DRUGS AND THE CRIMINAL JUSTICE SYSTEM  3
See CRJU452 for course description.
RESTRICTIONS: Requires permission of the instructor.

SOCI 456  LAWYERS AND SOCIETY  3
Seminar focusing upon the social organization and dynamics of the legal
profession. Topics include professional association, law school socialization,
professional ethics and law practice.
May be cross-listed with CRJU456.
PREREQ: SOCI201 and three additional sociology courses.

SOCI 460  WOMEN IN INTERNATIONAL DEVELOPMENT  3
Understanding of international development process in third world countries by
examination of the roles of men and women. Analyzes processes of development
with emphasis on women’s participation and/or exclusion. Examines development
at the project proposal or program implementation level. Hands-on experience in
practical project development and proposal presentation skills.
May be cross-listed with GEOG460, IFST460 and/or WOMS460.

SOCI 464  INTERNSHIP  1-4 PF
Provides an opportunity to apply sociological theory and research while working
in an agency or other organizational setting under supervision of department
faculty. Must complete an internship agreement and secure approval from faculty
member to sponsor internship.

SOCI 466  INDEPENDENT STUDY  1-3

SOCI 470  ENVIRONMENTAL SOCIOLOGY  3
Substantive and theoretical introduction to the major issues in environmental
sociology: the emergence and development of the environmental movement; the
development of environmental issues; and how environmental issues are related to
structural, contextual and perceptual factors.
PREREQ: SOCI201 and SOCI312.
RESTRICTIONS: Requires upper division status.

SOCI 495  FIELD EXPERIENCE IN CRIMINAL JUSTICE  4 PF
See CRJU495 for course description.

SOCI 496  PRACTICUM IN TEACHING  1-3 PF
Practical exposure to undergraduate education gained by assisting a member of
the faculty in carefully supervised experiences such as discussion leader, crafting
questions, consulting with students. Students may not be involved in the grading of
student work or the assignment of grades. May be repeated for up to three credit
hours.
RESTRICTIONS: Requires permission of instructor. Not for major credit.

SOCI 605  DATA COLLECTION AND ANALYSIS  3
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 METHODS  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 813  CURRENT ISSUES IN SOCIAL THEORY  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 811  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 812  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 814  ADVANCED DATA ANALYSIS  3
Methods of analyzing data in sociological research focusing on multivariate approaches.
PREREQ: SOCI605.

SOCI 815  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 preconditions for, and consequences of, successfully labeling and sanctioning an organization as deviant.

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

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

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

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

SOCI 666  SPECIAL PROBLEM  1-12
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 criminal control by focusing on various explanations for why certain 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.
PREREQ: SOAN101 or SPAN105.

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.

SPAN 107  SPANISH III - INTERMEDIATE  4
Review of grammar, continued practice in speaking and writing, and reading texts of average difficulty.
PREREQ: SPAN106.

SPAN 111  SPANISH IV - INTERMEDIATE/ADVANCED  4
Completion of high school Spanish. Increasing mastery of the basic skills of speaking, listening, reading and writing.
PREREQ: SPAN105.

SPAN 112  INTERMEDIATE SPANISH II  3
Continued practice in speaking and writing, reading texts of average difficulty, grammar review as needed.
PREREQ: SPAN111.

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  
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  
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  
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  
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  
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  
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  
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  
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  
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  
Representative works in all genres of Latin American literature from pre-Columbian to Modernism.  
PREREQ: SPAN201.

SPAN 304  SURVEY OF SPANISH-AMERICAN LITERATURE  
Representative works in all genres of Latin American literature in the twentieth century.  
PREREQ: SPAN201.

SPAN 305  ORAL COMMUNICATION  
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  
Strengthens skills in grammar and vocabulary in preparation for advanced courses. Includes oral exposés, discussion of articles and videos, textual analysis and compositions.  
PREREQ: SPAN200.  
RESTRICTIONS: Taught abroad only.

SPAN 307  CONTEMPORARY LATIN AMERICA II  
Discussion and study of issues related to contemporary cultural, political and social developments in Latin America.  
PREREQ: SPAN200.

SPAN 308  CONTEMPORARY SPAIN II  
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  
PREREQ: SPAN200.  
RESTRICTIONS: Recommended for prospective teachers.

SPAN 325  SPANISH CIVILIZATION AND CULTURE  
Survey of geography, history, art and society of Spain.  
PREREQ: SPAN200.

SPAN 326  LATIN AMERICAN CIVILIZATION AND CULTURE  
Survey of geography, history, art and society of Latin American lands.  
PREREQ: SPAN200.

SPAN 352  INTRODUCTION TO BUSINESS SPANISH  
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  
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  
Prereq: Any 300-level Spanish course. Survey of geography, history, art and society of Latin America. Focus of study is the Latin American press: newspapers and magazines printed in the Spanish language.  
PREREQ: Any 300-level Spanish course.  
RESTRICTIONS: Taught abroad and in Spanish.

SPAN 401  ADVANCED SPANISH GRAMMAR II  
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  
History of the language from Latin to the present. Historical phonology and morphology.  
PREREQ: Any 300-level Spanish course.

SPAN 406  ADVANCED SPANISH LANGUAGE  
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  
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  
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  
Covers the works of Spanish and Latin American Nobel Prize authors - Echegaray, Benavente, Mistral, Jimenez, Austurias, Alexandre, Neruda, Garcia Marquez, Paz and Cela - in relation to their cultural milieu with a 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 eighteenth to the nineteenth centuries. Authors studied include Santillana, Diego de San Pedro, Luis de Leon, Zayas and others. PREREQ: One SPAN 300-level survey of literature.

SPAN 420  TOPICS: MEDIEVAL LITERATURE  3
Works of one or more authors or of a special theme or genre within Spanish medieval literature. Example: Love and Passion in the Middle Ages on the Iberian Peninsula. PREREQ: One 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 SPAN 300-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 Martinez-Santos, Juan Goytisolo, Juan Benet, Carmen Martin Gaite, Ana Maria Maix and Esther Tusquets. Analysis of these works is grounded in international literary theory and criticism. PREREQ: One SPAN 300-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 Beccquer to the present day. PREREQ: One SPAN 300-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, Feijerman, 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. SPAN352 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 473  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 SPAN3325 or SPAN3326.

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 SPAN 300-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, Almodovar, 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 Martinez-Santos, Juan Goytisolo, Carmen Martin Gaite, and Esther Tusquets. Analysis of these works is grounded in international literary theory and criticism.

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

SPAN 650  TOPICS: MODERN HISPANIC LITERATURE 1898-1936  3
Works of one or more authors or of a special theme, genre, or topic within
Hispanic literature from 1898 to 1936.

SPAN 651  CONTEMPORARY SPANISH POETRY  3
Analysis of Spanish poetry from Becquer to the present day. Special emphasis on
stylistics.

SPAN 655  SELECTED AUTHORS, WORKS AND THEMES  3
Works of one or more outstanding authors or on a special theme.
RESTRICTIONS: May be repeated for credit when topics vary.

SPAN 660  TOPICS: CONTEMPORARY HISPANIC LITERATURE 1936-PRESENT  3
Works of one or more authors or of a special theme, genre, or topic within
Hispanic literature from 1936 to the present.

SPAN 662  TOPICS: HISPANIC SHORT FICTION  3
Explores short stories and novellas by major writers of the Hispanic world. Each
narrative is analyzed as an individual work of literature and is situated in its
literary, historical and critical contexts.

SPAN 664  CONTEMPORARY SPANISH-AMERICAN LITERATURE BY WOMEN  3
Explores 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.

SPAN 675  TOPICS: HISPANIC CULTURE AND CIVILIZATION  3
Study of topics in Hispanic culture and civilization, ranging through the
graphology, history, art and society of Spain and Latin American countries.

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

SPAN 869  MASTER'S THESIS  1-6

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

STATISTICS

STAT 200  BASIC STATISTICAL PRACTICE  3
Uses real data from a variety of disciplines to explore topics in data analysis, estimation
and inference such as graphical displays, estimation of and hypothesis
tests on means and proportions, sampling distributions, confidence intervals,
analysis of variance, simple linear regression, chi-square tests for independence.
PREREQ: College algebra.

STAT 266  SPECIAL PROBLEM  1-3

STAT 366  INDEPENDENT STUDY  1-6

STAT 370  INTRODUCTION TO STATISTICAL ANALYSIS I  3
Basic probability; continuous, discrete and joint distributions; distribution of
functions of random variables; order statistics; expected value and central limit
theorem.
PREREQ: MATH222 or MATH243.

STAT 371  INTRODUCTION TO STATISTICAL ANALYSIS II  3
Distributions of common statistics, sampling techniques, estimation, confidence
intervals, hypotheses testing and selected topics.
PREREQ: STAT370.

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

STAT 420  DATA ANALYSIS AND NONPARAMETRIC STATISTICS  3
Techniques of exploratory and graphical data analysis for univariate and
multivariate data sets, and numerical and categorical variables. Emphasis on
selection of proper procedure. Non-parametric techniques of estimation testing and
curve smoothing.
PREREQ: STAT371.

STAT 466  INDEPENDENT STUDY  1-6

STAT 475  STATISTICS FOR ENVIRONMENTAL SCIENCE  3
Introduction to statistical methods for analyzing environmental data. Relevant
probability and sampling theory 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.

STAT 601  PROBABILITY THEORY FOR OPERATIONS RESEARCH AND
STATISTICS  3
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.

STAT 602  MATHEMATICAL STATISTICS  3
Derived sampling distributions; decision theory; estimation theory; multivariate
normal; hypotheses testing; special topics.
PREREQ: STAT601.

STAT 603  VECTOR SPACES AND OPTIMIZATION  3
Bases, linear transformations, subspaces, projection theorem, least squares,
eigenvalues, eigenvectors, matrix factorizations. Quadratic programming,
convexity, duality, Karush-Kuhn-Tucker conditions, constraints, sequential quadratic
programming. Linear programming, simplex method, interior point methods.
Examples taken from maximum likelihood estimation, robust and ridge regression,
resource allocation, transportation problems.
PREREQ: MATH243 and MATH349.

STAT 608  STATISTICAL RESEARCH METHODS  3
See FREC608 for course description.

STAT 609  REGRESSION AND EXPERIMENTAL DESIGN  3
Introduction and overview of inferential methods used in analyzing regression
models and linear models for experimental designs.
PREREQ: STAT608 or equivalent.

STAT 611  REGRESSION ANALYSIS  3
Simple linear and nonlinear regression. Subset regression; principal component
and ridge regression. Introduction to experimental design and design models.
PREREQ: MATH202 or STAT371.

STAT 612  Advanced Regression Techniques  3
Selected topics in advanced regression analysis.
RESTRICTIONS: Requires permission of instructor.

STAT 615  DESIGN AND ANALYSIS OF EXPERIMENTS  3
Fundamental principles of design, randomized designs, Latin squares, sources of
error, components of error. Factorial designs, response surfaces, models for
design.
PREREQ: STAT371.

STAT 616  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 617  MULTIVARIATE METHODS  3
Multivariate analysis of variance and covariance; classification and discrimination;
canonical correlation; principal components; factor analysis.
PREREQ: STAT371.
STAT 618  Sampling Techniques  3
Simple random sampling; stratified random sampling; ratio estimates; regression estimates; systematic sampling; cluster sampling; double sampling.
PREREQ: STAT371.

STAT 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 unrestricted 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.
REQUIREMENTS: Requires permission of instructor.

STAT 624  Advanced Topics in Statistics  3
Current statistical and research techniques not covered in other courses.
REQUIREMENTS: 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 GEO657.
PREREQ: MATH201.

STAT 664  Statistics Internship  1-6 PF
Supervised on-the-job experience, performing statistical analysis of problems for clients.
REQUIREMENTS: 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.
REQUIREMENTS: 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
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.
REQUIREMENTS: Requires permission of instructor.

STAT 969  Doctoral Dissertation  1-12 PF

THEATRE

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.
REQUIREMENTS: 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.
REQUIREMENTS: 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.
REQUIREMENTS: 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 costume 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.

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. Explores 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/MEVALDE  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, costume, stage management, 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
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>THEA 490</td>
<td>Seminar in Theatre and Drama</td>
<td>3</td>
<td>Seminar in theatre and drama. Topics will be announced.</td>
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<td>RESTRICTIONS: Requires permission of instructor.</td>
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<tr>
<td>THEA 600</td>
<td>Distinctions of Professional Theatre Practice</td>
<td>1-3</td>
<td>Inquiry into the nature of the theatre as an art form; techniques and issues of communication,</td>
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<td>organization, management, leadership team participation and creativity necessary to the</td>
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<td>pursuit and accomplishment of fulfilling careers in institutional and commercial theatres.</td>
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<td></td>
<td>Studies the nature and purpose of the theatre as an art informs the day-to-day practices,</td>
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<td>values and behavior of the individual artist.</td>
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<td>RESTRICTIONS: Requires enrollment in the Professional Theatre Training Program. May be</td>
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<td>repeated up to 12 credit hours.</td>
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<tr>
<td>THEA 601</td>
<td>Dynamics</td>
<td>1</td>
<td>Vocal/physical warmup. Exercises designed to prepare student for the day's work.</td>
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<td>RESTRICTIONS: Requires enrollment in the Professional Theatre Training Program. May be</td>
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<td>repeated up to six credit hours.</td>
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<tr>
<td>THEA 602</td>
<td>Voice Development IA</td>
<td>1</td>
<td>Basic breath control and tone production to develop strength, control, flexibility and</td>
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<td></td>
<td></td>
<td>awareness.</td>
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<td></td>
<td>RESTRICTIONS: Requires enrollment in the Professional Theatre Program/Acting or Directing.</td>
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<tr>
<td>THEA 603</td>
<td>Voice Development IB</td>
<td>1</td>
<td>Continuation of THEA 602.</td>
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<td>PREREQ: THEA 602.</td>
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<tr>
<td>THEA 604</td>
<td>Voice Development IIA</td>
<td>1</td>
<td>Continuation of THEA 603, with an emphasis on range extension and the</td>
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<td>development of greater variety in expressiveness.</td>
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<td>PREREQ: THEA 603.</td>
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<tr>
<td>THEA 605</td>
<td>Voice Development IIB</td>
<td>1</td>
<td>Continuation of THEA 604.</td>
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<td>PREREQ: THEA 604.</td>
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<tr>
<td>THEA 606</td>
<td>Voice Development IIIA</td>
<td>1</td>
<td>Individual instruction to identify habitual vocal patterns and to strengthen</td>
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<td>individual weaknesses in voice.</td>
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<td>PREREQ: THEA 605.</td>
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<tr>
<td>THEA 607</td>
<td>Voice Development IIIIB</td>
<td>1</td>
<td>Continuation of THEA 606.</td>
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<td>PREREQ: THEA 606.</td>
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<tr>
<td>THEA 608</td>
<td>Stage Movement IA</td>
<td>1</td>
<td>Exercises and assignments to develop alignment, strength, flexibility, control,</td>
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<td></td>
<td>awareness, endurance, rhythmic sensitivity, balance and expressiveness.</td>
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<td>RESTRICTIONS: Requires enrollment in the Professional Theatre Training Program/Acting or</td>
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<td></td>
<td>Directing.</td>
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<tr>
<td>THEA 609</td>
<td>Stage Movement IB</td>
<td>1</td>
<td>Continuation of THEA 608.</td>
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<td>PREREQ: THEA 608.</td>
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<tr>
<td>THEA 610</td>
<td>Stage Movement IIA</td>
<td>1</td>
<td>Continuation of THEA 609, with an emphasis on stage combat, tumbling, circus and</td>
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<td></td>
<td></td>
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<td>other advanced movement techniques.</td>
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<td>PREREQ: THEA 609.</td>
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<tr>
<td>THEA 611</td>
<td>Stage Movement IIB</td>
<td>1</td>
<td>Continuation of THEA 610.</td>
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<td>PREREQ: THEA 610.</td>
</tr>
<tr>
<td>THEA 612</td>
<td>Stage Movement IIIA</td>
<td>1</td>
<td>Individual instruction to identify habitual movement patterns and to strengthen individual</td>
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<td></td>
<td>weaknesses in stage movement.</td>
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<td>PREREQ: THEA 611.</td>
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<tr>
<td>THEA 613</td>
<td>Stage Movement IIIIB</td>
<td>1</td>
<td>Continuation of THEA 612.</td>
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<td>PREREQ: THEA 612.</td>
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<tr>
<td>THEA 614</td>
<td>Stage Speech IA</td>
<td>2</td>
<td>Ear training and phonetics. Corrective work on regional speech habits.</td>
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<td>RESTRICTIONS: Requires enrollment in the Professional Theatre Training Program/Acting or</td>
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<td>Directing.</td>
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<tr>
<td>THEA 615</td>
<td>Stage Speech IB</td>
<td>2</td>
<td>Continuation of THEA 614. Beginning work on verse scansion.</td>
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<td>PREREQ: THEA 614.</td>
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<tr>
<td>THEA 616</td>
<td>Stage Speech IIA</td>
<td>1</td>
<td>Continuation of THEA 615 with an emphasis on phrase and verse scansion.</td>
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<td>PREREQ: THEA 615.</td>
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<tr>
<td>THEA 617</td>
<td>Stage Speech IIB</td>
<td>1</td>
<td>Continuation of THEA 616.</td>
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<td>PREREQ: THEA 616.</td>
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<tr>
<td>THEA 618</td>
<td>Stage Speech IIIA</td>
<td>1</td>
<td>Stage dialects and advanced work in phrasing and verse scansion. Individual tutoring in</td>
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<td>problem areas.</td>
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<td>PREREQ: THEA 617.</td>
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<tr>
<td>THEA 619</td>
<td>Stage Speech IIIIB</td>
<td>1</td>
<td>Continuation of THEA 618.</td>
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<td>PREREQ: THEA 618.</td>
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<tr>
<td>THEA 620</td>
<td>Rehearsal and Performance/Acting</td>
<td>1-6</td>
<td>Practical instruction and assignments in the preparation, rehearsal and</td>
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<td>performance of theatrical productions.</td>
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<td>RESTRICTIONS: Requires enrollment in the Professional Theatre Training Program/Acting. May be</td>
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<td>repeated up to 24 credit hours.</td>
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<td>THEA 633</td>
<td>Stage Management Organizational and Managerial</td>
<td>1-2</td>
<td>Development of organizational and communication techniques for the administration of stage</td>
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<td></td>
<td>Techniques IIB</td>
<td></td>
<td>managerial projects.</td>
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<td>RESTRICTIONS: Requires enrollment in the Professional Theatre Training Program/Stage</td>
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<td>Management.</td>
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<tr>
<td>THEA 634</td>
<td>Stage Management Organizational and Managerial</td>
<td>1-2</td>
<td>Further development of organizational and communication techniques for the</td>
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<td>Techniques IB</td>
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<td>administration of stage managerial projects.</td>
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<td>PREREQ: THEA 633.</td>
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<tr>
<td>THEA 635</td>
<td>Stage Management Organizational and Managerial</td>
<td>1-2</td>
<td>Development of organizational and communication techniques for the administration of stage</td>
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<td>Techniques IIIA</td>
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<td>managerial projects.</td>
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<td>PREREQ: THEA 634.</td>
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<tr>
<td>THEA 636</td>
<td>Stage Management Organizational and Managerial</td>
<td>1-2</td>
<td>Further development of organizational and communication techniques for the</td>
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<td>Techniques IIB</td>
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<td>administration of stage managerial projects.</td>
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<td>PREREQ: THEA 635.</td>
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<td>THEA 638</td>
<td>Stage Management Organizational and Managerial</td>
<td>1-2</td>
<td>Further development of organizational and communication techniques for the</td>
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<td>Techniques IIB</td>
<td></td>
<td>administration of stage managerial projects.</td>
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<td>PREREQ: THEA 637.</td>
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<td>THEA 639</td>
<td>Stage Management Production Skills IA</td>
<td>1-2</td>
<td>Development of stage managerial skills for organizing, preparing and fulfilling theatrical</td>
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<td>productions from inception through rehearsals and performance.</td>
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<td>RESTRICTIONS: Requires enrollment in the Professional Theatre Training Program/Stage</td>
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<td>Management.</td>
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<td>THEA 640</td>
<td>Stage Management Production Skills IB</td>
<td>1-2</td>
<td>Further development of stage managerial skills for organizing, preparing and fulfilling</td>
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<td>theatrical productions from inception through rehearsals and performance.</td>
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<td>PREREQ: THEA 639.</td>
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<tr>
<td>THEA 641</td>
<td>Stage Management Production Skills IIA</td>
<td>1-2</td>
<td>Development of stage managerial skills for organizing, preparing and fulfilling theatrical</td>
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<td>productions from inception through rehearsals and performance.</td>
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<td>PREREQ: THEA 640.</td>
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<td>THEA 642</td>
<td>Stage Management Production Skills IIB</td>
<td>1-2</td>
<td>Further development of stage managerial skills for organizing, preparing and fulfilling</td>
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<td>theatrical productions from inception through rehearsals and performance.</td>
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<td>PREREQ: THEA 641.</td>
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<td>THEA 644</td>
<td>Stage Management Production Skills IIIB</td>
<td>1-2</td>
<td>Further development of stage managerial skills for organizing, preparing and fulfilling</td>
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<td>theatrical productions from inception through rehearsals and performance.</td>
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<td>PREREQ: THEA 643.</td>
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<tr>
<td>THEA 645</td>
<td>Rehearsal and Performance/Stage Management</td>
<td>1-5</td>
<td>Practical instruction and assignments in the preparation, rehearsal and performance of</td>
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<td>theatrical productions.</td>
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<td>RESTRICTIONS: Requires enrollment in the Professional Theatre Training Program/Stage</td>
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<td>Management.</td>
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<td>May be repeated up to 24 credit hours.</td>
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</table>
THEA 648 Costume Construction 1
Introductory exploration of the mechanics and technology of the art of costuming. Surveys all aspects of the costumer's craft including practical work in the costume shop.
RESTRICTIONS: Requires enrollment in the Professional Theatre Training Program/Costume Construction.

THEA 664 Internship in Professional Theatre 1-9
Engagement with professional theatre in individual discipline area.
RESTRICTIONS: Requires enrollment in the Professional Theatre Training Program. May be repeated up to 18 credit hours.

THEA 665 Theatre Literacy 2
Discussion, research, and practicum in theatre terminology, literature and history.
RESTRICTIONS: Requires enrollment in the Professional Theatre Training Program. May be repeated up to 12 credit hours.

THEA 668 Research 1-6
THEA 674 Scenery Production 1
Materials, tools, hardware and construction methods used for scenery construction. Emphasis placed on traditional scenic construction with wood as the primary material.
RESTRICTIONS: Requires enrollment in the Professional Theatre Training Program/Technical Production.

THEA 675 Properties Production 1
Concentrates on property production techniques with emphasis on properties management, acquisition, and health and safety.
RESTRICTIONS: Requires enrollment in the Professional Theatre Training Program/Technical Production.

THEA 676 Scenery: Metalworking 1
Materials, tools and methods of working with metal for scenery construction.
PREREQ: THEA674.

THEA 677 Properties Production II 1
Tools, materials and methods for upholstery and drapery, casting, mold-makin, and other properties techniques.
PREREQ: THEA675.

THEA 679 Scenery: Stage Rigging 1
Tools, hardware and methods of rigging scenery. Emphasis on standard theatre rigging systems.
PREREQ: THEA674.

THEA 680 Lighting Production 1
Electrical theory and practice as applied to theatre production. Emphasis on current lighting production practice, systems and equipment.
RESTRICTIONS: Requires enrollment in the Professional Theatre Training Program/Technical Production.

THEA 681 Audio Production 1
Sound theory and practice as applied to contemporary theatre production. Emphasis placed on utilizing current systems, equipment and technology for audio production.
RESTRICTIONS: Requires enrollment in Professional Theatre Training Program/Technical Production.

THEA 682 Lighting Design 1
Essential skills and procedures for creating, documenting and realizing a lighting design for a theatrical production.
PREREQ: THEA680.

THEA 683 Production Project Management 1
Examines how project management techniques are applied to technical production. Techniques for project analysis, priority setting, scheduling, resource allocation and project tracking will be examined.
RESTRICTIONS: Requires enrollment in the Professional Theatre Training Program/Technical Production.

THEA 684 Technical Production Seminar 1
Investigation and discussion of technical problems and issues encountered in productions.
RESTRICTIONS: Requires enrollment in the Professional Theatre Training Program/Technical Production. May be repeated up to six credit hours.

THEA 686 Information Technologies for Theatre 1
Application of computer software to theatrical production practice. Emphasis is placed on CAD (drafting) techniques for theatre production.
RESTRICTIONS: Requires enrollment in the Professional Theatre Training Program/Technical Production.

THEA 687 Scenery Painting 1
Painting tools, materials, color theory and scenery painting techniques for theatrical production.
RESTRICTIONS: Requires enrollment in Professional Theatre Training Program/Technical Production.

THEA 688 Computer Aided Drafting and Scenery Construction 1
Continued work on CAD (drafting) with emphasis on construction work drawings for scenery construction. Further study of standard and specialized scenery construction methods.
PREREQ: THEA686.

THEA 692 Production and Performance/Technical 1-6
Practical instruction and assignments in the technical preparation and production of Professional Theatre Training Program public performances. Assignments include (but are not limited to): Master Carpenter, Master Electrician, Property Master, Audio Engineer, Scenic Artist and Technical Director.
RESTRICTIONS: Requires enrollment in the Professional Theatre Training Program/Technical Production. May be repeated up to 20 credit hours.

THEA 693 Production Seminar 1
Development of management and communication techniques for effective interaction among stage management, costume production and technical production areas of theatre.
RESTRICTIONS: Requires enrollment in the Professional Theatre Training Program. May be repeated up to six credit hours.

THEA 694 Special Topics in Theatre Production 1-3
Multiple units on advanced topics in theatre production and management. Students select topics from a list offered by PTTP production faculty.
RESTRICTIONS: Requires enrollment in the Professional Theatre Training Program. May be repeated up to nine credit hours.

UAPP 601 Measuring and Defining Planning Problems 1
Methods for identifying and measuring planning-related problems, including analyses of land use patterns, population dynamics, economic trends, social indicators, and ecological characteristics as predictors and determinants of future development.

UAPP 602 Introduction to Comprehensive Planning 1
Overview of 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.

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.

UAPP 604 Leadership in Organizations 3
Understanding process of change and positively affecting change in organizations through exercise of leadership skills and knowledge.

UAPP 605 Topics in Urban Affairs 3
Focuses on selected topics in urban affairs such as urban politics and government, urban education and neighborhood analysis.
RESTRICTIONS: May be repeated up to nine credits when topics vary.

UAPP 606 Local Economic Development: Policy and Practice 3
Examines theory and contemporary practice for promoting economic development of local communities. Reviews alternative ways of understanding dynamics of local economic development and devising strategies that benefit community residents.

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.

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.
UAPP 609  Financial Statement Analysis for Nonprofits 1
Geared toward graduate students with little or no background in accounting or reading financial statements. Gives basic understanding of financial statement analysis. Covers basic accounting concepts with emphasis on understanding financial statements of nonprofit organizations.

UAPP 610  Urban Land Use Planning and Administration 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.

UAPP 611  Regional Watershed Management 3
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.

UAPP 612  Urban Housing Policy and Administration 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.

UAPP 613  Planning Theory and Urban Policy 3
Provides overview of development and current conceptual normative and methodological issues in planning theory as applied to urban regions.

UAPP 614  The American Suburb 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.

UAPP 615  Urban, Regional and Environmental Planning 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 use policies, regional policies and urban policy. May be cross-listed with GEOG615.

UAPP 616  Volunteer Management 1
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.

UAPP 617  Contemporary Issues in Environmental and Energy Policy 1
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.

UAPP 618  Human Service Systems: Policy, Practices, Administration 3
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.

UAPP 619  Contemporary Issues in Urban Affairs and Public Policy 2
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.

UAPP 620  Criminal Justice Administration 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.

UAPP 621  Conflict Resolution 1
Introduction to conflict resolution skills. Provides communication and problem solving skills designed to de-escalate conflicts and create win-win solutions. Students learn new ways of approaching conflict while gaining understanding of their own conflict management style. Examines how these skills transfer to workplace.

UAPP 622  Resources, Development and the Environment 3
See GEOG622 for course description.

UAPP 623  Independent Study in Geographical Information Systems 1
Students complete self-paced individualized tutorials and apply knowledge in project of their choice. Material addressed includes creation and display of digital maps and data bases, preparation of data sets, sources of data and GIS standards.

UAPP 624  Seminar in Criminal Justice 3
Discussion and evaluation of institutional components of criminal justice systems. Topics include police, judicial and correctional systems.

UAPP 625  Energy Policy and Administration 3
See POSC624 for course description.

UAPP 626  Conservation and Renewable Energy Policy 3
Covers current policy issues for energy conservation, energy efficiency, and renewable energy sources. Some prior background in energy policy assumed. Topics include environmental impacts, utility programs, and international comparisons. May be cross-listed with MAST622 and/or POSC626.

PREREQ: POSC624.

UAPP 627  Comparative Environmental Politics 3
Examines the effect of institutional and systemic factors in the formulation and implementation of environmental policy in several developed and developing countries. Considers the impact of modes of political participation, level of development, and type of political economy on policy. May be cross-listed with POSC628.

UAPP 628  Issues in Land Use and Environmental Planning 3
See GEOG628 for course description.

UAPP 629  Theory and Practice of Historical Preservation Planning 3
Examines 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 630  Methods in Historic Preservation 4
Upper-level field research seminar concentrating on developing graphic, photographic and narrative skills for architectural documentation and professional skills related to historic preservation. Involves classroom and field sessions.

UAPP 631  Documentation of Historic Structures 1
Focuses on learning to create scaled, annotated field notes of historic resources in preparation for making measured drawings of 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 632  Making the American City 3
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, FHBB and HALMC.
UAPP 625 THE EVOLUTION OF THE AMERICAN URBAN LANDSCAPE
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 landscapes. Includes field trips to cities in region. May be crosslisted with GEOG635 and/or HIST635.

UAPP 636 RESEARCH TOPICS IN HISTORIC PRESERVATION
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 crosslisted with ARTH622, GEOG636 and/or HIST636.

UAPP 637 ORGANIZING FOR SOCIAL JUSTICE
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 638 WORLD CITIES IN COMPARATIVE PERSPECTIVE
See GEOG638 for course description.

UAPP 639 COMMUNITY DEVELOPMENT THEORY, CONCEPTS AND PRACTICE
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 640 INTERNATIONAL AND DEVELOPMENT ADMINISTRATION
See POSC640 for course description.

UAPP 641 TOPICS IN NONPROFIT MANAGEMENT AND LEADERSHIP
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 642 STRATEGIC PLANNING FOR PUBLIC AND NONPROFIT ORGANIZATIONS
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 643 HISTORIC ROADSIDE ARCHITECTURE
Examines various historic hospitality and retail venues with emphasis on their 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 landscapes. Includes field trips to cities in region.

UAPP 644 GRANTSHIPS AND PROPOSAL WRITING
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 ideas into feasible proposal capable of effectively attracting grant support.

UAPP 645 CIVIL ENGAGEMENT
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 646 ADMINISTRATIVE LAW
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 crosslisted with LEST646.

UAPP 648 ENVIRONMENTAL ETHICS
See PHIL648 for course description.

UAPP 649 CIVIL RIGHTS LAW AND POLICY
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 crosslisted with BAM649 and/or LEST649.

UAPP 650 VALUES AND ETHICS OF LEADERSHIP
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 651 MANAGING RISK AND SECURITY
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 652 GEOGRAPHIC INFORMATION SYSTEMS IN PUBLIC POLICY
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 653 POLITICS AND HEALTHCARE
See POSC653 for course description.

UAPP 654 VERNACULAR ARCHITECTURE
See HIST654 for course description.

UAPP 655 GEOGRAPHIC INFORMATION SYSTEMS IN THE PUBLIC AND NONPROFIT SECTORS
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 656 POLITICS AND DISASTER
See POSC656 for course description.

UAPP 657 HEALTH POLICY
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 658 CONTEMPORARY ISSUES IN PUBLIC ADMINISTRATION
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 659 TOPICS IN PUBLIC ADMINISTRATION
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 crosslisted with POSC659.

UAPP 660 SEMINAR IN URBAN MANAGEMENT
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 661 CIVIL RIGHTS LAW AND POLICY
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 crosslisted with BAM649 and/or LEST649.

UAPP 662 MUNICIPAL MANAGEMENT
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 663 DECISION TOOLS FOR POLICY ANALYSIS
See MAST663 for course description.

UAPP 664 CASE STUDIES IN STATE AND LOCAL MANAGEMENT
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
UAPP 670 FUND DEVELOPMENT: FUNDRAISING FROM INDIVIDUALS
Introduction to principles of fund development, guide to organizing for fund development, and overview of fundamentals of annual, major and planned fundraising from individuals.
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.

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.

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.

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.

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

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.

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, range 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.

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: UAPP934 or microeconomics.

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.

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-suburban shifts, and neighborhoods. Various kinds of regional policies analyzed. May be cross-listed with POSC683.
PREREQ: UAPP934 or microeconomics.

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; further's 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.

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: UAPP937.
RESTRICTIONS: Based on prior coursework and professional experience, prerequisite may be waived with instructor approval.

UAPP 686  STATE AND LOCAL GOVERNMENT: CONCEPTS AND ISSUES 3
Explores 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. Assess their contemporary role in federal system. May be cross-listed with POSC686.

UAPP 687  STATE GOVERNMENT POLICY AND MANAGEMENT 3
Focuses on roles and functions of United States state government. Topics include legislative policy making and operations, executive branch organization and functions, structure and role of state courts, and role of governor and states in intergovernmental policy-making. State government in Mid-Atlantic region receives special attention. May be cross-listed with POSC687.

UAPP 688  TOPICS IN STATE AND LOCAL MANAGEMENT 3
Focuses on selected topics in state and local management and policymaking. May include in-depth exploration of management processes/instruments (e.g., budgeting) and/or contemporary policy issues (e.g., educational reform, environmental crises) within state and local government with which public managers must contend. May be cross-listed with POSC688.

UAPP 692  ENVIRONMENTAL VALUES, MOVEMENTS AND POLICY 3
See MAST692 for course description.

UAPP 800  RESEARCH METHODS AND DATA ANALYSIS 4
Emphasizes program design evaluation, process evaluation, experimental and quasi-experimental design, and clinical trials.

UAPP 803  SEMINAR: PUBLIC ADMINISTRATION 3
Reading and discussion of theories and problems of public administration, including organization, coordination, field administration, contracts, personnel, policy making, participation, adjudication, budgeting and administrative behavior. May be cross-listed with POSC803.

UAPP 804  PROGRAM EVALUATION FOR HEALTH AND SOCIAL SERVICES 3
Introduces quantitative and qualitative methods for evaluating health and social service programs. Emphasizes program design evaluation, process evaluation, experimental and quasi-experimental design, and clinical trials.

UAPP 806  SURVEY RESEARCH 3
Methods and procedures for design, administration and analysis of sample surveys.

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.

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.

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.

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.
Demonstrates student's ability to analyze particular policy or administrative work plan, and a professional performance evaluation by site supervisor. Reflective paper. Requires prior approval of SUAPP Internship Coordinator, completion achieved for successful course completion. Requirement of doctoral program. A "defensible dissertation proposal" must be achieved for successful course completion.

RESTRICTIONS: Ph.D. students only.

RESTRICTIONS: Not open to freshmen. Requires permission of instructor.

RESTRICTIONS: Requires permission of instructor. May not substitute for major courses required in department curriculum.

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

RESTRICTIONS: Requires permission of instructor. May not substitute for major courses required in department curriculum.

RESTRICTIONS: Must be resident assistant.

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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 test materials. Strategies include identifying the underlying discourse structure of the field, summarizing, comprehension monitoring and transforming notes into test formats. Students practice on their own course materials.

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.

PREREQ: UNIV301.

PREREQ: UNIV301.

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 PF 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 PF 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 a resident assistant.

UNIV 322 CONTEMPORARY ISSUES FOR RESIDENT ASSISTANTS III 1 PF 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 a resident assistant.

UNIV 330 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.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>UNIV 363</td>
<td>Experiential Learning Sustaining</td>
<td>0 PF</td>
<td>Experiential learning under the supervision of a faculty mentor. Requisitions: Limited to students appointed as Experiential Learning Scholars within the Discovery Learning Experience. Must have approval of the Associate Director of Undergraduate Studies.</td>
</tr>
<tr>
<td>UNIV 364</td>
<td>Experiential Internship</td>
<td>3</td>
<td>Internship experience of fifty hours combined with a seminar emphasizing career development, reflection, and personal learning skills. Internship must be arranged and Learning Contract signed prior to first class meeting. Open to major and non-major related internships, paid or volunteer. Requisitions: May not substitute for major courses required in department curriculum.</td>
</tr>
<tr>
<td>UNIV 368</td>
<td>Undergraduate Research</td>
<td>0-6</td>
<td>Undergraduate research conducted on or off campus, out of class, and under the supervision of a faculty member. Requisitions: Requires permission of instructor. May not fulfill course requirements in a major curriculum except by departmental permission.</td>
</tr>
<tr>
<td>UNIV 369</td>
<td>Undergraduate Research Sustaining</td>
<td>0 PF</td>
<td>Research apprenticeship with faculty mentor. Requisitions: Limited to those appointed as Undergraduate Research Scholars in the Undergraduate Research Program. Must have approval of the Coordinator of Undergraduate Research.</td>
</tr>
<tr>
<td>UNIV 401</td>
<td>Senior Thesis</td>
<td>2-4</td>
<td>Senior thesis for students working toward a degree with distinction. Requisitions: Total credits for UNIV401 and UNIV402 not to exceed six.</td>
</tr>
<tr>
<td>UAPP 402</td>
<td>Senior Thesis</td>
<td>2-4</td>
<td>Continuation of UNIV401. Requisitions: Total credits for UNIV401 and UNIV402 not to exceed six.</td>
</tr>
<tr>
<td>UNIV 440</td>
<td>Peer Tutor Practicum III</td>
<td>0-1</td>
<td>Continuation of UNIV340. Requisitions: Requires permission of instructor.</td>
</tr>
<tr>
<td>UNIV 460</td>
<td>Experiential Teaching</td>
<td>0-3 PF</td>
<td>Teaching experience as group tutor, peer facilitator/instructor, workshop guide, or undergraduate teaching assistant. Leadership skills developed and applied in laboratory, problem-based learning (PBL), or peer-led team learning mode of instruction in an undergraduate course. Evaluation based on preparation and engagement in teaching and leadership process. Requisitions: Requires permission of instructor. May not substitute for major courses required in department curriculum.</td>
</tr>
<tr>
<td>UNIV 462</td>
<td>Experiential Learning</td>
<td>0-6</td>
<td>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. Requisitions: Requires permission of instructor. May not substitute for major courses required in department curriculum.</td>
</tr>
<tr>
<td>UNIV 468</td>
<td>Undergraduate Research</td>
<td>0-6</td>
<td>Undergraduate research conducted on or off campus, out of class, and under the supervision of a faculty member. Requisitions: Requires permission of instructor. May not fulfill course requirements in a major curriculum except by departmental permission.</td>
</tr>
<tr>
<td>UNIV 490</td>
<td>Honors Tutorial: Humanities</td>
<td>3</td>
<td>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. Requisitions: Requires 3.4 GPA, junior standing or above, and permission of the Honors Program.</td>
</tr>
<tr>
<td>UNIV 491</td>
<td>Honors Tutorial: Natural/Social Science</td>
<td>3</td>
<td>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. Requisitions: Requires 3.4 GPA, junior standing or above and permission of the Honors Program.</td>
</tr>
<tr>
<td>UNIV 495</td>
<td>Honors Seminar</td>
<td>3</td>
<td>Topics vary; usually interdisciplinary. Requisitions: 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.</td>
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<tr>
<td>UNIV 500</td>
<td>Leave of Absence</td>
<td>0 NR</td>
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</tbody>
</table>
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 MSTS215 for course description.

WOMS 216 INTRODUCTION TO FEMINIST THEORY 3
See PHIL216 for course description.

WOMS 222 LANGUAGE AND GENDER 3
See LNG222 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 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 ANTH316 for course description.

WOMS 318 STUDIES IN FILM 3
See ENGL318 for course description. 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.
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